

SECTOR REPORTS

NEPAL EARTHQUAKE POST DISASTER NEEDS ASSESSMENT

INTRODUCTION

The Post Disaster Needs Assessment (PDNA) assesses the impact of the April 25, 2015 earthquake in Nepal and defines a recovery strategy. This volume provides detailed description of sector specific damage, losses and recovery needs.

Each sector chapter includes the following sections:

- a) Summary;
- b) Pre-disaster baseline and analysis of context that existed prior to the disaster;
- c) Post-disaster context including sector preparedness and response;
- d) Assessment of the damage and loss including costs;
- e) Assessment of disaster effects and impact;
- f) Recovery needs and strategy including costs;
- g) Implementation arrangements; and
- h) Assessment methodology.

In the analysis, damage is defined as the cost to replace durable physical assets (buildings, equipment, facilities and machinery) that were damaged or destroyed. Loss refers to changes in financial flows due to the temporary absence of infrastructure, increased or new demands (operational costs) due to the disaster, lost revenues, higher expenditures and the cost of maintaining service provision. In addition to reconstruction costs, recovery needs are identified to build back better and are costed accordingly. Each sector has also examined issues of vulnerability and marginalisation, and the need for specific targeting in the implementation of the recovery strategy.

The report covers the following sectors:

A. Social

1. Housing and Human Settlements
2. Health and Population
3. Nutrition
4. Education
5. Cultural Heritage

B. Productive

6. Agriculture
7. Irrigation
8. Commerce and Industries
9. Tourism
10. Financial Sector

C. Infrastructure

11. Electricity
12. Communications
13. Community Infrastructure
14. Transport
15. Water, Sanitation and Hygiene

D. Cross-Cutting

16. Governance
17. Disaster Risk Reduction
18. Environment and Forestry

19. Employment and Livelihoods
20. Social Protection
21. Gender Equality and Social Inclusion

Section A: Social Sectors

HOUSING AND HUMAN SETTLEMENTS

Summary

The earthquake has impacted the housing and human settlements sector the most. The total effect (damage and loss) on this sector is valued at NPRs 350,379 million, with total damage valued at NPRs 303,631 million and total loss at NPRs 46,748 million. The damage accounts for physical housing damage and damage to household goods, the loss for demolition and debris clearance, transitional shelters and rental loss. The damage and loss for the real estate sector have also been included. This sectoral assessment targeted 31 districts identified as affected districts by the Government of Nepal (GoN). The baseline was provided by the 2011 census, and the housing damage information was provided by the DRR Portal (<http://drrportal.gov.np/>)¹ which summarize the information collected by Ministry of Home Affairs, Government of Nepal.

The damage data was categorized as “Fully Damaged” and “Partially Damaged”. However, due to the lack of uniform criteria for partial damage, the damage value was calculated based on a certain logic (described in Annex-1) assuming a certain level of uncertainty.

Based on the damage and loss, recovery and reconstruction needs were calculated as NPRs 327,762 million, including i) transitional sheltering, ii) permanent housing reconstruction with structural resilience, iii) demolition and debris clearance, iv) Repairs and retrofitting, v) clustering of dwellings to safe locations, vi) Training and facilitation and vii) Urban Planning including heritage settlement planning. Housing and settlements have been reviewed with a comprehensive view to ensure disaster resilience of the whole community, taking into consideration vulnerability due to location. The data for relocation of settlements in all affected districts was not verified at the time of preparation of the PDNA. Relocation cases require careful and detailed analysis of landslide risks and socio-economic impacts along with close consultation with impacted communities.

Estimated damage and losses are presented in Table 1. The figures consider physical damage and loss of housing. Similarly, total reconstruction and recovery needs are presented in Table 2.

Table 1: Total Damage and Loss

Details			Number of Houses	Damage and Loss (NPR million)	
Damage	Collapsed houses	Low Strength Masonry	474,025	199,091	258,442
		Cement based Masonry	18,214	19,671	
		RC Frame	6,613	39,680	
	Damaged houses	Low Strength Masonry	173,867	7,302	24,597
		Cement based Masonry	65,859	7,113	

¹ The damage data on private housing was captured as of May 28, 2015.

	RC Frame	16,971	10,182	
	HH goods			16,382
	Real estate sector			4,210
	Total Damage			303,631
Loss	Demolition and debris clearance			9,781
	Transitional shelters			14,968
	Rental Loss			1,999
	Real estate			20,000
	Total Loss			46,748
Total Effect (Damage and Loss)				350,379

Recovery of housing sector is proposed to be based on principles of equity, inclusion and participation of communities through an owner driven reconstruction approach while ensuring ‘build back better’ considerations. However, taking into account that only 19.7% of women own land and houses, recovery efforts will take account of the needs of female headed houses, senior citizens and other vulnerable social groups who may not have land ownership. The affected families will be supported to reconstruct, repair and retrofit their houses depending on the extent of damage with financial support, technical guidance, social mobilization and skill up gradation. Financial support in tranches will be based on compliance to disaster resistant construction guidelines. For difficult/remote areas, heritage settlements and urban areas, special assistance package may be defined to top up the basic recovery package. The handholding support to owners will require a well defined human resource setup of master artisans, junior and senior engineers, community organizers coordinated at VDC and district level guided by the Technical Committee. Financial assistance to the house-owners will be provided in tranches to confirm compliance to relevant standards. It will help regenerate the local economy. It also envisions that clustering of communities should be exercised in special conditions only. The house-owners will have opportunity to construct building typology of their choice and size by adding resources from their own savings or labour. Taking settlement planning view, reconstruction can also present an opportunity to upgrade living conditions.

Table 2: Total Recovery Needs

Details		Unit rates (NPRs/house)	Number of Houses	Amount (NPRs millions)
Demolition	Low-strength	21,000	94,805	3,972
	Cement based	54,000	7,285	
	RC frame	300,000	5,291	
Debris clearance	Low-strength	8,000	474,025	5,810
	Cement based	20,000	18,214	
	RC frame	250,000	6,613	
Cost of Equipment for demolition and debris removal				160
Temporary shelter		24,540	609,938	14,968
New House Reconstruction (450 sq.ft/ unit)		405,000	609,938	247,025
Repairs and Retrofitting		160,000	256,697	31,189
Clustering of houses			22,254	10,525
Subtotal				313,649

Training, facilitation and quality assurance costs	2.5%		7,841
Urban Planning (including heritage settlement planning)	2%		6,273
Total			327,762

It may be noted that number of houses to be reconstructed has been calculated on the basis of number of households made homeless. Considering the average number of households per house for each district, the total requirement was calculated as 609,938 houses to be constructed. This number may change after much needed house-to-house damage assessment.

Pre-Disaster Context and Baseline

2.1 Policies on Housing and Settlements

Several Constitutional Acts and policies are particularly relevant for housing and settlements sector. The 2007 Interim Constitution of Nepal stresses the responsibility of the state to provide land especially to the economically weak and/or landless people. The 2012 National Shelter Policy further stresses the right to safe and adequate housing to all.

The 2007 National Urban Policy aims for (i) settlement and economic activities in stressing balanced national urban structure, (ii) development of safe and prosperous settlement areas by increasing the resilience against environmental shocks and stresses, and (iii) effective urban management through capacity development of local bodies.

The 2012 National Land-use Policy has classified different categories of land, with a focus on optimal utilization and enforcement of land use control. It encourages relocation of settlements from hazard-prone areas and settlement development in safer locations that are hazard free. However, its implementation is being strengthened with a three-tier participatory land use planning exercise with UN-Habitat support. The existing land administration in Nepal is parcel based. The land registration system was introduced in 1965 and is based on cadastral maps with a unique real estate identifier (parcel number).

The 1999 Local Self Governance Act (LSGA) is the legal framework for citizen engagement in the decision making and resource mobilization based on the principle of subsidiary. The LSGA has mandated Local Bodies (Village Development Committee (VDC), District Development Committee (DDC) and Municipality) mainly for development planning and budgeting, building local infrastructure, providing basic services, maintaining the records and protecting public land, maintaining vital registration, and mobilizing and coordinating local development partners. The Local Bodies are also responsible for implementing land use policy, enforcing and monitoring the building code and ensuring the construction of disaster resilient infrastructure at local level.

The 1999 Building Act promotes safer building practice in the country with four types of buildings: i) International state of the art, ii) professionally engineered buildings; iii) mandatory rule of thumbs and iv) rural buildings. Nepal National Building Code has been developed along these lines. Department of Urban Development and Building Construction (DUDBC) is recognised as the central institution for implementation of the building code and monitoring of local bodies.

The 1997 Apartment Act promotes apartment living to solve housing demand. DUDBC is recognized as implementer and monitoring authority for apartments in the country.

The 1999 Nepal Engineers Act is the basis for a registration system for engineers through Nepal Engineers' Council (NEC). To bring a positive change in the current engineering practice, a system of competency based registration with periodic renewal is required. The current Engineers' Act does not include liability provision.

The National Plan of Action for Safer Building Construction is a comprehensive action plan which is currently in draft stage.

The 2013 Environment Friendly Local Governance (EFLG) Framework aims to promote voluntary compliance in the environmental management sector at local level. It comprises of the process, mechanism and motivation for achieving and recognizing a set of well-developed indicators for municipalities, VDCs and DDCs.

2.2 Land tenure related issues

Different tenure systems (i.e. statutory, customary, religious and informal, urban vs. rural) co-exist in Nepal. Almost all cultivable land, 27% of the total land mass consisting of about 30 million parcels are registered with formal tenure. Land title registration is based on large scale cadastral maps. There are three official land tenure systems in Nepal.

State land: This includes Government land that is owned by government offices, forest, national highways and other government agencies, and Public land owned by local bodies such as rural marketplaces, cemeteries, temples, playgrounds, etc.

Private land: Ownership certificate or title ensures formal rights to all owner-registered land.

Guthi land: Owned by trusts and community groups, used for religious, cultural and social events. In heritage settlements, this tenure system may be significant.

In addition to these, additional tenure types include i) unidentified religious and traditional tenure types which are not recorded in the land register; ii) informal tenure in the form of informal and squatter settlements, including riverside and highway-side slums and those established on the periphery of urban areas; and iii) dual ownership with tenancy where the tenant does not have absolute right and ownership over the land.

The residential and agricultural land of almost all earthquake affected areas is mapped and registered with formal title. Some land parcels in newly settled areas on the periphery of the villages may be unmapped or unregistered and lack formal title.

2.3 Urban Growth and Current Planning Initiatives

2.3.1. Urban Settlements and Population Influx

Like many other South Asian countries, Nepal has experienced increased urbanization in recent decades. Nepal is predominantly rural, with an urbanization level of about 38%. The decadal urban growth rate between 2001 and 2011 was 6.4%. However, Kathmandu with 61% decadal growth has witnessed a disproportionate influx from rural areas. The disaster risk to cities is of particular concern, as they are concentrations of people and serve as engines for economic growth. The 2015 earthquake has affected a total of 41 municipalities and many market areas.

2.3.2. Urban Planning and Development: A Case of Kathmandu Valley (KV)

The case of Kathmandu city is important to understand urban risk scenario as it impacts a large population. Land use change modelling and analysis has shown that the urban morphology of Kathmandu valley has changed drastically in the past two decades, with a 211% increase in built up area between 1992 and 2012. This has occurred through an equivalent loss of cultivated land and significant encroachment of open spaces. The loss of open spaces coupled with significantly increasing density has increased the urban risk of Kathmandu Valley.

The Kathmandu Valley Development Authority (KVDA) is in the process of implementing a 20 year Strategic Development Master Plan (SDMP 2015-2035 draft). Infrastructure improvements, environmental improvements, urban regeneration and land use planning are the four major areas of focus of this plan. The land use planning in particular is focussed on risk sensitive land use planning (RSLUP).

2.3.3 National Urban Development Strategy

The National Urban Development Strategy (which is in approval phase) seeks to promote resilience in urban development including climate change adaptation, development in safer locations, the review and enforcement of building codes, regulations, guidelines and planning bye-laws, and capacity building of the government institutions and local bodies. Some immediate proposed programs for fostering resilience in urban development include:

- Preparation of risk sensitive land use plans (RSLUP)
- Completion of the Kathmandu urban transport master plan (KUTMP)
- Revising building bye-laws
- Establishment of a hierarchy of road network
- Modification in land readjustment regulations
- Regeneration of 'agro-politan' traditional settlements
- Development, conservation and management of multipurpose open spaces
- Institutional and capacity building of KVDA for planning as well as implementation.

2.4 House Construction Process and Building Typologies

Large majority of houses in Nepal are non-engineered and constructed by owners themselves through non-formal sector. In rural and semi-rural areas local artisans provide all necessary technical and management support for construction where the house owner family works as support to him. The key construction materials are collected by the house owner and their family over the years. Hence, the whole construction process requires minimal cash flow. The house grows incrementally over a period of time. There is no building permit system or compliance mechanism in rural areas. However, the procurement mechanism changes in the urban areas where role of the house owners reduced to managing construction materials and labour as these have to be purchased, and whole construction

process requires much larger cash flow. Construction in the urban areas involves petty contractors and sometimes, engineers and architects. Municipal areas have mandated building permit and compliance systems.

Based on the predominant building types in the affected area, housing can be categorized into four main types based on their vertical and lateral load bearing systems, in line with the National Census. These are discussed below:

- 1) **Low-strength masonry buildings:** These buildings are constructed with locally available or produced masonry (stone, brick, and sun-dried brick) bonded with mud mortar. They are typically two storeys excluding the attic. Floors are of timber or bamboo overlaid with mud. Roofs are mostly of timber or bamboo covered with tiles, slate, shingles or CGI sheets. Walls tend to be very thick, depending upon the type of walling units. The seismic capacity of these buildings is very low, limited by the integrity of structural components and strength of walls and lack of elements tying the structure together (ring beams at wall or roof level). Vertical and horizontal wooden elements are sometimes embedded in walls, providing some level of earthquake resistance, but this is very uncommon.
- 2) **Cement-mortared masonry buildings:** These buildings have walls of fired brick, concrete block or stone in cement-sand mortar. They are typically up to three storeys. Floors and roofs are of reinforced concrete or reinforced brick concrete. Despite using high quality materials, these buildings suffer from deficient construction practices. Provision of earthquake resistant features is not common in these buildings.
- 3) **Reinforced concrete frame with infill:** These buildings consist of cast-in-situ concrete frames with masonry partition and infill walls (brick, block or stone masonry). Infill walls are not tied to the frame. Floors and roofs consist of reinforced concrete slabs. They are typically up to four storeys, however much taller buildings up to 20 storeys have been observed. Despite using high quality materials, the vast majority of these buildings suffer from deficient construction practices. While seismic detailing has become more common in recent years, older buildings have no ductile detailing.
- 4) **Wood and bamboo buildings:** These buildings are constructed of timber or bamboo with wooden plank, thatch or bamboo strip walling materials with flexible floor and roof. These suffered less damage from the earthquake due to their light weight.

Table 3: Existing building typology in the affected 31 districts (Ref CBS 2011)

Low strength Masonry	Cement based masonry	Reinforced Concrete Frame	Wood and Bamboo based
58%	21%	15%	6%

Post-Disaster Context

3.1. Building damage analysis

A large-scale impact survey was conducted by the Ministry of Home Affairs (MoHA) during the month following the earthquake. Results show that a total of 498,852 houses have fully collapsed or are damaged

beyond repair, and 256,697 have been partly damaged. This data does not categorize the damage by building type or urban / rural context. This assessment was conducted rapidly and is not a technical assessment. Past earthquake experiences elsewhere have shown that the balance of destroyed to partially damaged buildings is rarely this high, though the particular nature of this earthquake may explain this. For operationalizing the recovery strategy, a more rigorous technical house-to-house assessment will be necessary.

The catastrophic impact of the earthquake on the built environment of Nepal is primarily the result of the significant seismic vulnerability of unreinforced masonry buildings predominant throughout the country. There is a general lack of awareness of seismic risk in communities, coupled with lack of dissemination of improved construction practices (particularly rural areas), and a slow mechanism for enforcement of relevant building codes.

Most of the areas where buildings suffered damage were not subject to enforcement of the Building Code and Standards. Even in municipal areas where compliance to the Building Code is required for new buildings, the building code implementation mechanism is weak. Most of the buildings that suffered damage were old buildings constructed of weaker materials (i.e. stone, adobe, mud), buildings constructed with deficient construction practices and non-engineered buildings. It is important to note that even when efforts were made to improve the building stock, these were mostly concentrated in urban areas and there was weak dissemination of knowledge in the rural areas where most of the houses are constructed of traditional materials which are essentially weak in nature.

In addition to the above mentioned building practices, there is a strong culture of extending the house and buildings both vertically and horizontally depending upon availability of finance and family growth, with no consideration given to the structural strength of the original building. This issue is particularly relevant for vertical extensions. It is important to understand the problem has been further exacerbated by a lack of maintenance of old buildings.

3.2. Types of Building Damages

Damaged buildings have been categorized into 3 different types considering the ratio from census data and the ratio of possible collapse and partial damage derived from fragility functions for different earthquake shaking intensities.

Table 4: Building Typologies and Damage

Typology of Buildings	Fully Collapsed or Beyond Repairs	Partially Damaged (can be repaired/ retrofitted)
Low strength masonry	474,025 (95%)	173,867 (67.7%)
Cement based masonry	18,214 (3.7%)	65,859 (25.6%)
Reinforced concrete frame	6,613 (1.7%)	16,971 (6.7%)
Total	498,852	256,697

Based on the field observation, the main types of the damages were identified as follows:

Main Types of Damage in Masonry Buildings: Lack of integrity between different structural members and inherent weak properties of the materials was the main cause of failures in the masonry buildings. The main types of damages are listed as follows:

- Parapet and gable wall toppling
- Delamination of low strength masonry walls
- Out of plane toppling of walls
- Corner separation of walls
- Various types of wall failures under in-plane loading such as diagonal cracks, sliding cracks, crushing of piers, failure of spandrels
- Collapse of floor and roof due to loss of vertical load bearing elements such as walls

Main Types of Damage in RC Building: Damage to RC buildings is also predominantly because of lack of strength and ductility. The main causes of failures are as follows:

- Toppling of parapets, infill walls and partition walls
- Damage to Infill-Walls: Diagonal, sliding cracks, crushing of piers in infill walls
- Soft storey failure (collapse of building due to concentration of damage in a particular storey)
- Failure of beam-column joint
- Short column problem
- Shear/flexure cracks in column and beam members
- Poor workmanship

Summary Table of Estimates of Damage and Loss

Table 5: Damage and Loss

Details			Number of Houses	Damage and Loss (NPRs in millions)		
Damage	Collapsed houses	Low Strength Masonry	474,025	199,091	258,442	
		Cement based Masonry	18,214	19,671		
		RC Frame	6,613	39,680		
	Damaged houses	Low Strength Masonry	173,867	7,302	24,597	
		Cement based Masonry	65,859	7,113		
		RC Frame	16,971	10,182		
	HH goods				16,382	
	Real estate sector				4,210	
	Total Damage				303,631	
Loss	Demolition and debris clearance			9,781		
	Transitional shelters			14,968		
	Rental Loss			1,999		
	Real estate			20,000		
Total Loss				46,748		

Total Effect (Damage and Loss)	350,379
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Recovery Needs and strategy

The following guiding principles should form the basis of strategy and planning of post disaster recovery:

1. Participation of the community by empowering them to take control of reconstruction of their own houses and ensuring facilitation of owner-driven reconstruction.
2. A comprehensive view of housing reconstruction to include holistic habitat development including basic services and community infrastructure. Building Back Better should translate into a concept of “safer settlements”.
3. Reconstruction should be a vehicle to build long-term community resilience. Reducing vulnerabilities and strengthening community capacities to mitigate future disasters by improving construction practices for majority of the building stock in the country.
4. Strengthening the local economy through reconstruction and processes favorable to the poor, marginalized and informal sector. Reconstruction should provide an opportunity for the poor to upgrade their living conditions.
5. Ensuring sustainable and environmentally friendly reconstruction processes, taking account of climate change, natural resource management and scientific risk assessments.
 6. Rehabilitation should be equitable inclusive, and ensure that marginalized groups such as women, elderly people with disability and caste-based and ethnic minorities are able to participate and benefit from house reconstruction.

4.2 Gender and Social Inclusion

Gender: The recovery and reconstruction process must pay considerable attention to women-headed households, significant in earthquake affected districts. The women heading the family are already overburdened with their routine household activities including accessing basic services and their contribution to the farm. In such an environment, any role in the recovery and reconstruction process will only add more responsibilities and raise their workload to unsustainable levels. This situation needs to be analyzed while engaging women in the recovery and reconstruction process, including through skills development and capacity building and provision of crèche services.

The average literacy rate of women is 45 percent, and even lower in the remote earthquake affected areas. This should be considered whilst developing the construction management plan both for temporary and permanent shelter, in order to allow partially literate women to better manage their money, labor, material purchases and supervision of the reconstruction process. The settlement planning and design of shelters and services should also integrate social and protection issues generally faced by women in remote environments. The reconstruction should further present an opportunity to redress gender inequalities and promote women empowerment by giving them equal rights to their land and property. In this regard, the government should make compulsory condition of joint ownership to receive government aided recovery and reconstruction support. House reconstruction strategies will also enforce the rights ordained by the Interim Constitution, National Shelter Policy that require the state to avail land and housing to people from economically weak sections as well as those residing in unsafe settlements.

Disadvantaged Groups: A sizeable percentage of adult Dalits (9.2%) migrate abroad (59.5%), to Kathmandu (23%) and a few to nearby urban areas, mostly in search of jobs. Accordingly, labor mobility

is quite high among Dalits, induced by a need to escape caste discrimination in the domestic labor market (Source: Dalits and Labor in Nepal: Discrimination and Forced Labor, ILO, 2005). Amongst hill dalits, the Kami, Damai and Sarki are the most marginalised and are likely to have high migration. Amongst Terai dalits, Doms, Chamar, Satar, Tatmas, Dushads, Mushars, Dhanker and indigenous communities of Santhal, Munda, Jhangad and Kisan are the most landless. Women headed households of Dalit communities will be the most vulnerable. It is therefore necessary to facilitate, support and monitor the progress of recovery of these groups.

4.3 Land Use and Clustering of Housing

In a post-disaster scenario, ensuring life safety and therefore prioritizing risk and vulnerability assessment in future events is essential. If the settlement we are dealing with is at high risk, re-clustering/ relocation should be considered. However, before considering any such re-clustering, following suggestions should be followed:

1. Alternate low risk location selected as close as possible to the original location;
2. Ensure compulsory engagement of beneficiary families, particularly women who have a limited say in community decision making processes, while developing relocation plans and programmes;
3. The relocation plan should provide sufficient attention to the livelihood opportunities of the beneficiaries and therefore it should not be compromised at any cost.
4. Provide additional incentives to the relocated community in the form of monetary, material, technical and labor resources for reconstruction;
5. Ensure improved overall living standards through the provision of community services including schools, health centres and local roads; and
6. Provide temporary access routes to the original site to facilitate return of the communities to their places of origin to undertake ethnic and religious practices.

Relocation of settlements must be avoided as much as possible and should be conducted only when no other in-situ solution is possible. Land acquisition for relocation or clustering is likely to be complex, difficult and disputed if safe available lands have private ownership or is forest land. Relocation is also very costly. The government has identified need for clustering of 22,256 households along with infrastructure provision and settlement planning at the cost of NPRs 10,525 million. This will be vetted through rigorous multi-hazard study of each site.

4.4 Settlement Planning Approach for Rural Housing

It is important that housing reconstruction is taken with a comprehensive view, including community infrastructure within the settlements such as access to water, sanitation, waste disposal, energy, and others, and efforts should be made to promote planning principles. At the local level, consultative processes with the community should be undertaken to identify the community infrastructure that needs to be built, repaired, improved, augmented, or enhanced.

4.5 Risk Sensitive Planning for Urban Areas

Ministry of Urban Development (MoUD) is conceptualizing the norms and standards for 'safer settlements' that advocate a method for integrating indigenous and technical knowledge to identify and mitigate multi-hazard risk. Appropriate policy development will be required for urban and rural context, reflecting the inherent differences, their level of impact and needs for recovery based on BBB concept.

Also, long-term comprehensive urban recovery planning is required based on the future population forecast, future urban structure, risk sensitive land use plan, transportation plan and risk assessment. This

should involve review of future seismic hazards based on latest knowledge of seismology and geo-tech studies including analysis of recorded data of the Nepal Earthquake and define earthquake loads to structures as in NBC 105, etc.

With this comprehensive planning, building permission, registration and inspection (i.e. simplified building administration for rural housing linked with quality inspection), land title and registration, open space creation, emergency transportation network, preservation and management can provide comprehensive approach to strengthen resilience.

Within the urban environment, three types of distinct categories are emerging which demand well targeted and specialized interventions in order to meet their requirements: i) Kathmandu Valley metropolitan and sub-metropolitan areas, ii) heritage settlements, and iii) small and new municipalities. Special attention has to be given to settlements with heritage importance to ensure improvement of housing stock while maintaining the heritage value. Similarly infrastructural needs of small and new municipal areas need to be identified and planned during reconstruction. There is need for balanced growth by developing smaller municipalities taking a regional planning perspective. Housing reconstruction should follow this overall framework.

On the other hand, in order to mitigate disasters for high rise buildings and maintain urban development, building code regulation on anti-seismic structure, height of buildings and floor-area ratio is required with institutional enforcement and management.

4.6 Strategy for Transition and Reconstruction Phase

4.6.1 Transition phase:

In the short term, the focus of the recovery strategy is twofold: (1) to address immediate needs of the affected people during the transition phase, and (2) to plan, prepare and start the reconstruction phase. Temporary or transitional sheltering solutions are needed so that people can live with a certain degree of comfort and dignity till permanent reconstruction or repair and retrofitting work is completed. People must be informed of ways to improve the temporary shelters as they may be habituated for a number of years. During this transition phase, people will also demolish and salvage reusable and recyclable material from their damaged homes.

Demolition, Debris Clearance and Salvaging Material: There is a need for demolition and clearance of debris before owners can undertake reconstruction. During the transition phase, it may be necessary for owners to undertake this process and salvage the materials at the earliest. Field observations have shown that owners of low strength masonry buildings were able to quickly demolish and salvage materials, and that a significant portion of such homes were in fact salvageable. Owners of RC frame buildings are in a difficult situation as buildings may be perilously standing and need special skills and tools to be demolished. The disposal of debris will need proper planning and environmental considerations, so as to avoid blocking waterways or damaging agricultural lands.

Planning for Reconstruction: Planning for reconstruction will require a comprehensive, rigorous and transparent house-to-house damage assessment and eligibility survey to understand the nature and extent of damage and eligibility for the government reconstruction assistance program. Detailed policy packages for reconstruction of houses, repairs and retrofitting covering all types of affected social groups particularly the poor and vulnerable, tenants and women households, and families living in difficult

remote areas will be required. Other early activities for long-term recovery include large-scale communication of the reconstruction program, communication of safe construction practices (since many have already started rebuilding) and the setting up of the cascading social-technical facilitation mechanism for recovery (at the national, district and local level).

4.6.2 Reconstruction Phase

The entire housing reconstruction process is likely to take up to 5 years. The reconstruction process will empower communities and households to take charge of their own recovery through an “owner-driven” reconstruction process wherever possible. Households will be facilitated with significant technical assistance to manage reconstruction. Housing reconstruction grants will be provided in tranches, conditional on compliance to safe building standards. Large scale cascading training programs will be needed to build the necessary pool of trained masons, carpenters and artisans.

Particular strategies will be needed to address the complexity of recovery of urban environments. These complexities include, inter-alia, the management of demolition in dense neighborhoods, fragmentation of building ownership, high-level of rental populations, the heterogeneity of community structures and particularly dynamic migration patterns of urban populations. Tools and activities to support urban recovery may include: monitoring systems for urban displacement and migration, detailed hazard mapping, participatory planning exercises, rapid urban expansion studies, facilitated management structures (bringing together communities, government and private sector), rental stock support plans and more.

Beyond ensuring that all homes are rebuilt to hazard-resilient standards, reconstruction further aims at start addressing underlying processes that create vulnerability (even beyond the areas affected by the earthquake). As such, recovery should foster reformative rather than restorative processes. Such a “reformative recovery” should start to tackle underlying causes of vulnerability and risk, based on in depth studies. Common causes of vulnerability include lack of risk awareness, lack of dissemination and training of artisans and builders in safe construction practices, lack enforcement of building standards, lack of high-technical capacity of the private engineering practice, and more.

Overall, the reconstruction program will need to support the reconstruction of approximately 600,000 housing units and the repair and retrofitting of approximately 250,000 homes. The next sections will discuss implementation mechanisms and modalities for reconstruction in greater detail.

Table 6: Recovery and Reconstruction Costs

Details		Unit rates (in NPRs/unit)	Number of Houses	Amount (in NPRs in millions)
Demolition	Low-strength	21,000	94,805	3,972
	Cement based	54,000	7,285	
	RC frame	300,000	5,291	
Debris clearance	Low-strength	8,000	474,025	5,810
	Cement based	20,000	18,214	

	RC frame	250,000	6,613	
Cost of Equipment for demolition and debris removal				160
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Repairs and Retrofitting		160,000	256,697	31,189
Clustering of houses			22254	10,525
Subtotal				313,649
Training, facilitation and quality assurance costs		2.5%		7,841
Urban Planning (including heritage settlement planning)		2%		6,273
Total				327,762

Implementation Strategy

The success of the recovery strategy will depend on its implementation mechanism and modalities. The main components are (i) to ensure identification of affected households through a transparent and comprehensive criteria and a robust mechanism of vetting and grievance redress, and (ii) to empower and facilitate house owners through an owner-led reconstruction mechanism.

Careful consideration will be required for houses hosting more than one family, women headed households, absent member households, marginalised caste groups. Affected communities in remote area may also require particular consideration, particularly for material transportation, cash transfer and technical facilitation and monitoring.

5.1 Building Damage and Eligibility Survey for Recovery

It is critical that a house-to-house damage assessment and eligibility survey is carried out in order to identify specific damages to homes in order to ascertain the eligibility for housing recovery assistance in a uniform and transparent manner. The survey will also present the opportunity to identify vulnerable households (people living with disability, senior citizens, widows and single mothers etc) who may need additional support in house construction and in attaining ownership. It should be conducted as soon as possible, before conditions of homes are altered due to the monsoon, or self-recovery (i.e. early reconstruction) or demolition by households. The assessment will link a particular damage state and building typology to a specific safe reconstruction activity (example: repair of a wall, or complete reconstruction of a building of a certain type) and assistance package. The assessment must be uniform, transparent and strengthened by a robust grievance redress mechanism. Information gathered from the survey can further serve as basis for a powerful management information system (MIS) to monitor recovery. Modern GPS-enabled electronic tablets can be leveraged to streamline the data-gathering

process and mapping of activities and needs. The assessment will most likely also involve a mutual agreement between the household and government (through signing an MOU) committing to roles and responsibilities of the household (to construct following government approved standards, to use assistance only for housing construction, etc) and the government. The assessment is also a key avenue to communicate to households the steps for recovery (example: opening a bank account to receive assistance, receiving training on reconstruction practices, etc.).

5.2 Building Construction Technologies, Materials Supply and Labor

5.2.1 Building Construction Technology

The earthquake has clearly exposed the vulnerability of buildings to earthquakes, and enhancements are required to ensure that reconstruction adheres to building back better practices. Most heavily damaged buildings did not comply with any of the National building regulations and guides.

The provision of basic disaster resistant elements (i.e. corner stitches, vertical reinforcement, diagonal bracing and horizontal bands, etc), coupled with adherence to proper masonry construction practices should be made mandatory. The Mandatory Rules of Thumb (MRT) of National Building Code should be brought in practice and enforced where applicable. Reinforced concrete building construction should incorporate proper seismic (ductile) detailing. For small buildings, “confined masonry” should be encouraged in favor of concrete frame with masonry infill, as confined masonry has shown better seismic performance. For heritage settlements, special technology options and guidelines will have to be developed. A summary of likely building technology options are shown in Table 7.

Table 7: Likely Building Construction Technology Options for Reconstruction

Major Building Components	Building Typology				
	Low strength masonry		Cement based masonry		RC frame (for small to medium size building)
	Stone Masonry	Brick Masonry	Brick Masonry	Blocks Masonry	
Foundation	Linear wall footing				Isolated column footing tied together by foundation beams/ Raft
Wall material	Stone	Brick	Brick	Conc. block Soil stabilized block	Brick or concrete block infill in cement mortar
Upper floor/ Attic	<ul style="list-style-type: none"> Stabilized mud on timber joist and planking RC/ RB slab 		<ul style="list-style-type: none"> RC slab RB slab 		RC slab
Roof	<ul style="list-style-type: none"> CGI sheet RC/ RB slab 		<ul style="list-style-type: none"> CGI sheet RC/ RB slab 		RC slab

Seismic resistant elements	<ul style="list-style-type: none"> • Wooden/ bamboo bands, • RC band, ties and stitches wherever possible 	RC bands, vertical reinforcements, stitches	RC frame with full compliance to ductile detailing
Indicative cost per sq.ft of plinth area, NPRs	900	1500	2000
Likely proportion of reconstruction (KTM Valley)*	24%	38%	38%
Likely proportion of reconstruction (Other districts)*	77%	15%	8%
<i>Timber: It could be preserved and used efficiently through simple innovations.</i>			
<i>* based on proportional distribution of typologies in census 2011 accepted as trend</i>			

5.2.2 Material Requirements

With over half a million houses to be reconstructed and half as many to be repaired and retrofitted will necessitate a huge rise in building construction activities over multiple years. Two critical potential bottlenecks for effective reconstruction are availability of construction materials and labor (in addition to availability of finance). Mechanisms will be needed to ensure that materials available at a reasonable price, and accessible in locations where they are needed.

The total annual production capacity of various materials against the total likely requirement of the housing sector are shown below.

Table 8: Expected Total Material Demand for Housing Component

No.	Item	Unit	Annual Production (Pre-disaster scenario)	Total Demand for Housing (post-disaster scenario)
1	Ordinary Portland Cement	Million Ton	3.5	2.01
2	Deformed Steel bars - 10-25mm	Million Ton	0.75	0.14
3	CGI Sheets - 26 G Medium	Million Ton	0.8	0.09
4	Burnt Bricks	Million No.	430*	1193
5	Timber	Million m ³		0.55

6	Quarry Stone/ Rubble	Million m ³		22.15
7	River Sand	Million m ³ .		2.61
8	Aggregates - 10-20mm	Million m ³		0.83
9	Galvanized welded wire mesh (WWM) - 13 G 25mmx25mm	Million Ton		0.01

Note: * Production estimate from Kathmandu valley only

The materials salvaged from collapsed houses are likely to result in recycling of 80% stone, 30% wood and 25% brick in reconstruction. This will help speed up the reconstruction by reducing financial and transport burdens. Appropriate guidelines about reuse of salvaged materials should be developed and disseminated to house-owners to ensure good quality construction.

5.2.3 Labor Requirements

Such a large-scale housing reconstruction need will require significant workforce (estimated at 352 million workdays). Assuming that the majority of the reconstruction will occur in the first three years, it is estimated that the labor requirement will peak at 0.7 million workers for reconstruction only, which is significant compared to the current estimates of one million workers already involved in the housing sector (ILO). A significant amount of unskilled work will likely be undertaken by family members themselves, which will alleviate some of this need.

Of main concern is the skilled workforce, which constitutes around 46% of the needed laborers. The housing component alone may need over 20,000 masons who are often part-time workers, or migrating between Nepal, India and the Middle East. This sector of the labor market need to be augmented through large scale geographically distributed training.

5.3 Financial and Socio-Technical Facilitation

There is a need to develop a project implementation and management structure for socio-technical facilitation for house-owners undertaking reconstruction, repairs and retrofitting. National, District and VDC level mechanisms will have to be setup to help people for access to banking, material supplies, training, technical guidance, social mobilisation for community level efforts, timely grievance redressal, quality assurance and disbursement support mechanism. The financial and socio-technical facilitation will also create mechanisms for providing targeted support to marginalised households as well as facilitating house ownership for the landless.

5.3.1 Financial Facilitation:

The government shall devise a financing policy clearly stating the modalities of grant, loan and owner contribution expected for rebuilding private houses.

A robust and fully transparent system will have to be developed for transparent and timely cash transfer of any assistance package while ensuring compliance to standards and guidelines for disaster resistant construction. A system to certify progress and quality of construction will have to be put in place at the local level. Typically the financial assistance is provided in three or four stages - i) initial tranche for

mobilisation of construction work, ii) on completion of plinth level, iii) on completion of walls, and iv) final tranche on completion of construction. Usually, first three tranches support the construction work and the final tranche is the smallest, used as incentive to owners for timely completion of reconstruction. For difficult/remote areas, heritage settlements and urban areas, special assistance package may be defined to top up the basic recovery package.

5.3.2 Socio-Technical Facilitation:

As the recovery efforts are likely to be largely owner led, it is critical to provide significant on-site guidance and technical assistance for reconstruction, repairs and retrofitting to promote safer housing. It is very necessary to ensure that this aspect of recovery program is not weak. Communities will have to be mobilised to undertake reconstruction as per the policy and plans put in place by the Government and will have to be explained the whole mechanism and modalities.

A socio-technical facilitation team should provide interface between the owners and government assisted reconstruction program. This mechanism will support the owners at each stage of construction, making them aware of recovery program and their entitlement, handholding them through the administrative processes to avail the assistance as per modalities defined by government policy, provide appropriate social and technical advice at the time of construction, identify and support owners in redressal of bottlenecks and grievances, assist in certification of stages of construction for financial disbursement.

About 22,250 houses are identified for the process of clustering due to likelihoods of hazards at the current locations. Any such effort will have to be evolved only with community involvement and consensus, as place of residence is strongly linked to their agriculture and other forms of livelihood, their beliefs, associations and sentiments.

5.4 Management Structure for Recovery

To ensure support for this recovery effort, it is very critical that adequate and trained human resources are organised in a well-defined mechanism to provide support and undertake various necessary tasks. For facilitating every 1000 families to reconstruct, repair or retrofit their house, a team of 1 coordinator, 2 Junior Engineer/ sub overseer, 2 Community Organizers, and 4 master artisans will be required. There will 750 such teams and their work responsibility may be decided based on geographic spread in the VDCs and municipalities. Broadly, the recovery program will require 3000 master artisans, 1500 Junior Engineers/ Sub-Overseers, 1,500 Community Organisers, and 750 coordinators at VDC level to support the reconstruction process, quality assurance and compliance. These field teams will have to be coordinated at district level involving about 62 engineers and 15 senior engineers and 31 District Coordinators.

This whole human resource structure for facilitation of such a large recovery effort will have to be managed by the proposed National Reconstruction Authority, The total five year budget for the cost of the socio technical facilitation including human resources, training, quality assurance and other governance functions is provided as 2.5% of total needs.

5.5 Technical Committee

Identification of causes of heavy damage to buildings like soil profiles, improper design and detailing, poor construction practice, etc. will be the basis for development of feasible technical solutions for improvement. Measures will have to be identified for reconstruction of each building typology. Similarly,

there is need to evolve simple methods of repair and retrofitting of non-engineered buildings along with simple equipment that can also be used in remote areas. Technical Committee will play important role. Considering complexities of the building stock in the earthquake affected areas and their rehabilitation, role of an expert group headed by an earthquake engineering advisor is envisioned to advice on vast variety of technical issues that is expected to arise during the course of the project. Members should have broad experience in post-disaster recovery; understanding of Nepali building typologies and materials, particularly the non-engineered materials and technologies; understanding of Nepal building codes and standards; geography of Nepal; expertise in geotechnical field, understanding of socio-cultural situation of Nepal; experience in capacity building. Under the guidance of Technical Committee, Technical Guidelines may have to be prepared for - i) disaster resistant reconstruction for different building typologies; and ii) repairs and retrofitting of partially damaged buildings. Nepal National Building Code Development Project, DUDBC, UNESCO, Earthquake Engineering Research Institute, World Housing Encyclopedia, Architecture Institute of Japan, etc. along with traditional local wisdom could be used to evolve a set of guidelines. The Technical Committee could guide preparation of

- o Illustrative guideline for each building typology for repair, remediation and seismic improvement
- o Illustrative guideline for each building typology for reconstruction
- o Guidelines on Training for Trainers for engineers, Junior engineers, foreman and craftsman (stone mason, brick mason, concrete mason, carpenter, etc)
- o Building inspection guideline, videos
- o Methods for dissemination of information.

5.6 Capacity building of Community Organisers, Artisans and Engineers

There will be a need for capacity development of human resources. It is anticipated that nearly 20,000 masons and carpenters, 1500 junior engineers, 1500 community organisers, 750 coordinators and higher level staff will be involved in providing construction services to house owners. They have to be trained for disaster resistant construction. So a large capacity development program will have to be instituted as part of socio-technical facilitation mechanism. This will also involve training of the trainers including the community organisers, engineers and master masons who will conduct the training programs.

Tier 1 training - Basic training on assessment, repair, remediation and seismic improvement to engineers, junior engineers, foremen, and artisans is needed. Practical and hands-on training following Rule of Thumb should be able to address simple and small buildings.

Tier 2 training - This tier of training will provide skills on quantitative assessment and strengthening of various categories of small to mid-height buildings to structural engineers. The training should be practical and hands-on so that it could be immediately used for advising on such buildings during reconstruction.

Tier 3 training - This training will provide skills on quantitative assessment and strengthening of complex medium to large buildings to limited number of structural engineers. These engineers will be senior professionals from the structural engineering fraternity. The training should be practical and hands-on so that it could be immediately used for advising on such buildings during reconstruction.

Training for Community Organisers: Separate trainings on social facilitation for community organisers will be developed and implemented. These trainings would include simple modules on key technical aspects

for the technical orientation of community organisers. Similarly the technical trainings would have simple modules on key aspects of social mobilisation for the proper orientation of technical staff training.

Certification of trainees: Candidates meeting the minimum requirements should be awarded certificate. Only such artisans should be encouraged to work as lead artisans on the construction site. Engineers/ Junior Engineers/ sub-engineers/ master masons working on the project must also be certified accordingly. This also means that instituting a training certification program at the earliest so that adequate number of artisans are trained before reconstruction takes off.

House-owners Awareness Programme: As the recovery is going to be largely owner led, it is essential to make them aware of need of disaster resistant construction. There will be need to guide them on choice of building typologies, materials and costing in addition to minimum disaster resistant features. As the owners hire artisans and take decision with regards to materials and construction system, their awareness is critical. Dissemination of required information on reconstruction, repairs and retrofitting to them is very important.

5.7 Concurrent Monitoring and Quality Assurance

Independent technical monitoring and auditing of the house reconstruction and repairs-retrofitting program will be necessary components. This quality assurance mechanism should be concurrent during reconstruction phase for timely reporting on progress and quality of work so that redressal of deficiency, if any, can be undertaken. It is also necessary that independent professional institutions are involved in concurrent quality assurance to provide this feedback and the government mechanism can then take appropriate decisions to redress the issues.

5.8 Risk Coverage through Insurance of Houses

Insurance coverage for damaged housing stock is almost non-existent in the context of Nepal. Thus, such liabilities end up with the government as a final guarantor. Hence, the need for some form of direct government assistance is more acute, necessitated by lack of insurance cover, scarcity of savings, and higher poverty levels. This may be appropriate time to think and encourage insurance coverage of all reconstructed and retrofitted houses. Government of Nepal may identify appropriate policy framework and mechanisms to promote insurance of the housing stock that is created under reconstruction and recovery initiatives.

Assessment Methodology

The assessment of damage, loss and consequent recovery needs has been based on overall damage data provided by Ministry of Home Affairs through the DRR portal. The data was collected through DDRC from VDCs and categorised as fully collapsed and partially damaged houses. As per the damage data, 498,852 houses have fully collapsed and 256,697 houses are partially damaged.

Field visits were made to Chautara (Dist. Sindhupalchowk), Khokna (Dist. Lalitpur), Bhaktapur (Dist. Bhaktapur), Gangabhu (Kathmandu), Sankhu (Dist. Kathmandu) and Gorakha (Dist. Gorakha) to understand damages (type and extent) and government assessment methodology. Our discussions with government officials involved in the damage data collection at district level indicated that buildings deemed damaged to the point that repair would be too expensive were counted as fully damaged.

6.1 Housing Damage Calculation

The 2011 Census was used to define the distribution of building types at each district. Building typologies were simplified into three predominant types: (1) low strength (mud mortar based) masonry, (2) cement based masonry and (3) reinforced concrete frame. Damages were distributed between building types based on vulnerability curves developed by NSET. Details on the damage distribution to different type of buildings are given in Annex-1.

The size of each house type was estimated at 600 sqft for low strength masonry (average size according to the "National Living Standard Survey 2010/11, Nepal"), 900 sqft for cement mortared houses (reflecting more well-to-do households), and 3,000 sqft for reinforced concrete (predominantly urban and multi-storey).

Cost per sq.ft. was calculated as NPRs 700 for low strength masonry, NPRs 1,200 for cement based masonry and NPRs 2,000 for reinforced concrete. These rates are based on prevailing market rates.

Total damage was calculated as the replacement cost of fully destroyed buildings based on the values above, and repair (return to previous state) cost of partially damaged buildings estimated at 10% of replacement cost.

6.2 Damage to Household Goods Calculation

Damage to household goods was based on an estimated value of household goods by building type. It was further estimated that in fully damaged houses, 60% of household goods were destroyed, versus 20% in partially damaged houses.

6.3 Demolitions and Debris Clearance Cost Calculations

While buildings may be "fully damaged," many among them will still be standing in some form, and need to be demolished. It was estimated that amongst the fully damaged low strength masonry homes, 20% would need further demolition, 40% for cement based masonry, and 80% for RC frame buildings. Demolition costs were estimated at 5% replacement costs, while clearance was estimated as NRs 8,000, NRs 20,000 and NRs 250,000 respectively for low strength masonry, cement mortared masonry and RC buildings.

6.4 Real Estate Sector Damage and Loss Calculations

Real Estate Sector private bungalows, high-rise apartments, commercial complexes suffered damages in the Earthquake. The scale of such damages is varying across different buildings. Altogether, 10,700 units from 83 high-rise buildings and 2881 bungalows from 45 colonies have been estimated to have been damaged. Based on the understanding of the real estate sector market and prevalent market rates damages and losses were calculated as NPRs 4,210 Million and NPRs 20,000 Million respectively.

6.5 Rental loss Calculations

Data on number of renters or rented apartments collapsed is not available yet. Therefore, it is difficult to assess loss of rental income. The most prevalent situation for renters are - i) hosted by families and friends,

ii) returned to their homes in villages, iii) have found alternative place on rent, or iv) are staying in temporary shelters in camps. We have assumed that option of alternative rented accommodation is minimal and there is loss of gross rental income. This will have to be confirmed by a detailed survey. Proportion of rental versus ownership was obtained from the census. Rent scenarios and rates for the urban and rural areas were obtained based on various sources. For the partially damaged units, the rental loss was assumed as half the rent. Annual losses are reduced over time as reconstruction proceeds and rental units are repaired, reconstructed and ready for occupation.

Table 9: Rental Loss Calculation

Districts	Average Monthly Rent (NPRs)	Damaged Rental Units	Destroyed Rental Units
Kathmandu	21,350	30,182	21,988
Bhaktapur, Lalitpur, Patan	14,850	5,415	13,063
Other districts	4,200	20,492	7,958

6.5 Transitional Shelter Cost Calculation

The number of transitional shelters required is based on households affected by fully destroyed houses. As per the available data 609,938 households will need some form of temporary sheltering solution, based on the damage data and the number of households per house.

Cost estimations of temporary shelter are based on the shelter packages guide by the National Planning Commission. The package should provide approximately 300 sq.ft. of covered space, roofed by 2 bundles of CGI sheets, and leveraging salvageable materials. Considering use of salvaged materials, additional cost of NPRs 24,540 will be required for such a shelter.

6.6 Needs for Housing Reconstruction and Retrofitting Calculation

The need for housing recovery is based on a uniform assumed need per household (not based on pre-existing house) of a 450 sq.ft. core house built to seismic resilient standards. Cost of construction following proper seismic standards was estimated at NPRs 900 per sq.ft, equivalent to approximately 30% increase from the base replacement cost. Cost per house is therefore estimated at NPRs. 405,000. This amount is the basis for defining needs, but does not suggest that affected households will need to construct such homes. Besides, the amount required for remote and difficult area and heritage settlements may be higher and government assistance may take this into consideration for these areas. It is acknowledged that the choice of building system and the size of house will be decided by the house owner at the time of reconstruction, conditional on compliance to seismic resistant standards. In order to estimate construction material needs, it is assumed that the choice of rebuilding will shift slightly away from low strength masonry buildings in favor of cement mortared and reinforced concrete buildings.

Needs for repair and seismic retrofitting of partially damaged buildings are estimated at 40% of cost of a core house, or NPRs. 160,000. (NPRs. 50,000 for repairs and NPRs 110,000 for retrofitting).

Needs for clustering of houses in terms of total households and costs are based on MoUD information and also include infrastructure provision. These may later be vetted through a more specific and rigorous

assessment hazards at each site. 2% of total new reconstruction costs have been included with clustering costs towards settlement planning.

Needs for training, facilitation, quality control, communication and other technical assistance activities are estimated at 2.5% of the total needs, consistent with other home-owner driven earthquake recovery programs. Needs for urban planning including that for heritage settlements are estimated at 2% of total needs.

Annex-1: Calculation Logic - Damage, Loss and Needs

Damage

1) Physical Housing Damage

A. Baseline data: Source Census 2011

B. **Typologies:** Using the construction type for foundation, walls and Roof as given in the Census we have derived the Building Typologies as follows

1. **Stone/Brick in Mud Mortar** (In flexible CGI sheet + Thatch roofing)
Type of outer wall: Mud bonded bricks/stone + Unbaked brick + Others + Not Stated
2. **Stone/Brick in Cement Mortar** (In Flexible CGI Sheet and Rigid RC roofing)
Type of outer wall: Cement bonded bricks/stone - Type of foundation of house: RCC with pillar
3. **RC: Reinforced Concrete Building**
Type of foundation of house: RCC with pillar
4. **Wood & Bamboo**
Type of outer wall: Wood/ planks + Bamboo

C. Categorization of Damaged Building into Typology and Damage Costs

The average floor area for different building types are taken from limited surveys conducted earlier. The average floor area for three different type of buildings are given below:

Table 10: Typology and Damage Cost

Typology	Total Built up (sq.ft.)	Replacement Cost (NPRs/sq.ft.)
Stone/Brick in Mud Mortar	600	700
Stone/Brick in Cement Mortar	900	1200
Reinforced Concrete Building	3,000	2,000

D. District Categorization:

Districts are assigned for different average intensities as per the intensity distribution map from USGS. Only one intensity is assigned at this stage. Once the detail intensity map is prepared through intensity mapping survey this can be revised. Districts with average intensity of Modified Mercalli Intensity (MMI) VII or VIII are considered the severely damaged districts and MMI VI to VI+ are considered as moderately damaged districts.

Table 11: Severely and Moderately Damaged Districts

Severely Damaged Districts		Moderately Damaged Districts	
District Name	MMI	District Name	MMI

Sindhupalchowk	VIII	Solukhumbu	VI+
Kathmandu	VII	Chitawan	VI+
Nuwakot	VIII	Lamjung	VI+
Dhading	VII	Khotang	VI+
Rasuwa	VII	Tanahu	VI+
Gorkha	VIII	Kaski	VI+
Bhaktapur	VII	Syangja	VI+
Kavrepalanchowk	VII	Parbat	VI+
Lalitpur	VII	Baglung	VI+
Dolakha	VIII	Palpa	VI+
Ramechhap	VII	Gulmi	VI+
Makawanpur	VII	Bhojpur	VI
Okhaldhunga	VII	Nawalparasi	VI
Sindhuli	VII	Dhankuta	VI
		Shankhuwasabha	VI
		Arghakhanchi	VI
		Myagdi	VI

E. Categorization of Damaged Buildings into Different Structural Types

The damaged buildings are categorized to 3 different types considering the ratio of different type of buildings in each districts from census data as well as the ratio of possible collapse and partly damage derived from fragility functions for different intensities. Fragility functions from Guragain, R. 2015² are used for different type of masonry buildings and HAZUS, 2003³ for Reinforced Concrete Buildings. Considering the vulnerability of non-engineered RC buildings, pre-code functions were used. Complete damage functions were used to calculate the ratio for complete damage while the functions for extensive damage were used for calculation of ratio for partial damage.

The factors derived from the relative vulnerability of the buildings for different intensities are given below:

Table 12: Factors derived from the relative vulnerability of the buildings for different intensities

MMI	PGA	Damage	LSM	CBM	RC
VI	0.12	Complete	1.00	0.00	0.00
		Partial	0.93	0.07	0.00
VI+	0.17	Complete	0.93	0.07	0.00
		Partial	0.60	0.31	0.09

² Ramesh Guragain, 2015, Development of Earthquake Risk Assessment System for Nepal, PhD Dissertation, The University of Tokyo, Japan

³ HAZUS-MH. (2003). "Multi-hazard Loss Estimation Methodology." Department of Homeland Security, Emergency Preparedness and Response Directorate, *Federal Emergency Management Agency (FEMA)*, Washington D.C.

VII	0.22	Complete	0.88	0.09	0.04
		Partial	0.35	0.53	0.12
VII+	0.31	Complete	0.67	0.25	0.08
		Partial	0.14	0.50	0.36
VIII	0.4	Complete	0.49	0.33	0.18
		Partial	0.06	0.38	0.56
VIII+	0.57	Complete	0.36	0.35	0.29
		Partial	0.00	0.20	0.80

Note: MMI - Modified Mercalli Intensity, PGA= Peak Ground Acceleration

Loss

G. Losses due to clearance and demolition

The cost of clearance of the debris of the destroyed houses is considered as 5% of the cost of the replacement of that building.

Table 13: Clearance Cost

	Clearance Costs for Destroyed Buildings (NPRs/unit)
LSM	21,000
CBM	54,000
RC	300,000

Needs

Construction Materials & Labor for Recovery Need

Table for Reconstruction: Required material and labor for reconstruction of one house of each typology for a budget of NPRs. 405,000

Table 14: Reconstruction for different typologies

Major Building Material	Unit	Building Typology		
		Mud	Cement	RC
		Area = 450 SF (42 m ²)	Area = 270 SF (25 m ²)	Area = 200 SF (19 m ²)
Cement	Bags (50 Kg)	9.6	190.5	60.8
Brick	1000 No.	0.0	8.1	2.1
Stone	m ³	55.9	0.0	0.0
Sand	m ³	1.3	8.1	3.3
Aggregate	m ³	0.3	3.3	2.5

Steel bars	Kg	129	345	282
Wood	m ³	1.3	0.3	0.1
CGI Sheet	Bundle	2.2	1.3	0.0
Labor requirement:				
Skilled	man-days	157	77	20
Unskilled	man-days	197	100	41

Table for Repairs and Retrofitting: Required material and labor for seismic improvement and repair in one house of each typology for the work that can be done for budget of NPRs.160,000

Table 15: Repairs and Retrofitting

Major Building Material	Unit	Building Typology		
		Low strength masonry	Cement based masonry	RC Frame
Cement	Bags (50 Kg)	34.6	20.8	15.6
Sand	m ³	3.6	2.2	1.6
Aggregate	m ³	0.3	0.2	0.2
Wire mesh	m ²	37.4	22.4	16.8
Steel bars	Kg	117	70.4	52.8
Labor requirement:				
Skilled	man-days	53	32	24
Unskilled	man-days	62	36.8	27.6

Annex- 2: Building Damage Gradation & Categorization

Detailed (qualitative) assessment of buildings is required for building damage gradation and categorization which forms the basis for planning response, recovery and rehabilitation of these buildings. The extent of damage is dependent not only on the severity of the earthquake shaking but also on the building typology and quality of construction. Therefore it is important to understand distinct purpose of the building damage gradation and building damage categorization. Damage gradation is done with the purpose of defining and developing type and extent of engineering intervention based on the damage, whereas building damage categorization is to facilitate financial assistance which is based on % of damage and resource requirement to repair, retrofit or reconstruct.

Any building damage categorization or gradation should take the following into account:

- Building typology
- Damage typology (crack types)
- Damage intensity
- Damage location to the building and its components

Building Damage Gradation

For engineering purpose, damage grades are classified into five levels as presented in Table 1. The gradation is based on component failure.

Table 16: Broad Damage grade indicators taking housing typologies into consideration. It is also important to clarify the purpose of damage categorization.

Building damage gradation	Details
G1	No structural damage, slight non-structural damage
G2	Slight structural damage, moderate non-structural damage
G3	Moderate structural damage, heavy non-structural damage
G4	Heavy structural damage, very heavy non-structural damage
G5	Destruction - very heavy structural damage

Detailed indicators are required based on the parameters presented above. Department of Urban Development and Building Construction, Government of Nepal has already developed guidelines on the above, however that needs updating taking into account Nepalese building typologies and experience gained from the 2015 Nepal Earthquake.

Building Damage Categorization

For financial assistance, a weightage based building damage categorization method is required which needs to be developed taking into account damage at component level, however the categorization system should be transparent. Financial assistance should be based on % of building damage. The % damage will be evaluated based on damaged components and likely resource requirement with help of a guideline tool. This tool will have to be developed. The proposed assistance based on % damage is presented in Table 17.

Table 17: Damage categorization for financial assistance

Building damage categorization	% damage	Intervention	Financial assistance category
No damage	<5%	No intervention	No assistance
Slight damage	>20%	Repair and strengthening	Lower assistance
Moderate damage	>40%	Repair and strengthening	Higher assistance
Severe damage/ collapsed	>60%	Reconstruction	Maximum assistance

The % damage is structural damage, and not loss. Methodology and guidelines for % damage will need to be evolved immediately. It will be necessary to keep this methodology as simple and transparent as possible

Annex-3: Training and Awareness for Disaster Resilient Building Technologies:

A. Training

Training in Seismically appropriate construction as well as repair and retrofitting of existing damaged buildings for artisans, supervisors and engineers accompanied by awareness generation in the communities should be an integral part of the reconstruction strategy. This training should be initiated as

soon as possible, and be repeatedly provided on an ongoing basis throughout the reconstruction period. Assistance for permanent housing will need to be tied to the adoption of the improved practices. With the scale of devastation and loss of life fresh in the minds of so many households, there is a unique window of opportunity to gain buy-in for these changes. Where necessary, alternate emerging technologies may be adopted only after thoroughly tested for their safety, acceptability, and replicability. A comprehensive “training cum quality assurance group” set up is necessary for capacity building as well as to feed into the government system of approval. The following could be the organizational structure of such as set up.

Socio-Technical Facilitation, Training & Quality Assurance Group Structure

No.	Personnel & Quantity	Description & Role
1	Artisans – 17,500	It is estimated a pair of masons will take 15 days to complete reconstruction of a typical house. Similarly a pair masons will take 3 to 7 days to repair and strengthen an average house. If artisans work for 200 days a year and whole reconstruction program is uniformly distributed over five years, 17,500 masons are expected to be required housing. These individuals are employed by the house owners as and when required.
2	Master Artisans – 3,000	It is estimated that 3,000 Master Masons will be required for reconstruction project. Their role will be to guide and supervise the masons working on house sites. On average four Master Masons are allotted to each Village Development Committee (VDC) and municipality. These Master Masons will be full time employee of the project and will be based in respective VDCs and Municipalities.
3	Junior Engineer/Sub-overseer- 1,500	It is estimated that 150 junior engineers/ sub-overseers will be required for reconstruction. For the estimation of the requirement two (2) Junior Engineer/ sub-overseers have been allocated for each Village Development Committee (VDC) and municipality to provide support and guidance to the reconstruction process, advise to house owner and to <u>approve the work and report to the government system of approval for release of next tranche</u> . The Junior Engineer/Sub-overseers will be full time employees of the project and will be based in the VDCs and Municipalities.
4	Community Organiser – 1,500	In each VDC or Municipality there will be 2 community organisers whose role will be to interact with the community members, educate them about the program and building technologies, facilitate the interaction between the people and masons and Junior Engineers.
5	Coordinator (VDC level) – 750	In each VDC or Municipality there will be 1 Coordinator whose role will to coordinate the functioning of the VDC level group since the functioning will involve much movement across the mountains. This person will also be responsible for ensuring communication with the district.
6	Engineer (62) and Senior Engineer (14)	It is estimated that four (4) engineers and one (1) senior level engineer will be required for each district to provide support and consultation, and help ensure smooth operation of reconstruction program. The Engineers and Senior Engineers will be full time employees of the project and based in the district headquarter
7	District Coordinator (31)	District coordinator will be a management/ social development professional to coordinate the district team of engineers, senior engineer and manage the district level reconstruction program.
8	Project Director - 1	The Director will provide leadership to the whole project on Built Back Better on support, consultation and liaison with the Governance.

9	Technical Committee	Considering the complexities of the building stock in the earthquake affected areas and their rehabilitation, role of technical committee is envisioned to advice on a vast variety of technical issues which are expected to arise during the course of the project. The Committee members may be identified having background in earthquake engineering, geo-technical studies, architecture, heritage conservation, etc. relevant fields to guide the decision making with regards to reconstruction, repairs, retrofitting, planning, land use, etc. The committee would also provide solutions on issues that emerge during implementation.
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B. Information Dissemination & Awareness Campaigns: The disasters have shown that absence of communication on various aspects of the reconstruction program between the affected households and the government leads to a variety of problems including inaction on the part of the house owners, adoption of incorrect building practices, unreasonable expectations from the government etc. Hence, a crucial part of the program strategy should be effective and widespread consultations and dissemination of information to the affected communities. This should include information on the full range of assistance options, their eligibility criteria, and the means of accessing them, as well as on improved construction methods for seismically safe houses.

HEALTH AND POPULATION

Summary

Background: In line with the broad framework of the Post Disaster Needs Assessment (PDNA) undertaken by the overall leadership of the National Planning Commission, the Ministry of Health and Population (MoHP) conducted a comprehensive assessment for health and population sector, which aimed at collecting and collating information on damage, losses, and post-disaster needs for reconstructing and rebuilding the country with the broader concept of building back better. The work accomplished by the assessment team has provided (i) analysis of the situation before the earthquake, (ii) a thorough assessment of damage and losses incurred following the earthquake and an estimation of the effect of the earthquake on health and population related services; and (iii) identification of needs for recovery and reconstruction in immediate, intermediate and medium terms.

The following section presents the summary of the findings.

The situation before the earthquake: Nepal was making significant progress in the overall health situation, with a maternal mortality ratio of 190 per 100,000 live births in 2013¹ and infant mortality rate of 46 per 1,000 live births in 2011². In 2011, life expectancy at birth was estimated to be 65.5 years for male and 67.9 years for female³. Total Fertility has declined significantly to 2.6 births per woman in 2011 from about 5 births per woman in 1990. Per capita government expenditure on health is 827 in 2013/14 while the per capita total health expenditure is estimated to be US\$ 38 in 2012. MOHP, as the national health authority for fulfilment of its organisation, regulation and service provision role, has a network of 4,118 health facilities which range from the central level specialized hospital to Health Posts at the VDCs and Urban Health Centers in the Municipalities for the delivery of health care services. Besides this, more than 350 health facilities nationwide in private sector cater the health care demands of the population. Out of the total public health facilities, 19% and 23% of total health facilities are located respectively in highly and moderately affected districts.

Effect of the earthquake: Health and population has been severely affected as evident from damages and losses to health infrastructure and disruption in essential health care services delivery along with the death of 8,702 persons (45% male and 55% female) and 22,303 injured. A total of 446 public health facilities including administrative building (consisting 5 hospitals, 12 Primary Health Care Centers and 417 Health Posts, 12 others) and 16 private facilities are completely destroyed while a total of 765 health facility or administrative (701 public and 64 private) structures are partially damaged. Nearly 84% (375 out of 446) of the completely damaged health facilities are from the 14 most affected districts. As a result,, the ability of the health facilities to respond to the healthcare needs has been affected by the destruction and service delivery is disorganized. Consequently, vulnerable populations, including disaster victims, have been further disadvantaged in accessing health services in remote areas. A total of 18 health workers and volunteers have lost their lives and 75 got injured adding further challenges in health resumption of services delivery.

¹ Source: (WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division, 2014)

² Source: (Ministry of Health and Population , 2012)

³ Source: (Central Bureau of Statistics, 2014)

Similarly, existing capacity of the Ministry of Health and Population in general and that of concerned District Health Offices have been stretched to ensure the resumption of disrupted services delivery, coordination with concerned agencies and stakeholders and management of increased case load for treatment including trauma cases.

Estimates of Damage and Loss: Total damage and loss due to the earthquake is estimated to be NPR 6.33 billion of which the public shares 84% rest being that in the private sector including NGO and Community owned service providers. While the value of damages is estimated to be 5.2 billion NPR, the estimate of losses is 1.1 billion NPR. Severely affected 14 districts account for around 88% (including 29% of central hospitals and health infrastructures) of the total value of damage and losses while other districts account for 11.4%. Gorkha, Sidhupalchowk and Dolakha are the hardest hit districts in terms effects of the earthquake sharing 22.4% of damages and losses, after the central level health infrastructure which alone account for 29% of damage and losses.

Table S1: Estimates of damages and losses Amount in million

<i>Estimates of damages</i>	Public (NPR)	Private (NPR)	Total (NPR)	Total (US\$)
Facilities completely destroyed	3,577	608	4,185	41.8
Facilities partially destroyed	479	243	722	7.2
Equipment and logistics	291	0	291	2.9
Total damages	4,346	851	5,197	5.2
Estimates of losses				
Demolition and removal of debris	63	16	79	0.8
Treatment services for injured	393	147	540	5.4
Provision service delivery for affected population	472	0	472	4.7
Governance and risk management	48	0	48	0.5
Total losses	977	163	1,139	11.4
Grand total (effects of earthquake)	5,323	1,014	6,337	63.4

Recovery and reconstruction strategy: Ministry of Health and Population has adopted three pillar strategies for the recovery and reconstruction which are basically adopting the immediate (until mid July 2015), intermediate term (over the FY 205/16) and medium term (2015/16 – 2019/20) implementation framework.

- First strategy is to furnish the districts with necessary logistics and human resources by mid July 2015 to ensure follow up treatment of those injured, resumption of health services and support the districts offices and facilities to deal with foreseen immediate risk and vulnerabilities by providing necessary logistics such as drugs and supplies and budget for preparedness ad rapid response.
- Second strategy is to replace the temporary arrangements (e.g. tents) by short term arrangements to ensure the continuity of service delivery, cater the changing pattern of health care needs, and provide routine services in an uninterrupted manner. This would include demolition of damaged buildings, accomplish repair works and reinstitute peripheral health facilities by setting up pre-fabricated structures. Similarly, work will be initiated for setting up set up hospitals and rehab centres and strengthening of institutional capacity for disaster preparedness.
- Third strategy is much concerned on the reconstruction of the sector from the longer term perspective following the concept of build back better which would entail setting up of new health infrastructures and equipment with concrete structure. This will be done after carrying out a more rigorous

assessment of the existing networks of health facilities and their capacities with due consideration of geography and population size and distribution.

Recovery and reconstruction needs and costs: The total recovery and reconstruction need in the health and population sector is estimated to be 11.27 billion NPR for recovery and reconstruction related initiatives. Out of the total needs, 153 million is needed immediately mainly for the resumption of the services in the affected areas particularly for temporary structure, renting, drugs and supplies. Costs for intermediate (over the FY of 2015/16) and medium term (2015/16- 2019/20) needs are estimated to be 1.36 billion and 9.75 billion respectively. A comprehensive plan of activities have been developed for the continuation of treatment of injured, regularisation of service delivery, making the health sector better prepared for disaster, and repair and reconstruction of health facilities that were damaged and destroyed by the earthquake. When split the overall needs, district level need is 7.26 while central level needs is 4.99 billion NPR.

Table S2: Estimates of Cost for Recovery and Reconstruction Amount in million NPR

	District level (NPR)	Central level (NPR)	Total (NPR)	Total (US\$)
Immediate term	86	67	153	1.5
Intermediate term	1,191	173	1,364	13.6
Medium term	4,994	4,759	9,752	17.5
Total needs	6,270	4,999	11,269	11.3

Implementation strategy: Recovery and reconstruction of the health and population sector will be guided by a Central Coordination Committee for Recovery and Reconstruction led by MoHP and includes members of development partners. Based on the finalized implementation plans, budgets will be allocated to districts considering the identified needs and resource availability. While major infrastructure and equipment and routine drugs and supplies and major human resources will be provided from the center, the remaining activities will be accomplished by the Districts based on a guideline to be developed by the MoHP. Recovery and reconstruction initiatives will be implemented over next years requiring approximately 1.4%, 18.1% and 21.9% of the estimated budget respectively in 2014/15, 2015/16 and 2016/17. Rest of the years will require equal proportion of the budget i.e. 19.5% of estimates total budget for each year until 2019/20.

Pre-Disaster Context and Baseline

Baseline: Ministry of Health and Population (MoHP) has a network of 4,118 health facilities ranging from the central level specialized hospitals to Health Posts and Urban Health Centers at the Village Development Committee (VDC) and Municipality levels respectively. Fourteen Districts were severely affected by the earthquake of April 25, 2015 causing 8,699 deaths until 2nd June and over 21,000 injured resulting into increased health care needs (Ministry of Home Affairs, 2015) at the time when health facilities in 61 districts were directly affected. Out of the total public health facilities of the country, 19% and 23% of total health facilities are located respectively in highly and moderately affected districts as summarized in Table 1 (Department of Health Services, 2014).

Table 1: Number of Public Health Facilities

District category	Hospitals	PHCCs	HPs	Total
Highly affected (14)	26	44	723	793
Moderately affected (17)	20	44	882	946
Others (44)	58	120	2,201	2,379
Total	104	208	3,806	4,118

Source: Annual Report 2070/71, DoHS

Besides above-mentioned facilities, Ayurveda health services are being delivered through two hospitals 14 Zonal Aushadhalayas, 61 District Ayurveda Health centers and 214 Aushadhalayas in the country. Moreover, more than 350 health facilities in private sector cater the health care demands of the population in Nepal majority of them being in Kathmandu Valley and other urban areas. Further to this, Department of Drug Administration also has four regional offices in addition to its central office for the regulation and quality control of drugs and equipment.

Population profile shows that highly and moderately affected districts respectively consist of 20% and 17% of the total population in the country. Highly and moderately affected districts respectively consist of 19.0 and 16.6 percent of expected pregnancies in the year 2014/15. Distribution of the population by age group including expected pregnancies is presented in the Table 2 below and district wise details are in annex 2. (Department of Health Services, 2014/15).

Table 2: Population Profile in Affected Districts

figures in thousand

District category	Total Population	Population of 0-11 months	Population of 0-4 years	Female population of 15-44 years	Women of Reproductive age of 15-49 years	Married Women of Reproductive age 15-49	Expected Pregnancies of 15-49 years	Adolescent Population of 10-19 years
Highly affected (14)	5,633	116	535	1,449	1,584	1,201	138	1,285
Moderately affected (17)	4,651	100	460	1,259	1,380	1,046	120	1,077
Others (44)	17,439	392	1,825	4,435	4,849	3,675	467	4,005
Total	27,723	609	2,820	7,144	7,813	5,922	725	6,366

Source: Health Management Information System, 2014/15, DoHS

The target set for MDG 4 was to reduce the under-5 mortality rate by two-thirds between 1990 and 2015 and Nepal stands at 40 per thousand live births in 2013. Similarly, another MDG goal is maternal mortality which has declined by 76% from 790 per 100,000 live births in 1996 to 190 in 2013 being well on track. (WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division, 2014). However these goals may get affected due to the earthquake. Total Fertility is 2.6 births per women in 2011 is also a significant decline from 5 births per women in 1990.

The 2011 Population Census showed the percentage of disability among male and female was respectively 2.2% and 1.7% (Central Bureau of Statistics, 2014). Percentage of households within the reach of 30 minutes to HP, PHCC/public hospital and private clinic/hospital is respectively 61.8% 33.6% and 53.4% (Central Bureau of Statistics, 2011). Percentage of visits to public facilities, private facilities and others including pharmacies for health services are respectively 37%, 33% and 30% (Central Bureau of Statistics,

2011). Per capita government expenditure on health is NPR 827 in 2013/14 (Ministry of Finance, 2013/14) while the per capita total health expenditure is estimated to be US\$ 38 in 2012 (Global database, WHO).

Disaster Preparedness: Ministry of Health and Population (MoHP) with support of WHO and other development partners had conducted different activities as a part of preparedness for disaster. Health Emergency Operation Centre (HEOC) was established within the premises of MoHP in 2013 which was very helpful in managing the health sector response in the aftermath of earthquake. Similarly, hub-hospitals and satellite centres were identified for the emergency management of health care needs including preparation of roster and early deployment training was given to the hospital staff in Kathmandu valley. GIS mapping of health facilities was also carried out which was also helpful to quickly locate the health facilities and their status after the earthquake. Pre-positioning of medical logistics (especially Medical tent, interagency emergency health kit, diarrhoeal kit, surgical kit, reproductive health kit) was also done in strategic locations such as DOHS complex, Tribhuvan University Teaching Hospital (TUTH), Patan Hospital, UN building, Biratnagar and Nepalgunj. Capacity building of staff on Mass Casualty Management (MCM), Hospital Preparedness for Emergencies (HOPE) and specific service package such as reproductive health including simulation exercise was also carried out by the MoHP.

In the similar manner, structural and non-structural assessment of health facilities was initiated to minimize the risk of potential disaster. Assessment of all fast track/priority hospitals, 9 health facilities (one PHC, One Health Post and one sub health post selected from Kathmandu, Lalitpur and Bhaktapur districts) was also carried out before the earthquake. Non-Structural mitigation including retrofitting was conducted in TUTH, Patan Hospital and Bhaktapur Hospital and Civil Service Hospital. Besides aforementioned initiatives of the MoHP, standards for public health emergency management like mass casualty management strategy, protocols, referral and early deployment guidelines, and Rapid Response Team guidelines were developed. These activities became instrumental for overall effectiveness of the health response in the aftermath of the earthquake. The trauma protocols facilitated the international and national medical teams to proceed for the treatment of the seriously injured people. Further, the HEOC remained the command centre of the Ministry of Health and Population to manage the health response during the first few weeks of the earthquake. At the district level, District Health Office represented health sector as a member of the District Disaster Response Committee.

Post Disaster Context

The assessment shows that existing infrastructure of 5 hospitals, 12 Primary Health Care Centres (PHCCs), 417 Health Posts (HPs) and 12 other facilities are completely damaged in the public sector by the earthquake while a total of 701 public health facility structures are partially damaged. Similarly, reporting from the private sector shows that 16 health facilities are completely damaged while 64 are partially damaged in the private sector including NGO and community institutions. A total of 8,792 deaths have been reported along with 22,220 injuries requiring immediate response from the health sector for the treatment of those injured and resumption of regular health services.

A central Information Management Unit was set up under the HEOC for the compilation of the health services delivery related information and hospital based surveillance system was also initiated. A toll free number (1660 01 33 444) was also set up at the HEOC to help people access general information regarding treatment services and handle grievances. Similarly, Medicine and Equipment Custom Release Desk at Tribhuvan International Airport was established on 01 May 2015 to support speedy release of drugs and medical equipment at the custom office and channel other health related international support measures. Since May 1st HEOC produced daily situation update reports until 22 May 2015.

Immediate Response: Ministry of Health and Population together with international and national partners, voluntary and social organizations have been actively engaged in health sector's response after the earthquake. MoHP organized a meeting to manage the health sector response on 25th April just after the earthquake when Health Emergency Operation Centre (HEOC) was also activated. At the same time, the high level committee chaired by Secretary of the MoHP was formed to oversee and guide the overall health sector response in the aftermath of the mega earthquake.

Health emergency and operation centre started to coordinate with the affected districts and updated the situation for the necessary decision and action such as deployment of medical teams and supply of drugs and other logistics. Pre identified six emergency hubs within Kathmandu valley were activated for medical services to the injured including those referred from other districts. High level committee mobilized teams at the central hubs as well as sent officials to the highly affected districts to ensure proper coordination and support districts in responding immediate needs.

Infrastructure and Assets: Damage status of the public health facilities was reported by the respective District (Public) Health Offices which were validated during the field visit by consulting focal persons of districts and health facilities. In addition to complete damage to 446 district and sub district level public health facilities, major blocks of central and regional hospitals (Maternity Hospital, Bir Hospital and Pokhara Regional Hospital) are also severely damaged causing interruption of health services delivery in those hospitals. Damage status of the health facilities is presented in Table 3. Sindhupalchowk, Nuwakot and Gorkha are the districts where largest number of health facilities has been completely damaged.

Table 3: Damage Status of Health Facilities

Districts	Hospital		PHC		HP		Others		Private sector facilities	
	Completely Damaged	Partially damaged	Completely Damaged	Partially damaged	Completely Damaged	Partially damaged	Completely Damaged	Partially damaged	Completely Damaged	Partially damaged
Bhaktapur	0	1	1	1	6	9	0	0	0	6
Dhading	0	1	1	1	33	12	1	1	3	5
Dolakha	1	1	0	1	33	16	1	0	3	2
Gorkha	0	1	1	2	35	24	6	6	5	3
Kathmandu	0	0	1	7	7	33	0	0	0	24
Kavre	0	1	1	2	32	50	0	1	0	2
Lalitpur	0	0	0	2	9	20	1	0	0	12
Makwanpur	0	0	1	2	14	13	0	0	3	6
Nuwakot	1	0	1	1	43	19	1	1	0	0
Okhaldhunga	0	0	0	0	17	17	0	0	0	0
Ramechhap	1	0	1	1	20	28	0	1	0	0
Rasuwa	1	0	0	1	14	3	1	0	1	2
Sindhuli	0	1	1	3	23	7	0	0	1	2
Sindhupalchok	1	0	1	2	62	17	1	0	0	0

Total (14 districts)	5	6	10	26	348	268	12	10	16	64
Other districts	0	13	2	28	69	330	0	0	0	0
Central and Regional level hospital/ administrative buildings		20	0	0	0	0	0	0	0	0
Total	5	39	12	54	417	598	12	10	16	64

Source: Field assessment for 14 districts and D(P)HO reporting for others.

In addition to public facilities, a total of 16 private health facilities have reported complete damage and 64 have reported partial damage.

Health Service Delivery and Access

Assessment of situation and medical needs: Damage of infrastructure and assets disrupted the delivery of services while the demand for the services increased as many people got injured. A total of 18 health workers and volunteers lost their lives and 75 got injured due to the earthquake adding further challenges in health services delivery. Considering the immediate needs of the districts, public health and medical officials of the MoHP were sent to highly affected districts to support the district teams for the resumption of health services delivery.

Concurrently regular public health services were also resumed from the non-damaged health facilities, at tent and by national and foreign medical teams. In the most affected districts, D(P)HO with support from partners conducted mobile health camps particularly focusing on a priority set of life-saving services. Apart from interruption of some services in severely affected Health Posts and Primary Health Centre the routine package of health services were being delivered. Besides the emphasis on delivery of routine health services, dignity kit, hygiene kit, and reproductive health kit were provided in the severely affected districts. Now, there is demand for additional services such as psychosocial counselling which need to be provided on top of ensuring regular services with effective referral linkage.

Provision of free treatment service: Government made a decision to bear the cost of treatment of major surgeries to support injured persons in getting timely treatment and avoid additional financial burden to the affected households. Hospitals were instructed to provide free treatment to all the injured including for minor surgeries and outpatient services. However, there were some complaints at the HEOC that some of the private hospitals were charging fee from that injured. MoHP is still collecting the data of treatment and consequently reimbursing to them for the delivery of free services.

Deployment of Medical Teams and setting up field hospitals: In addition to public health facilities and designated private hospitals, delivery of free services was extended from temporarily established field hospitals and national as well as foreign medical teams. A total of 20 temporary field hospitals, 47 national medical team and 133 foreign medical teams were deployed for the delivery of health services in the affected districts by June 02. Even the existing public and private facilities were delivering services in the tents. Different organizations also provided logistics in terms of tents, medicines and supplies and health kits such as dignity kit, reproductive health kit, hygiene kit. Details of the support received from different organization are in annex 2.

As shown in the Table 4, a total of 2,385 persons including 1,068 doctors were deployed for health service delivery through FMTs. Many of them also went to hard to reach areas with necessary logistics through helicopters and those who needed higher level of treatment were uplifted to Kathmandu. As of 02 June 2015, a total of 25 FMTs are still providing health care services in the earthquake-affected districts and district wise disaggregation is in annex 1.

Table 4: Deployment of Foreign Medical Teams by District

Districts	Number of FMTs	Number of doctors	Number of nurses	Number of other team members	Total team members
Bhaktapur	11	41	52	120	213
Dhading	13	53	26	47	126
Dolakha	5	42	6	36	84
Gorkha	10	41	23	31	95
Kathmandu	26	452	62	258	772
Kavrepalanchowk	15	116	46	111	273
Lalitpur	10	78	10	110	198
Lamjung	1	5		0	5
Makawanpur	1	3	2	4	9
Nuwakot	9	43	32	70	145
Ramechhap	2	4	6	4	14
Rasuwa	4	24		6	30
Sindhupalchowk	26	166	100	155	421
Grand Total	133	1068	365	952	2,385

Source: HEOC, MoHP

Temporary field hospitals established by different foreign team played important role in delivering inpatient services in addition to outpatient services to those with minor injuries. Other medical teams mainly focused on the emergency and outpatient treatment services and referred the complicated cases to the nearby hospitals.

Thus, foreign as well as national medical team also played a quite important role to meet the immediate health care needs of the injured people though coordination with the district health offices remained a challenge particularly when the teams were in remote areas away from the district offices. Table 5 below shows the cumulative data of outpatient and inpatient services including surgeries and trauma cases collected from the health facilities under surveillance in 14 highly affected districts until June 02, 2015.

Table 5: Total Number of Services Provided in Most Affected 14 Districts

Category	Public	Private	Community/NGO	Temporary Hospital	Total
Outpatient	67,762	31,686	12,191	5,339	116,978
Inpatient	22,062	11,690	6,757	690	41,199
Major surgeries	1,739	916	485	81	3,221
Minor surgeries	2,630	802	361	310	4,103
Trauma	9,320	3,629	2,244	174	15,367

Note: data as of June 02, reported by health facilities under surveillance.

Source: Health facility based surveillance system, HEOC.

Trauma management: Casualty Triage Desk was also established at the Airport on 29 April, 2015 to triage the critical patients brought by the air route, perform basic initial symptomatic management, and refer them to the public hospitals or the temporary hospitals as appropriate. As of 2 June 2015, a total of 443 casualties have been triaged and referred from the desk and the detail is in annex. Six emergency medical hubs of the Kathmandu valley were mainly handling the trauma cases on top of delivery of other services.

Dead body management: There is a total of 8,702 death reported out of which 45% are male and 55% are female. This shows that female population are more affected by the quake than male. Summary of death and injuries by sex and districts are presented in the Table 6.

Table 6: Number of Death and Injured by District

District	Death				Injured
	Male	Female	Unknown	Total Death	
Sindhupalchowk	1497	1943	0	3440	2101
Kathmandu	621	600	1	1222	1218
Nuwakot	459	627	0	1086	662
Dhading	340	393	0	733	952
Rasuwa	287	310	0	597	7949
Gorkha	213	230	0	443	1179
Bhaktapur	118	215	0	333	3052
Kavrepalanchowk	129	189	0	318	229
Lalitpur	67	107	0	174	1051
Dolakha	84	85	1	170	61
Ramechhap	16	23	0	39	135
Makawanpur	16	17	0	33	771
Okhaldhunga	10	10	0	20	230
Sindhuli	5	10	0	15	1571
Total of 14 districts	3862	4759	2	8623	21161
Moderately affected 17 districts	25	19	0	44	1142
All other districts	12	23	0	35	
Total	3899	4801	2	8702	22303

Source: DRR Portal, MoHA

Timely identification of dead body and its hand over to the concerned families was important to minimize tensions to the affected family and help them to recover. As of 02 June, 8672 dead bodies have been handed over to next of kin.

Governance

District capacity and human resource situation: Existing capacity of the Ministry of Health and Population in general and that of concerned District Health Offices have been stretched to ensure the resumption of disrupted services care delivery, coordinate with concerned agencies and stakeholders and manage increased case load for treatment including trauma cases. Focal person were sent to each of the highly affected districts from the MoHP to coordinate and support the districts. Districts health offices were closely coordinating with the District Disaster Response Committee and Health, WASH, Nutrition and

Protection clusters, and foreign and national medical teams. MoHP also sent money to the districts to purchase immediately required items such as medicines, power back up, renting of buildings etc.

While to prevent absenteeism of staff in healthy has been instructed to continue working, the assessment team noted that a significant number of sanctioned posts of health workers (for instance, only 185 out of the total of 306 sanctioned posts for Health Posts in Sindhuli) are currently vacant. assessment team noted that a significant number of sanctioned posts of health workers (for instance, only 185 out of the total of 306 sanctioned posts for Health Posts in Sindhuli) are currently vacant. This meant that existing health workers had to work overtime to meet the immediate health care need while their own shelter was damaged and many had their family members directly affected by the earthquake. In such situation, existing staff are overstretched and may not sufficiently cater the surge in the case load that is evident in many health facilities and districts, as reported by the health workers themselves. Therefore, motivating the health workers on work possibly through financial and no-financial incentives and keeping their morale high is very crucial not only for now but also to better manage the disaster in future.

Information management system: Routine information system especially the health management information system (HMIS) has been affected in the aftermath of the earthquake as reporting forms and formats are not recoverable at many health facilities on the one hand and, on the other hand, health workers had to engage in the delivery of emergency services in their full capacity. Some of the facilities have lost their service register causing problem in follow up services particularly for those with communicable diseases. This will also add up the challenge in efficient management of services in the affected areas. The pattern of health care need will vary across affected areas due to movement of people and cases of injuries. Important health indicators, guiding health service delivery (e.g. expected number of pregnancies/deliveries) are expected to change because of population migration from one catchment area to others. These aspects will have to be taken into account while planning the implementation of activities at the district level.

Risk and Vulnerability

Hospital based post- earthquake surveillance system: Considering the risk of epidemic and disease outbreak, hospital based post- earthquake surveillance system was established by the HEOC covering public and private hospitals of 14 highly affected districts. Initially, this surveillance system covered 96 treatment sites including 66 hospitals and temporary camps within the Kathmandu valley and 30 hospitals and temporary camps outside the Kathmandu valley. Since 28th May, the number of sentinel hospital sites has been reduced to 38 in 14 affected districts.

This surveillance system is important to ensure that outbreaks are not missed. The number of syndromes crossing the threshold level (doubling of the average of the previous 7 days, with a minimum of 5 cases) gives us signals to be in alert position. Four outbreak prone conditions namely acute respiratory illness, watery diarrhoea, bloody diarrhoea and fever of unknown origin have been closely monitored by the MoHP. No outbreaks have been ascertained till 2 June 2015. Trend of outbreak prone conditions is in annex 3.

High risk population groups: based on heightened needs occurring in normal times, pregnant women, women in post-natal period and new born children are the single biggest vulnerable group. We estimate a total of 29,332 deliveries and corresponding new born children who will be directly affected in the 3 months following the earthquake. A caseload of patients suffering from chronic conditions (TB, HIV, leprosy, non communicable diseases) and whose continuous assistance cannot be guaranteed because

either the disruption of the offer but also because of difficulties in access should be considered. Similarly severely injured persons, persons with disabilities children, elderly, and adolescents are also vulnerable to health risk in such a post disaster situation. With 1.95% of disability, total number of people with disability is estimated to be above 100,000 people in the 14 most affected districts.

Health facilities as risk: As there is the risk of landslide and other threats such as floods during the monsoon season, some of health facilities may also be exposed to this risk. Particularly, some of the health facilities which are located in the remote areas in high mountains are in the risk of being disconnected from district headquarter and even from Kathmandu Valley due to road blockade by landslides. Vulnerabilities are also invited at the facilities by power cuts (e.g. cold chain); relative lack of appropriate WASH facilities in communities (and consequent heightened risk for waterborne diseases) diseases associated with crowding (measles, ARI, if relevant) and, if relevant vector borne diseases. Districts offices and centre are to be prepared for rapid response to manage along with the maintenance of minimum stock of drugs and other supplies in strategic locations.

Damage and Loss

Based on the data reported by district offices and information collected through field visits from most affected 14 districts, inventory of damages of buildings, equipment, instruments, furniture and drug and supplies were taken. In total, 462 health facilities were completely damaged while 745 facilities were partially damaged as presented in the Table 7. Unit cost was defined in consultation with respective technical experts based on which the cost of damages was estimated which is summarised in table 6 below.

Table 7: Cost of Damages and Losses by Category Amount In million NPR

Estimation of Damages			
<i>Facilities completely destroyed</i>	Public	Private	Total
Public hospitals and buildings	1535	608	2,143
Primary Health Care Centres	120		120
Health Posts	1877		1,877
Others	45		45
<i>Sub total</i>	3577	608	4,185
<i>Facilities partially destroyed</i>			-
Hospitals (district hospitals plus individual blocks of central hospitals)	144	243	388
Primary Health Care Centres	54		54
Health Posts	269		269
Others	11		11
<i>Sub total</i>	479	243	722
<i>Equipment and logistics</i>			
Equipment	223		223
Office equipment and furniture	41		41
Medications and supplies destroyed	13		13
Other medical logistics and supplies(e.g. instruments, HMIS forms)	14		14
<i>Sub total</i>	291	0	291
Total damages	4346	851	5,197
Estimation of Losses			
<i>Demolition and removal of debris</i>			-

Hospitals	17	16	33
Primary Health Care Centres	2	0	2
Health Posts	42	0	42
Others	3	0	3
Sub total	63	16	79
Treatment services for injured			
Reimbursement for treatment of seriously injured	85	0	85
Transportation for the referral to higher level of facilities	13	0	13
Revenue lost due to waiver of users fees (outpatient treatment)	18	23	41
Payment for treatment services (users fee)	119	123	242
Rehabilitation services for those having disability	90	0	90
Budget allocation by MoHP for management of service delivery	67	0	67
Psychosocial counselling	1	0	1
Referral for those needing rehabilitation services	1	0	1
Sub total	393	147	540
Provision service delivery for affected population			-
MBBS doctor in the HFs of highly affected areas	21	0	21
Establish five step down hospital and rehabilitation centres	11	0	11
Subside contribution to affected population for enrolment in health insurance	400	0	400
Establish geriatric ward in highly affected hospitals	17	0	17
Temporary arrangement of health facility building & rent	10	0	10
Arrangement of utility services at damaged facilities	10	0	10
Mobile Services (Mobile Camps)	1	0	1
Reproductive health and geriatric care	2	0	2
Sub total	472	0	472
Governance and risk management			-
Public awareness through media and IEC and BCC activities	5	0	5
Water and sanitation campaign	7	0	7
Medicine for monsoons and pre-positioning for outbreaks	3	0	3
Outbreak investigation and response team at the central level	1	0	1
Public Health inspector - to monitor the situation and responses	24	0	24
Outbreak prevention and response district level	3	0	3
Monitoring and supervision	3	0	3
Information Management (HMIS/LMIS tools, data recovery)	0	0	0
Support and mobilise DRRT (in 14+21 districts)	1	0	1
Monitoring and management of information, disease surveillance (14 districts)	1	0	1
Sub total	48	0	48
Total losses	977	163	1,139
Grand total (effects of earthquake)	5,323	1,014	6,337

Total value of damage and loss is estimated to be 5.96 billion NPR out of which 80% share was of damage and rest 20% being losses. Similarly, value of damage and losses was heavily dominated by the public sector (having 92% of total) due to the existence of large number of public health facilities in the affected districts.

An attempt has been done to decompose the value of damages and losses by the affected districts and categories which are summarised in Table 8 below. Gorkha, Sindhupalchowk, and Dolakha are the top three districts in terms of estimated value of damage and loss, excluding the central level hospital and administrative buildings.

Table 8: Cost of damages of buildings, equipment, other logistics and losses

Districts	Infrastructure	Medical equipment	Office equipment	Medicines & supplies	Other logistics	Others losses	Total	Total (%)
Bhaktapur	71	3	0	-	1	16	90	1.4
Dhading	315	2	2	-	0	66	386	6.1
Dolakha	334	7	3	2	1	72	420	6.6
Gorkha	426	16	12	4	3	96	558	8.8
Kathmandu	155	2	5	-	0	34	197	3.1
Kavre	199	8	1	0	2	43	253	4.0
Lalitpur	103	0	1	-	0	21	125	2.0
Makwanpur	222	-	-	-	-	46	268	4.2
Nuwakot	264	2	3	0	0	56	324	5.1
Okhaldhunga	86	0	0	1	0	18	105	1.7
Ramechhap	159	8	1	0	2	35	204	3.2
Rasuwa	151	3	3	1	1	33	192	3.0
Sindhuli	174	0	1	0	0	36	212	3.3
Sindhupalchowk	345	10	6	2	2	76	441	7.0
Total of 14 districts	3,004	62	38	12	12	648	3,776	59.6
Other districts	588	6	4	1	1	124	724	11.4
Central hospitals	1,393	155	-	-	-	288	1,836	29.0
Grand Total	5,141	223	41	13	14	1,060	6,337	100

Source: Estimates based on damage and losses.

Disaster Effects and Impact

The human loss, injuries and damage to health infrastructure have resulted in major health impact and many years of life lost. Many of the seriously injured people who have undergone major surgeries like amputation and those having severe spinal injury by the earthquake are at risk of long term disability. Death and rise in disability will have detrimental effect on the people's health causing many years of disability adjusted life years. Further, people are at risk of mental trauma and need immediate psychological counselling and mental health intervention to prevent and properly manage the situation. Due to the large number of death occurred at once, mortality rate will go up and life expectancy will go down for the current year but this will not have long term effects in mortality rates except by serious injuries and disabilities.

Similarly due to damage to the health facilities and health services, the basic health service like anti natal check-up, treatment care and support of HIV infected population, TB treatment continuity, child and neonatal health services and many other public health programs will have some to major effect even though the response activities will be focused to mitigate such needs. The access to care if affected and thus effect will be seen in programs for regular follow up for antenatal, post-natal care, neonatal care, DOTS and ART services which can result in high morbidity and mortality of the disease status. The negative affect on health is also expected due to effect on the nutritional status of the vulnerable population in these districts. However, estimates of life years lost and other social impacts of the earthquake in the health sector have not been estimated in money value due to the complicated methodologies involved.

Recovery Needs and strategy

Ministry of Health and Population formed a coordination committee for the assessment of needs and planning for recovery and reconstruction of the health sector under the chair of Chief of Policy, Planning and International Cooperation Division. Based on the information available from the districts an initial set of necessary activities was defined, cost was estimated and submitted to the NPC. However, detail planning for the recovery was carried out together with concerned District (Public) Health Offices followed by the situation assessment.

While the proper reconstruction of the sector may take some years while the prime concern at present is resuming services to cater immediate health care needs of the population. Considering this scenario, Ministry of Health and Population has adopted **three pillar strategies for the recovery and reconstruction** which are basically adopting the immediate until mid July 2015), intermediate term (during FY 2015/16) and medium term (FY 2015/16 to 2019/20) implementation framework.

First strategy (until mid July 2015) is to furnish the districts with necessary logistics and human resources within current fiscal year (by mid July 2015) to resume essentials health services, organizing health camps and enable districts offices and facilities to deal with foreseen immediate risk and vulnerabilities such as those resulting from monsoon rain, landslides and disease outbreaks. Technical assessment of buildings, demolition of completely damaged structures and quick repairs are also considered under this strategy in order to resume services. This strategy also include managing exit of medical teams and temporary field hospitals that were established in different locations to address the urgent needs of the population. Priority will be to available local resources and generous support of partner agencies to address the immediate needs.

More specifically, demolition of damaged buildings, temporary arrangement for building in terms of shed or renting, purchase of medical instruments and office materials, resumption of utility services such as electricity, water, communication, and internet are to be done by mid-July 2015. Similarly, providing medical doctors to needy districts, prepositioning of medicines in strategic location for the monsoon and preparedness for disease outbreak and disaster are being planned. Besides the existing structure and temporary set up for building, health services will also be delivered through mobile camps with special focus on reproductive health, psychosocial counselling and rehabilitation. At the central level, mapping of injured persons, strengthening of surveillance and response system and awareness campaigns will be carried out.

Second strategy (FY 2014/2015) is to replace the temporary provisions by short term arrangements to ensure the continuity of service delivery, cater the changing pattern of health care needs and make necessary provisions of human resources in the intermediate term i.e. fiscal year 2015/16. Continuing the

demolition of remaining damaged buildings, doing major repair works and reinstating health facilities by setting up pre-fabricated structure are the key functions to be carried out under this strategy during a period of one year. Specifically, 40% of the damaged Health Posts and limited structure for damaged PHCCs and hospitals will be reconstructed by pre-fabricated materials.

Based on the technical assessment of the buildings, reconstruction process will also be initiated for concrete infrastructure. Other activities such as purchase of damaged major equipment, outbreak prevention and response and continuation of service delivery will be carried out in the immediate terms.

While the first and second strategies aim to address the immediate and intermediate needs for the recovery, **third strategy (2015/16 to 2019/20) is much concerned on the reconstruction of the sector from the longer terms perspective.** In this strategy, detail assessment of the existing networks of health facilities and their capacity will be carried out in consideration with geographic situation and population size. Based on this assessment, medium term plan will be developed which will basically consist of setting up the new structures by reconstructing buildings for health facilities along with necessary equipment. Further, setting up a comprehensive preparedness, response mechanism and governance structure is key priority for management any possible disaster in future.

Under this approach, Health Posts which are not yet built by pre-fabricated materials, PHCC and hospitals will be reconstructed in the damaged sites. Similarly, establishing of 9 Richter seismic resistance emergency centres in each of 14 ones and setting geriatric wards in hospitals of affected districts are considered. These measures may take minimum of 3 to 5 years to accomplish and also follows the concept of build back better. This medium term plan for the reconstruction will be built into the routine plans and strategies of the MoHP as feasible. Design of the buildings and other details of the reconstruction plan are provided in annex 4.

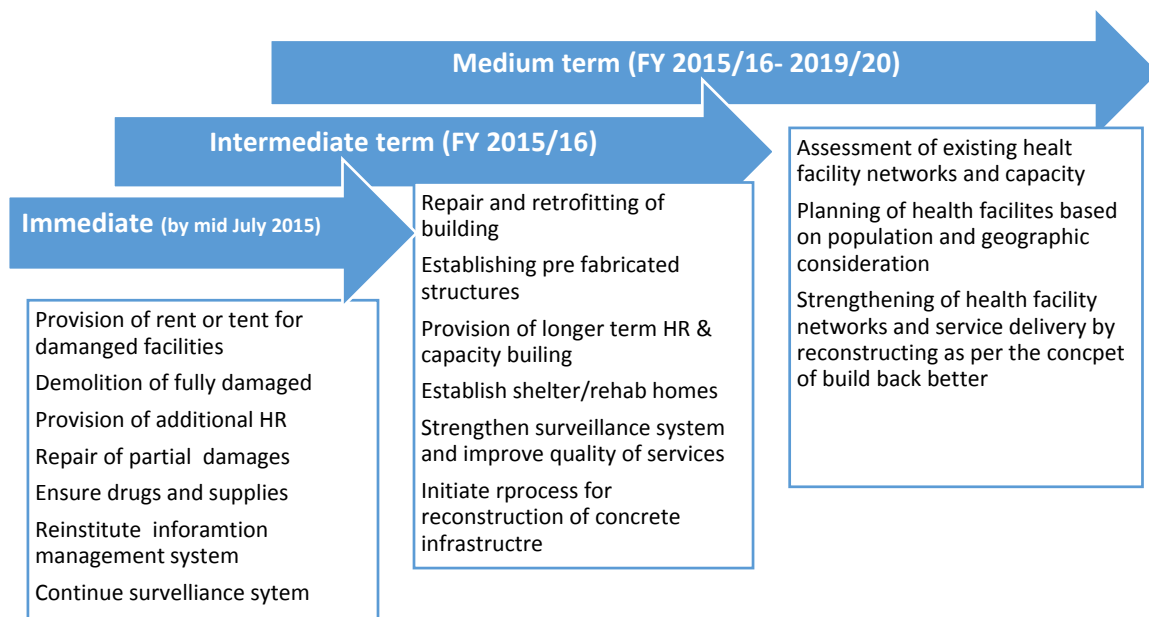
With the increased share of Person With Disability (PWD) as a result of earthquake, all short term, medium and long term infrastructure set up for health service provision will be disable friendly that ensures access of medical service and health facilities for PWD.

Provision of treatment, physiotherapy and peer counseling need to be integrated into plan and costing

Post-earthquake recovery also needs to address demand for mental health treatment and psychosocial counseling and therefore need to be integrated into all short, medium and long term health strategy.

Earthquake has damaged most of the birthing centers, these needs to be rehabilitated and reestablished immediately.

Figure 1: Recovery and Reconstruction Strategy



The Ministry of Health and Population has developed a comprehensive plan for immediate resumption of critical health services by reconstructing damaged health facilities and, where appropriate, expansion of services to new settlements. It includes package of services for targeted vulnerable population groups- pregnant mothers, new born, and senior citizens – and additional services to meet urgent health needs in the aftermath of the earthquake: mental health, rehabilitation, etc. Through the plan the ministry seeks to strengthen disease surveillance to protect communities from risk of outbreaks and disasters. Recovery and reconstruction plan consist of district and central level activities which are summarised in the following tables.

Table 9: Cost of District Level Recovery and Reconstruction Plan Amount in million NPR

Immediate term (Until July 2015)	Amount	Intermediate term (FY 2015/2016)	Amount
Demolition of damaged buildings	50	Construction of health facilities (prefab structure)	1,001
Temporary arrangement of building & Rent	10	Repair and maintenance of partially damaged	74
Arrangement of utility services	10	Equipment and drugs	73
Medical instruments and office materials	2	Service delivery	0
Medicine for monsoons and pre-positioning for outbreaks	3	Mobile services (Mobile Camp)	8
Mobile Services (Mobile Camp)	1	Reproductive health & geriatric Care	12
Reproductive health & geriatric Care	2	Psychosocial counseling	7
Psychosocial counseling	1	Rehabilitation services	6
Rehabilitation services	1	Monitoring, supervision and public hearings	8

Outbreak prevention and response	3	Intermediate term cost	1,191
Monitoring and supervision	3	Medium term (FY 2016/2017 to 2019/20)	
Information Management (HMIS/LMIS tools, data recovery)	0	Construction of health facilities (concrete structure)	4,767
IMMEDIATE COST	86	Purchase of land for health facilities	227
		Medium term cost	4,994
Total of district level recovery and reconstruction cost			6,270

*Note: Some of activities reflected in intermediate plans will also be continued in medium term.
Source: Cost estimated based on the district assessment and planning.*

In the immediate plan, treatment of the injured and resumption of health services are mainly covered. In the intermediate plan, construction of prefab structure, strengthening of services, repair and maintenance and preparedness for disaster and governance system are included. Lastly, medium term plan mainly consist of reconstruction of damaged facilities, setting of health emergency centres at zonal level and purchase of land for selected HPs. Overall cost of recovery and reconstruction plans is estimated to be 11.27 billion NPR cost of district level plan is 6.27 billion while the cost of central level plan is 4.99 billion.

Table 10: Cost of Central Level Recovery and Reconstruction Plan Amount in million NPR

A. Immediate term plan (until July 2015)		B. Intermediate term plan (FY 2015/16)	
Payment to hospitals for treatment of injured	20	Public Health inspector - to monitor the situation and responses	24
MBBS doctor in the HFs of highly affected areas	21	Establish five step down hospital and rehabilitation centres	28
Collection of injured data from hospitals and treatment plan	10	Establish monitoring mechanism and systems of the above all activities	1
Strengthen the surveillance system (diseases and conditions - syndromes)	2	Strengthening HMIS - printing tools, distribution and training	14
Support and mobilise DRRT	1	Strengthen central surveillance unit	2
Create public awareness through media and IEC and BCC activities	5	Human resources for Health Emergency Operation Centre (HEOC)	50
Outbreak investigation and response team at the central level	1	Define and maintain minimum level of logistics requirement at different levels	0
Water and sanitation campaign	7	Establish two tier M & E mechanism	5
Immediate term cost	67	Strengthen information management for disaster preparedness	1
Medium term plan (2015/16-2019/20)		Demolition of central level hospital and administrative blocks	12

Subsidy for household- identified affected population for enrolment into insurance	200	Retrofitting of partially damaged hospital and administrative blocks	36
Establish geriatric ward in highly affected hospitals	17	Intermediate term cost	173
Reconstruction of Maternity and Bir Hospitals	3,000	Grand total (central level recovery and reconstruction plan)	4,999
Reconstruction of Pokhara Regional Hospital	800		
Reconstruction of partially damaged building at centre	700		
Establishment of 9 Richter seismic resistance emergency centre at zonal level	42		
Medium term cost	4,759		

Note: Some of activities reflected in intermediate plans will also be continued in medium term.

Source: Cost estimated based on the district assessment and planning.

Cost of the recovery and reconstruction has increased by around 63% of the value of damage and losses. Higher percentage of increase is mainly because of the reconstruction of damaged health facilities in a bigger size considering the increased catchment population under the concept of build back better. Similarly strengthening of institutional capacity and preparedness for such disaster in future have also resulted higher cost of recovery and reconstruction. However, reconstruction and other activities are based on prevailing network of health facilities. Any major resettlement of population might have implication in the number of health facility and their capacity and hence cost estimates.

Implementation Arrangements

Recovery and reconstruction of the health and population sector will be guided by a Joint Coordination Committee for Health Sector Recovery and Reconstruction which is led by the chief of Policy, Planning and International Cooperation Division and include members of development partners. The Committee will oversee the standards and specifications for health infrastructure and will be responsible for the reconstruction plan for damaged health facilities.

After the finalization of the implementation plans, budgets will be allocated to districts considering the identified needs and resource availability. While major equipment and common supplies and major human resources will be provided from the center, the remaining activities will be accomplished by the districts based on a guideline developed by the MoHP. Recovery and reconstruction initiatives will be implemented over next years requiring approximately 1.4%, 18.1% and 21.9% of the estimated budget respectively in 2014/15, 2015/16 and 2016/17. Rest of the years will require equal proportion of the budget i.e. 19.5% of estimates total budget for each year until 2019/20.

Assessment Methodology

Following the PDNA orientation on May 20-21, MoHP formed a working team at the central level. The central level working team drafted scope of work, working timeline, assessment tools for the situation assessment of infrastructure, service delivery, governance and risks as well as planning template for recovery and reconstruction. Assessment tools mainly covered three aspects of work: validation of data

already compiled at the centre, collection of additional information on damages and its effects and identification of recovery and reconstruction needs.

Fourteen teams were formed for the visit to each of 14 most affected districts which were led by senior officials of the MoHP and co-facilitated by partner agencies. Orientation to the field team was organized on 23rd of May and the teams dispatched to the field on 24th and worked until 27th of May in the field. The field assessment teams consulted with the district health offices and health facility staff as appropriate as well as other key stakeholders and collected information on the status of damages and needs as per the provided templates. Collected information and field observations were shared by each of field team on 28th of May.

While the field teams were compiling data from the districts, central team in the meantime started preparing the assessment report based on the analysis of secondary data that were already available. All the data collected from the districts were compiled and analysed to produce the summary tables. Unit costs were defined for the infrastructure and major equipment in consultation with experts of the relevant area which was applied to estimate monetary value of damages and reconstruction.

Overall estimates of the cost consist of the damage of buildings (complete and partial) and damages of equipment and other logistics plus losses incurred as an effect of earthquake in terms of treatment cost and management of health sector response. Costing of the damages has been done in a disaggregated by the level of health facilities (i.e. HP, PHCC, District Hospitals, Central Hospitals and others) and by districts. Estimate of damages and losses was done based on the data from 14 districts and similar assumptions were applied for the estimation of other districts. Unit cost of damages was defined in consultation with technical experts which are applied for the estimates of total costs by type of health facility and equipment. Unit cost assumed for the estimation of the damages and demolition is given in the table below.

Table 11: Unit Cost for the Estimation of Damages and Losses of Infrastructure Amount in NPR

Unit cost	Demolition cost	Value of building	Partial damage
HP	100,000	4,500,000	450,000
PHCC	150,000	10,000,000	1,000,000
District hospital	1,000,000	38,000,000	3,800,000
Central hospital block	1,500,000	30,000,000	3,000,000
Private facilities	1,000,000	38,000,000	3,800,000

Consultation was done with association of private sector association and the reported data was used for estimation of damages. All the relevant data collected from the field and received by June 2nd are considered for the estimation of the costs. It should be noted that losses resulted from the health workers not able to work due to earthquake are not accounted as the reliable data were not available for such estimation. Therefore overall volume of the costs might have been underestimated as damages unidentified by 08 June remain non-captured.

Preliminary cost estimates of the damages and losses as well as recovery and reconstruction needs were discussed within MoHP, NPC and PDNA sector Team and PDNA secretariat. Preliminary estimates of damages, losses and needs were further refined based on the suggestions received. Finally a draft report was produced which was further refined based on the feedback received.

Annex 1: Number of Foreign Medical Team Returned and Currently Deployed

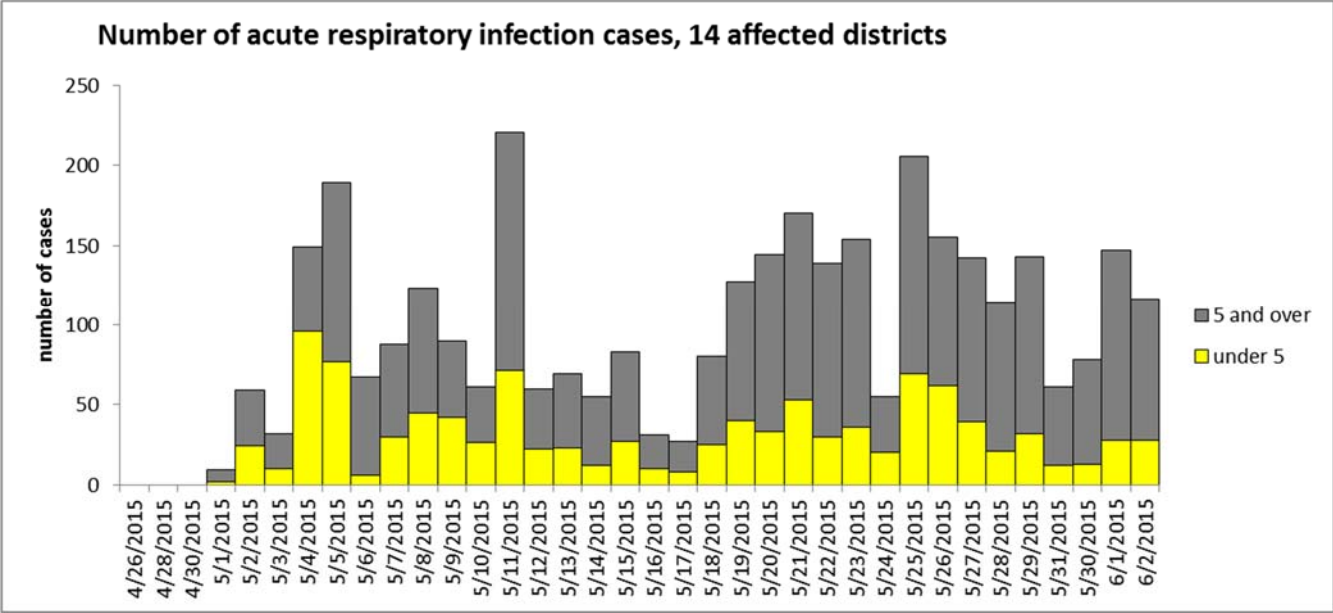
Districts	FMTs returned	FMTs currently deployed
Bhaktapur	9	1
Dhading	11	1
Dolakha	5	4
Gorkha	8	3
Kathmandu	24	2
Kavrepalanchowk	13	3
Lalitpur	9	0
Makawanpur	1	0
Nuwakot	4	3
Ramechhap	2	1
Rasuwa	4	1
Sindhupalchowk	20	7
Grand Total	111	25

Source: HEOC, MoHP

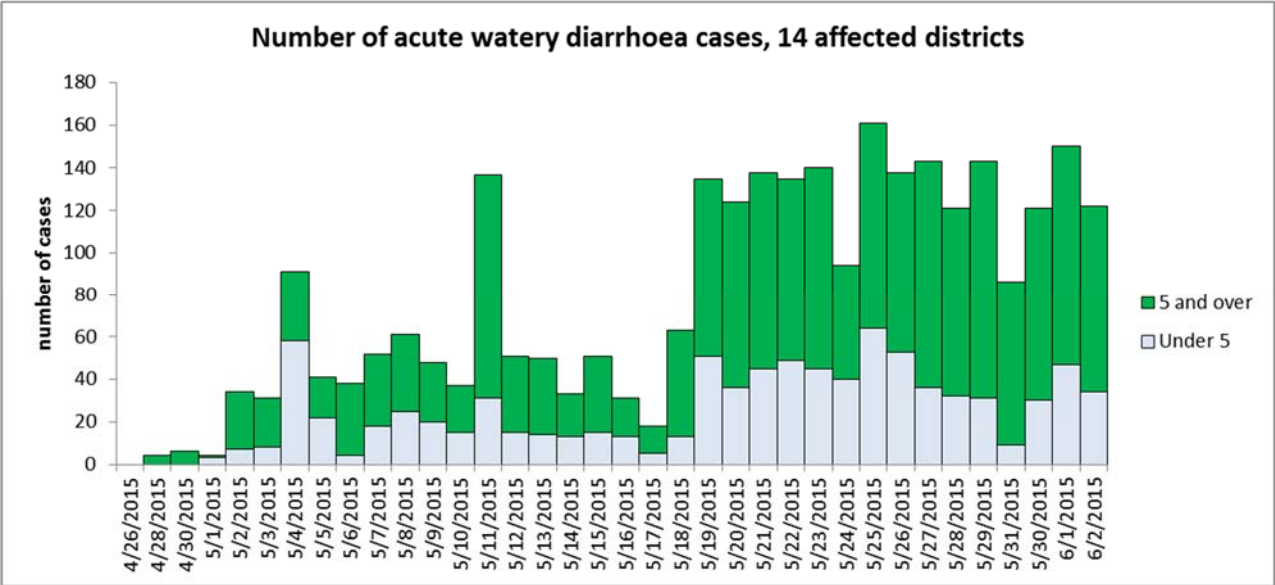
Annex 2: To be inserted later.

Annex 3: Trend in outbreak prone syndromes

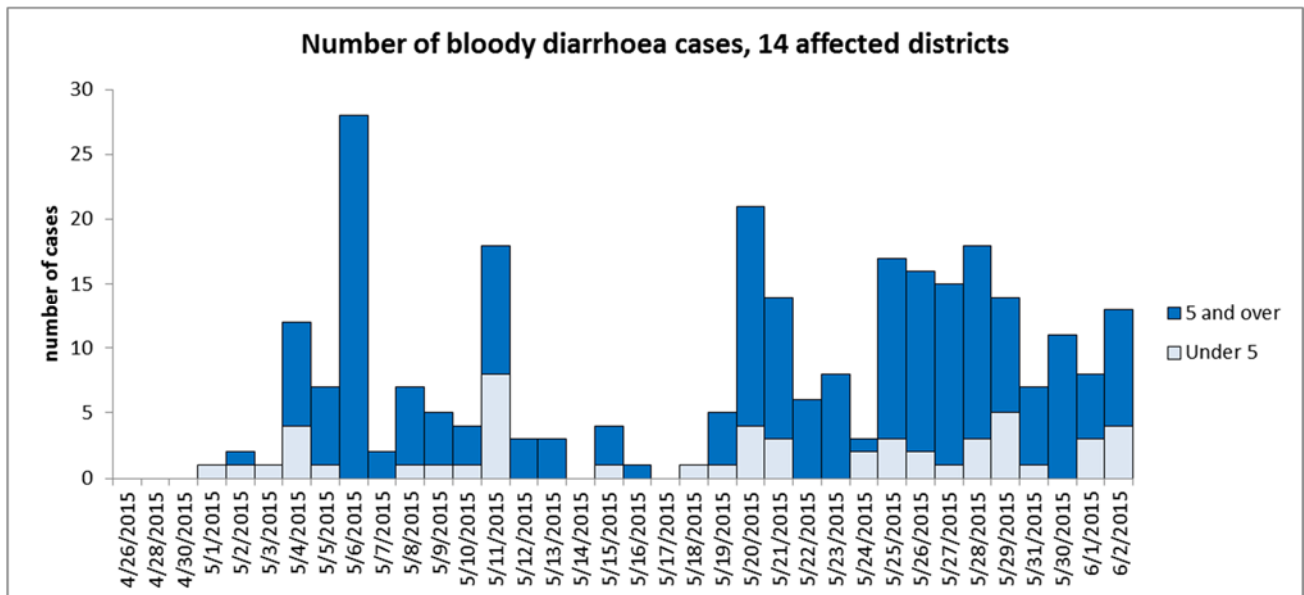
The number of ARI cases peaked on 11th May with 221 cases which represents about 6% of outpatient visits. The second peak was on 24th May and it has remained above 60 cases since then. However, there was no any clustering of cases and no outbreak reported.



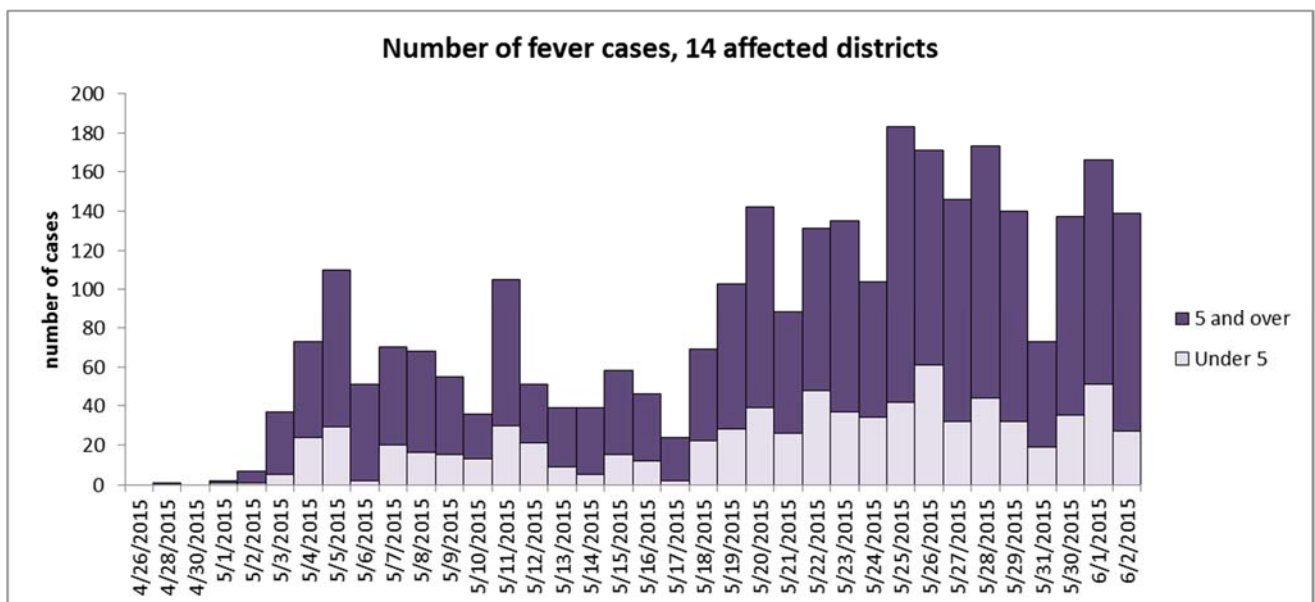
The number of acute watery diarrhoea cases peaked on 25th May with 161 cases which represents about 3.5% of outpatient visits. It has remained above 86 cases since 19th May. These cases were sporadic and no outbreak reported.



The number of bloody diarrhoea cases peaked on 6th May with 28 cases which represents about 2% of outpatient visits. But it has remained below 15 cases since 25th May except on 29th May. These cases were sporadic and no outbreak reported.



The number of fever cases peaked on 25th May with 183 cases which represents about 2% of outpatient visits. It has remained above 73 cases since 25th May. These cases were sporadic and no any disease specific outbreak reported.



Annex 4: Basis for Reconstruction and Design of the Health facilities

The structure proposed for intermediate reconstruction of the damaged health posts in the 14 affected districts is approximately 124 m² (1350 ft²). It incorporates a birthing unit (delivery room, ante-/post-natal

areas), clinic, dispensary, waiting area, administration room as well as staff accommodation (2 staff residence units). The health post is designed for pre-fabricated construction using steel structures and walls/partitions using one of the following technologies – fiber cement board, aerated cement boards, or PUF (Poly Urethane Foam) panels.

This design is 4.2 times smaller than the standard Integrated Health Post design (520m²) from the Management Division of the Department of Health Services. Even though smaller in size, the pre-fab design aims to incorporate the most essential functions of a health post, and allows for fast construction, in turn helping to resume health services in the disaster hit areas. These structures are estimated to last a minimum of 15 years.

To select which of the fully damaged facilities are to be rebuilt using the pre-fabricated design, the following selection criteria are to be used:

1. If the fully damaged facility has enough land to construct the new structure, and owns such land.
2. Total Population: This is the population that falls under the catchment area of the particular health institution. Catchment area (in terms of walking distance and radius of coverage) and respective population size as per the hierarchy of the institution is given in table 1. The assigned figures in this table have been derived from GIS analysis.

Type of Health Institution	Geographical Region	Distance to be travelled (Km)	Walking Distance (minutes)	Total Population
Health Post	Mountain	2	30	3000
	Hill	2	30	4000
	Terali	3	30	5000
Primary Health Care Center	Mountain	4	60	10000
	Hill	4	60	15000
	Terali	6	60	50000
16-30 bed capacity Hospital	Mountain	7	120	15000
	Hill	7	120	30000
	Terali	10	120	80000
31-50 bed capacity Hospital	Mountain	7	120	30000
	Hill	7	120	50000
	Terali	10	120	120000
51-70 bed capacity Hospital	Mountain	9	180	80000
	Hill	9	180	120000
	Terali	15	180	300000

3. Serving Population: This is defined as the net population after deducting the population served by the health institution of same or higher level from the total population fall under the catchment

area of that institution. Since catchment area of one institution may overlap with another, this deduction must be done to obtain the actually served population. Served population is calculated using GIS tool.

4. Accessibility: The location of the health facility plays an important role in providing effective health service. Besides, availability of adequate physical infrastructure (building, road network and enabling environment) is also important. Hence, to make decision for upgrading and new construction, criteria such as road network, potential for larger service coverage are taken into account. Such potential institution can serve larger population effectively. For this, prioritization is done based on analysis of availability of roads and their hierarchy (highway, secondary road, graveled road, seasonal road, agriculture road). These information are collected from department of roads and the concerned stakeholders which is mapped in GIS system and used for analysis. Besides, availability of other services such as agricultural, educational, commercial, administrative services also contribute in gaining higher score.

Note: A = highly affected, B = moderately affected, C = others

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NUTRITION

Summary

Undernutrition has been a longstanding problem in Nepal depicted by the high burden of key child undernutrition indicators such as stunting and wasting that currently stand at 37.5 and 11.3 percent respectively at the national level. The most recently available pre-earthquake data collated from Multiple Indicator Cluster Survey (MICS) 2014 and Small Area Estimation (SAE) 2014 indicated high child undernutrition rates in the affected districts. Infant and Young Child Feeding (IYCF) practices were also found to be sub-optimal in those districts.

Given its cross cutting nature, the nutrition sector does not have separate infrastructure to operate nutrition programming. Nutrition specific interventions are provided through the health facilities and community based extension services provided by Female Community Health Volunteers (FCHVs). Nutrition sensitive interventions are provided through related sectors such as education, agriculture, and water sanitation and hygiene. Hence, the damage caused by the earthquake to these sectors ultimately impact nutrition also. A post-earthquake assessment found that food consumption practices had worsened in the affected districts compared to pre earthquake assessment data. This will directly impact on the nutritional status, especially of children under five years of age, pregnant and lactating women who constitute the primary vulnerable groups for undernutrition. Around 250,000 children aged 6-59 months and 135,000 pregnant and lactating women are estimated to have been affected by the earthquake in the 14 districts.

As of now, there are no first hand statistics on the nutrition impact of earthquake amongst the affected population in Nepal. Experiences from other countries show that the underlying factors such as food insecurity, poor water, sanitation, hygiene, poor caring practices and disease outbreaks will have a gradual impact on the nutritional status. Hence the immediate concern is to prevent deterioration of nutritional status among the affected population, with a particular focus on pregnant and lactating women and young children as this population has specific nutritional needs.

Recovery and reconstruction activities have been proposed to address the immediate as well as longer-term needs. Supplementary food assistance and Multiple Micronutrient Powder (MNP) supplementation to the vulnerable groups has been planned for the initial year. These activities will be in conjunction with routine nutrition services provided by the health system, homestead food production, enhanced education and counselling on optimal Maternal Infant and Young Child Nutrition (MIYCN), management of Severe Acute Malnutrition (SAM), promotion for increased production and utilisation of nutrient rich agriculture including livestock products and capacity enhancement, all of which will continue as the medium as well as long term measures. Nutrition assessments and monitoring have also been planned to monitor and guide the interventions. The total tentative budget has been calculated for approximately 50.4 million USD.

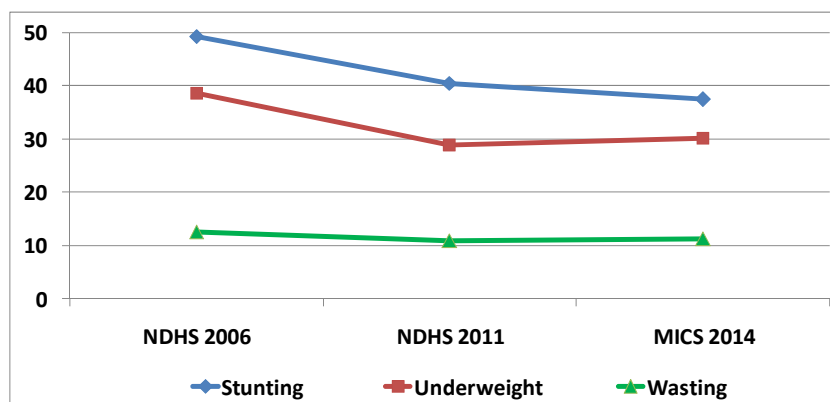
The overall recovery strategy will be aligned with Nepal's Multi-sector Nutrition Plan (MSNP) through multi-sector, multi-stakeholder and multi-level coordination and collaboration for nutrition.

Pre-Disaster Context and Baseline

Under nutrition has been a prevailing problem in Nepal prior to the devastating earthquake on 25th April 2015, particularly amongst the vulnerable population groups such as children under five and pregnant and lactating women. Nepal Multiple Indicator Cluster Survey (MICS) conducted in 2014 provides the latest statistics on the extent of the child under nutrition challenge faced by the country. Stunting, underweight and wasting rates stand at 37.5, 30.1 and 11.3 percent respectively.

¹ Figure 1 shows a comparison of the findings of MICS 2014 with the situation five and ten years ago, from the Nepal Demographic and Health Survey (NDHS) 2011² and 2006³. Though the stunting prevalence seems to be declining, it is still considered very high according to the World Health Organization (WHO) Categorization of the Public Health Significance of Undernutrition Indicators. In the past five years, the prevalence of underweight, the Millennium Development Goal (MDG) indicator for nutrition, and wasting have increased.

Figure 1: Child Undernutrition Rates (%)



The MICS 2014 did not collect information on micronutrient status or on the nutrition status of women. However, the high anemia rate of 48 percent among pregnant women shown by NDHS 2011 is a depiction of widespread poor maternal nutrition status. Similarly, 46 percent of children aged 6-59 months were found to be anemic by the same survey and the prevalence was almost 70 percent amongst 6-23 month olds. Furthermore, according to MICS, nearly a quarter of children (24.2%) are born with low birth weight.

In order to comprehend the degree of problem at district level before the earthquake, data was collated for the affected districts to the data of the corresponding eco-development region presented by MICS 2014. Table 1 provides a summary of key nutrition indicators taken from the MICS 2014 as baseline information of the situation prior to the earthquake.

¹ Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics and UNICEF (2015.)Nepal Multiple Indicator Cluster Survey 2014, Key Findings and Tables.

² Nepal Demographic and Health Survey (2011)

³ Nepal Demographic and Health Survey (2006)

Table 1: Summary of key nutrition indicators in the 14 severely affected districts before the earthquake, MICS 2014

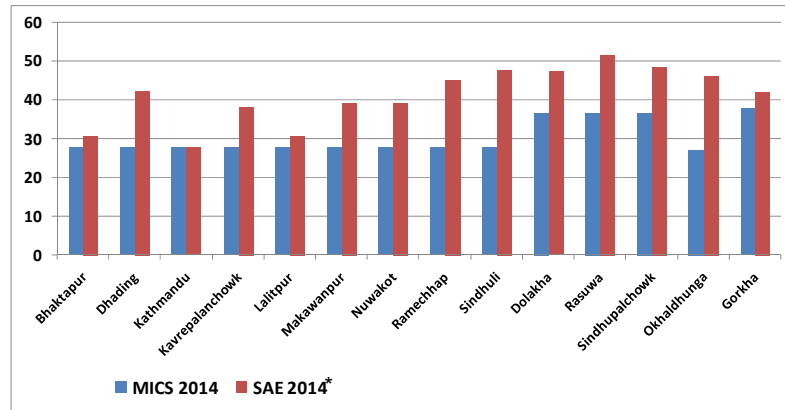
S. N.	District	Eco-Dev Region	Low Birth Weight (%)	Anthropometry, children 0-59 months (%)				Infant and Young Child Feeding (IYCF) (%)		
				Stunting Below -2SD	Severe Stunting Below -3SD	Wasting Below -2SD	Severe Wasting Below -3SD	Initial BF Within an hour of birth	Exclusive BF	Minimum Acceptable Diet
1	Bhaktapur	Central Hill	23.7	27.7	11.5	5.9	4.4	45.6	54.3	38.6
2	Dhading									
3	Kathmandu									
4	Kavrepalanchowk									
5	Lalitpur									
6	Makawanpur									
7	Nuwakot									
8	Ramechhap									
9	Sindhuli									
10	Dolakha	Central Mountain	21.0	36.6	16.4	7.3	1.2	74.6	38.9	20.3
11	Rasuwa									
12	Sindhupalchowk									
13	Okhaldhunga	Eastern Hill	26.6	26.9	9.9	10.8	4.2	43.9	35.5	46.8
14	Gorkha	Western Hill	23.3	37.6	12.9	7.4	3.8	45.3	68.9	41.5

Source: MICS 2014

A recently released Small Area Estimation (SAE) of under nutrition 2014⁴, based on NDHS 2011 and Population Census 2011, fills the paucity of data at district and sub-district level. Annex 1 presents the district level datasets from both sources for the available nutrition indicators. Figures 2, 3 and 4 show a comparison of data from the two sources for stunting, wasting and severe wasting prevalence in the 14 districts.

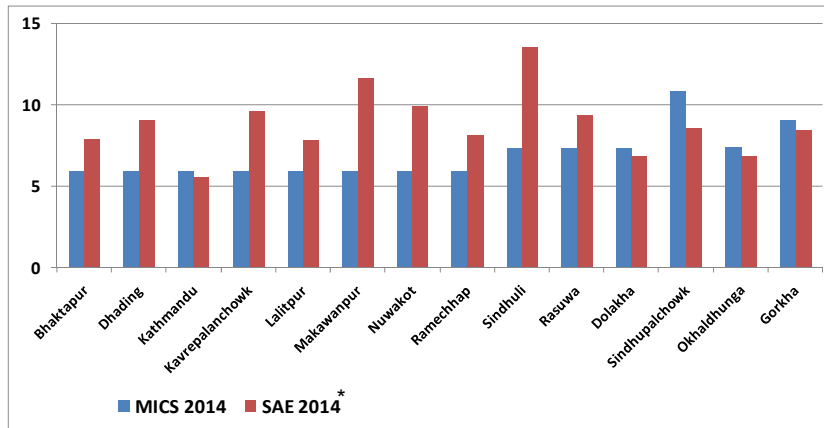
⁴ Haslett, S., Jones, G., Isidro, M., and Sefton, A. (2014) Small Area Estimation of Food Insecurity and Undernutrition in Nepal, Central Bureau of Statistics, National Planning Commission Secretariat, World Food Programme, UNICEF and World Bank, Kathmandu, Nepal, December 2014.

Figure 2: Stunting Prevalence (%)



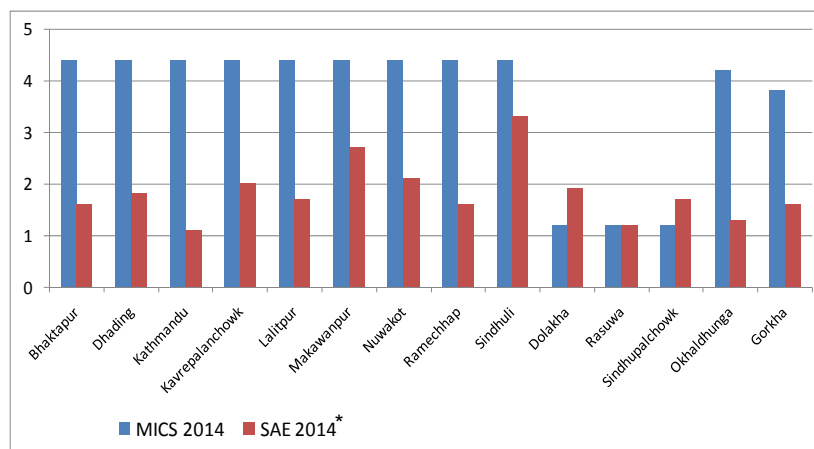
* Data sources: NDHS 2011 and Population Census 2011

Figure 3: Wasting Prevalence (%)



* Data sources: NDHS 2011 and Population Census 2011

Figure 4: Severe Wasting Prevalence (%)



* Data sources: NDHS 2011 and Population Census 2011

Overall, the findings of MICS 2014 are lower than the estimation of SAE 2014 except for severe wasting prevalence. It can be seen from the graphs that stunting, which reflects chronic under nutrition, follows the usual pattern seen in Nepal of being highest in the mountain areas. Hence, the three mountain districts: Dolakha, Rasuwa and Sindhupalchowk have the highest child stunting rates. Wasting was found to be higher than 5 percent in all districts by MICS 2014 and higher than 7 percent in all districts by SAE 2014. It is above 10 percent in Makwanpur, Nuwakot, Sindhuli and Sindhupalchowk from either source. The MICS 2014 found alarmingly high levels of severe wasting, above or almost 4 percent in all central hill districts, Okhaldhunga and Gorkha.

Infant and Young Child Feeding (IYCF) practices, as demonstrated by the MICS 2014, show that half of the children were initiated breastfeeding within one hour of birth and half of children were exclusively breastfed during the first six months of life. Less than 40 percent of children were able to meet the recommended minimum acceptable diet which was even lower at 20 percent in the case of the three central mountain districts: Dolakha, Rasuwa and Sindhupalchowk.

The above synthesis of child under nutrition indicators are considered to be of high prevalence according to the WHO Categorization of the Public Health Significance of under nutrition for young children and pregnant and lactating women.

The Government of Nepal (GoN) has developed a Multi-sector Nutrition Plan (MSNP) to address the complex set of determining factors for improving nutritional status of families through a multi-sectoral approach. To support the scaling up essential nutrition specific and sensitive interventions listed in the MSNP, many national programmes and large scale projects are currently being implemented in Nepal.

Post Disaster Context

Regarding infrastructure, the nutrition sector does not have separate facilities to operate nutrition programs. Nutrition specific interventions are provided through the health facilities and community based extension services provided by Female Community Health Volunteers (FCHVs). According to recent records, eight health workers and 10 FCHVs died in the earthquake; 68 health workers and seven FCHVs

are injured; and two health workers are missing⁵. Nearly 80 percent of public health facilities are damaged due to the earthquake and many of the government offices providing social services have been destroyed⁶. While a relatively small number of FCHVs died or were injured, many are seriously affected, were found to be under stress, and may not be in a position to carry out their functions like before, negatively impacting nutrition services. Primary Health Care and Out Reach Clinics are still functional in most of the places.

There are approximately 73,000 pregnant women and 62,000 lactating women in the earthquake-affected areas. Field visit observations found that many of these women are suffering from a) reduced food intake and dietary diversity, b) stress and trauma caused by the earthquake and the subsequent disruption to their lives. This is likely to negatively affect not only their own nutritional situation, but may also affect exclusive and continued breastfeeding among their children. Unsolicited distribution of infant formula focusing on children under five years was observed in Gorkha and Sindhupalchowk districts after the earthquake, which further threatens breastfeeding practices. In response to this, the Nutrition Cluster has prioritized creating designated spaces where mothers can access safe, low-stress areas to breastfeed, rest, eat and receive skilled counseling and targeted advice about breastfeeding and nutrition as an important part of the immediate response plan.

Many of the water supply systems are affected and toilets are destroyed at the household level.⁷ It is estimated that half of the population in the affected districts need support to meet their needs for water supply, sanitation and hygiene and environmental cleanliness. Women have reported walking between one and three hours to collect water from alternative sources in areas where serious damage to the water system occurred. Water collection is often used for both household members and livestock, incurring a time, energy and child care cost. Nutritional status can be negatively impacted by reduced access to sanitation, possible increases of open defecation, reduced production of vegetables and other nutritious food as a result of damaged irrigation systems, and increased energy expended by walking longer distances, likely by women, to collect water.

Majority of the schools and early childhood development (ECD) centers, including their water and sanitation facilities, are damaged in the 14 districts. The effect on the education sector is likely to have a direct and indirect effect on the nutrition sector as well. Damaged water and sanitation facilities may be linked to outbreaks of diseases such as diarrhea which can negatively impact nutritional status. The provision of mid-day meals by the education sector would support the nutritional needs of children, including both preschool (ages 3-5) and primary school age children (ages 6-10). In addition to supporting the nutritional needs of school going children, the mid-day meals would also reduce the food requirement at the household level. It also helps to attract and retain children at schools which has a longer term benefit on nutrition as there is a direct correlation between education attainment of a mother and her child's nutritional status.

With the objective to prevent malnutrition, District Health Offices with support from the District Level Support Agency (DLSA) have already initiated emergency nutrition response activities through the community management of acute malnutrition (CMAM) approach and mother baby areas. These

⁵ HEOC Report, May 29, 2015

⁶ HEOC Report, May 29, 2015

⁷ WASH Sector Report, June 2015

response efforts include Infant and Young Child Feeding (IYCF) counselling, breastmilk substitute code monitoring, and establishment of Outpatient Treatment Programmes (OTPs) in health facilities located in the affected districts. A blanket supplementary feeding programme for pregnant and lactating women and children 6-23 months will be implemented in June, 2015. Annex 3 provides the activities and achievements of nutrition cluster so far.

Regarding food access, a post-earthquake assessment of 1,010 households in 11 affected districts outside of Kathmandu Valley confirmed widespread losses of household food stocks, seeds, and agricultural tools affecting both immediate and longer term food security⁸. Affected households have lost a total estimated 52,000 MT of grain and 80 percent of households in the most food insecure areas reported losing their entire food stocks. Food security pre-earthquake monitoring data show that all 627 VDCs in the affected districts were classified as minimally food insecure. Post-earthquake data show that 80 VDCs are now severely food insecure, 277 VDCs are highly food insecure, and 172 VDCs are moderately food insecure, with the most severely affected VDCs in Gorkha, Sindhupalchok, Dhading, Dolakha, Rasuwa, Nuwakot and Kabhrepalanchok⁹. It was observed that the affected communities were provided with externally aided food items, some of which are less nutritious than the foods that are locally produced. It was further observed that the affected people were more interested to receive such food donations rather than consuming their own local products.

Nineteen percent of households reported poor food consumption practices, which has increased from 7.6 percent pre-earthquake. Furthermore, 35 percent of households are limiting their food intake by reducing meal portion size or number of meals as a coping strategy.

Regarding income, households dependent on daily labour and trade are among the most affected with over two-thirds reporting income losses of over 30 percent since the earthquake. People reported a decrease in household expenditures by an average of 13 percent and a decrease of 43 percent in the mountainous areas. These reductions match the reduced food consumption.

Markets are overall functional in less affected areas and quickly recovering along the seismic belt but remain largely closed in the remote mountain area (only 5 percent of households are able to find cereals and pulses in the nearest market). Prices of staple foods are expected to rise in the coming months due to higher transport costs due to the monsoon and declines in international relief.

Damage and Loss

As mentioned above, the nutrition sector does not have separate infrastructures to estimate specific damage and losses. However, the affected population groups who are vulnerable to Undernutrition have been estimated. Since the exact number of affected children under five years, pregnant women and lactating women are not available per affected district, an estimation has been made based on two primary government sources: affected number of households due to the earthquake from the Disaster

⁸Nepal: A report on the food security impact of the 2015 earthquake. Assessment conducted by the Nepal Food Security Monitoring System (NeKSAP). Food Security Cluster, May 2015.

⁹DHS 2011 data and the resulting small area estimation report shows that these 7 districts have a pre-existing global acute malnutrition prevalence of 6.8% (Dolakha), 8.4% (Gorkha), 8.5% (Sindhupalchok), 9% (Dhading), 9.3% (Rasuwa), 9.6% (Kavre), and 9.9% (Nuwakot).

Risk Reduction (DRR) portal and the estimated target population from the Department of Health Services, Estimated Target Population Fiscal Year 2071/72 (2014/2015). Using the data available on the DRR portal, the percentage of affected households was multiplied with the estimated target population from the DoHS to give estimated numbers of affected children less than two years, 6-23 months, less than five and 6-59 months as well as pregnant and lactating women. The figures for estimated live births were used to estimate the total number of affected lactating women which refers to women with children less than six months of age.

Table 2: Estimated number of affected children under five years, pregnant and lactating women

SN	District	Children <2 years*	Children 6-23 months	Children < 5 years	Children 6-59 months	Pregnant women	Lactating women
1	Sindhupalchowk	11873	8810	28158	25097	7351	6230
2	Kathmandu	73560	54686	35166	31371	8969	7606
3	Nuwakot	11379	8445	28312	25232	7380	6258
4	Dhading	14452	10723	28859	25705	7517	6375
5	Rasuwa	1850	1372	4199	3737	1113	944
6	Gorkha	11029	8163	22488	19977	6036	5116
7	Bhaktapur	12763	9465	12220	10875	3187	2702
8	Kavrepalanchowk	15499	11496	33449	29796	8765	7432
9	Lalitpur	19264	14315	10635	9485	2729	2314
10	Dolakha	7738	5740	20794	18519	5461	4632
11	Ramechhap	8302	6160	20251	18046	5302	4497
12	Makawanpur	18346	13632	16255	14501	4169	3536
13	Okhaldhunga	6433	4767	6102	5428	1629	1381
14	Sindhuli	13181	9794	12343	11013	3176	2693
	Total	225669	167568	279231	248783	72784	61715

Source: MoHA DRR Portal and DOHS HMIS report 2014

* also gives an estimation of the number of breastfeeding mothers of children under two years of age

Disaster Effects and Impact

The nutritional status of vulnerable populations is not immediately affected due to disaster. However, underlying factors such as food insecurity, poor water, sanitation, hygiene, poor caring practices and disease outbreaks will have a gradual impact. As of now, there are no firsthand statistics on the nutrition impact of earthquake amongst the affected population in Nepal. Experiences from other countries show that in the month after a natural disaster occurs, the likelihood of acute illness, such as acute respiratory infections, diarrhea and fever increase by 9-18 percent in children under-five.¹⁰ The negative impact of natural disasters on linear growth is also well documented in countries such as China, Indonesia, Ethiopia,

¹⁰ Datar A, Liu J, Linnemayr S, Stecher C. The Impact of Natural Disasters on Child Health and Investments in Rural India. *Social science & medicine* (1982). 2013;76(1):83-91. doi:10.1016/j.socscimed.2012.10.008.

and Zimbabwe.¹¹ In the year after a natural disaster the likelihood of stunting increases by 7 percent and the likelihood of full-immunizations decreases by 18%. In the two years after a shock, women that were in the second and third trimester of pregnancy when the disaster occurred have children that are significantly shorter compared to women that did not experience the shock.¹² Furthermore shocks can negatively impact maternal health increasing mortality and low birth weight.¹³

Assessments by other sectors reported large scale losses of food stocks and agricultural assets, household assets, disruption of water systems and damage to sanitation facilities and health infrastructure. Income that may have typically been designated for purchase of household food may be redirected to materials and labor to rebuild homes, replace lost household items or support extended family. Food related coping strategies, such as reducing the size or number of meals consumed, was reported by more than a third of households in the affected areas (35%). Overall loss of income, from lost assets, savings and reduced opportunities to be paid for daily labor, reduces families' purchasing power to provide quality meals in sufficient quantity. Disrupted water systems and sanitation facilities heighten the risk of disease among affected populations. It is also possible that increased financial strains on households may promote increased workloads among family members, including pregnant and lactating women, which could negatively impact a woman's own health during pregnancy and affect mothers' caring practices of their children. Similarly, longer walks to collect water or other household needs may have the same effect on women's health and nutritional status and time available for child care.

Given that these factors that directly impact nutrition, the immediate concern is to prevent deterioration of nutritional status among the affected population, with a particular focus on pregnant and lactating women and young children as this population has specific nutritional needs. In addition, recovery efforts will also aim to support the rehabilitation of systems and services that address underlying factors contributing to both acute and chronic malnutrition.

Research confirms that a child's first 1,000 days, from conception through a child's first two years of life, is a critical period for growth and development. Challenges affecting optimal growth and development during this window have lifelong effects on a child's physical and cognitive growth. Inadequate access to nutritious food, safe and hygienic environments, quality health services and caring practices may result in increased risk of morbidity and mortality in childhood, reduced learning capacity and school performance, increased risk of obesity and non-communicable diseases later in life and overall lower earning potential and decreased work capacity¹⁴.

There is a unique opportunity for emergency response and development programmes to work synergistically to improve nutrition among women and child. Emergency response programmes provide an important platform for nutrition and food security activities but the interventions are typically short-term and supply-driven such as therapeutic feeding, general food aid and seed distribution. Recovery programmes should give greater emphasis on addressing the root causes of vulnerability and prevention of malnutrition. Hence, it is advisable to orient all reconstruction efforts towards a more sustainable

¹¹ IZA (2010) Do natural disasters affect human capital? An assessment based on existing empirical evidence. DP No. 5164

¹² E. Frankenburg, J. Friedman, N. Ingwersen, & D. Thomas (2013). Child Height After a Natural Disaster.

¹³ J.K. Antilla – Hughes & S.M. Hsiang (2013). Destruction, Divestment and Death: Economic and Human Losses Following Environmental Disaster.

¹⁴ Maternal and Child Nutrition series. The Lancet. 2013.

approach that addresses both immediate and underlying causes of undernutrition through integrated agriculture and other sectoral activities.

Recovery Needs and strategy

Achieving nutrition and food security is a cross cutting goal that requires action from various sectors. Recognizing the need for a multi-sectoral approach and for a strengthened multi-sectoral policy guidance and coordination, Nepal endorsed a Multi-sector Nutrition Plan (MSNP) in 2012. Similarly, a High Level National Nutrition and Food Security Steering Committee (HLNFSSC) has been established at the National Planning Commission and a coordination architecture has been set up. Existing policies on nutrition specific and nutrition sensitive programmes and interventions need to be strengthened with the involvement of all relevant sectors and stakeholders. All nutrition service providers should work with the existing nutrition architecture at the district as well as at the national level.

Post-earthquake nutrition activities will include the continuation of services to prevent and treat acute malnutrition alongside increased efforts to improve systems and services contributing to longer term nutritional gains which will focus on a multi-sectoral approach. External support should be built on existing local food and nutrition practices. Rural, urban and the slum areas need to be covered by government and non-government programmes/interventions and existing nutrition and food security programmes in the 14 districts should be further strengthened. Coordination (multi-sector, multi-stakeholders and multi-level) with various sectors and stakeholders under the leadership of the National Planning Commission should be strengthened and ensured at all levels for effective implementation of the nutrition interventions. Overall, the post-disaster nutrition strategy should complement the knowledge and practices that the communities already have. This should be implemented in the spirit of strengthening local resilience which explains the lesser impact on nutrition (as compared to other areas) by the current disaster.

The nutrition activities for recovery have been identified for short and medium term and are aimed at all pregnant and lactating women and children under five years. Special efforts will be made to work through the community leaders and Health Facility Management Committee as well as FCHVs to ensure that the most vulnerable groups like the Dalits, female headed households, and others are included. The suggested list of activities in this report is only tentative based on the limited information available. Hence, the recommendations/activities will be updated and revised more concretely and to reflect enhanced coordination with relevant sectors.

Table 3: Proposed nutrition interventions and tentative cost estimates (Short term activities for up to one year)

Intervention	Quantity	Unit Description	Cost per Unit (NPR)	Total (NPR)	Total (USD) Exchange rate: 1 USD = 100 NPR	Assumptions
Short-term Activities						
Supplementary food assistance						
Provide assistance to increase access to supplementary food to children aged 6-59 months, pregnant and lactating women through health facilities to prevent deterioration of nutritional status as well as increase health service utilisation including enhanced nutrition counselling. The assistance can be in the form of cash, vouchers or food (e.g. fortified blended food, locally procured as much as possible) and provided for up to 1 year. Assessments such as those produced by or in collaboration with Nepal Food Security Monitoring System (NeKSAP) on the impact of earthquake on food security will be used to guide the form of assistance provided to the different affected areas.	385 000	Person	8000	3 080 000 000	30 800 000	Local producers of fortified supplementary food will be able to meet the requirements for the target population requiring food based assistance; market assessments and necessary banking infrastructure will support cash based assistance in other affected areas. Weather or other environmental factors will not prevent the delivery of assistance.
Promotion of production and utilization of local foods						
Promote the production and utilisation of indigenous crops, rich in macro and micronutrients of plant and animal origin *	400 000	households	100	40 000 000	400 000	Nutrient-rich foods will be available and accessible to promote for consumption.
Initiate homestead food production including poultry amongst existing and returnees households**	400 000	households	4000	1 600 000 000	16 000 000	
Maternal Infant and Young Child Nutrition (MIYCN)						

Promote optimal child development through implementation of child care activities, in coordination with Ministry of Women Children and Social Welfare (MoWCSW)	279 231	children under five years	100	27 923 100	279 231	
Intensify the promotion of optimal Maternal Infant and Young Child Nutrition (MIYCN) and hygiene including Behaviour Change Communication (BCC). [Breastfeeding and complementary feeding]				10 000 000	100 000	
Intensify monitoring of compliance and Nepal Breast Milk Substitute (BMS) Act & Regulation to ensure that unsolicited BMS is not distributed and used	14	Districts	1 000 000	14 000 000	140 000	
Management of severe acute malnutrition						
Establish and maintain management of severe acute malnutrition (SAM), including preventive and treatment services	10 000	children under 5 years	15 000	150 000 000	1 500 000	Caseload of SAM patients requires ongoing treatment services and commodities are available to support this treatment.
Micronutrient supplementation						
Replenish the lost stock of micronutrient supplements (Vitamin A, Iron Folic Acid and deworming tablets as well as zinc tablets and ORS for treatment of diarrhea) in the health facilities and provided to FCHVs				5 000 000	50 000	Sufficient supply of stock is available and able to be distributed in the affected areas.
Provide Multiple Micronutrient Powder (MNP) supplementation during the first year to children aged 6-59 months in areas where fortified supplementary food will not be provided.	125 000	Child	500	62 500 000	625 000	Sufficient supply of stock is available and able to be distributed in the affected areas.
Training/capacity enhancement						
Ensure that nutrition topics are covered in the training/on-site coaching of new FCVHs and in refreshers for the existing FCHVs	14 000	FCHVs	500	7 000 000	70 000	Adequate staffing is available and environmental conditions do not inhibit training or onsite coaching plans.

Nutrition survey/assessment and monitoring activities						
Conduct a rapid SMART or other nutrition survey to obtain primary district level estimate of nutrition situation in all 14 severely affected districts	1	Survey	25 000 000	25 000 000	250 000	Adequate staffing are available and environmental conditions do not inhibit completion of the survey.
Regular monitoring of all nutrition activities conducted in the affected districts				5 000 000	50 000	Adequate staffing is available and environmental conditions do not inhibit regular monitoring of activities.
Establish a nutrition surveillance mechanism in 14 districts through the health facilities				10 000 000	100 000	
Total				5 036 423 100	50 364 231	

** Production activities will be budgeted under the agriculture sector. Advocacy and promotional activities will be conducted by the nutrition sector in collaboration with health and other sectors.*

*** Based on the number of fully destroyed households excluding partially destroyed households. Furthermore, only 50 percent of the households have been taken for the four districts with high proportion of urban areas (Kathmandu, Lalitpur, Bhaktapur and Kavre)*

****Based on the SAM prevalence estimate of 2.6 percent from NDHS 2011 as the ongoing programmatic experience as well as field observations differ from the high Severe Wasting levels from MICS 2014*

Medium and long term activities to be continued beyond one year:

- Promote the production and utilisation of indigenous crops (millet, buckwheat, amaranthus, etc.) as well as protein and micronutrient rich crops (legumes, vegetables, fruits, livestock products (including meat, fish, milk and eggs, etc.) through the agriculture sector
- Intensify homestead food production including poultry amongst existing and returnees households
- Continue the monitoring of compliance with Nepal BMS Act and Regulation
- Continue to implement strategies to ensure adequate micronutrient intake among the affected population (may include promotion of micronutrient rich foods, expanding fortification initiatives and ongoing provision of micronutrient supplementation based on need)
- Continue the intensified promotion of optimal MIYCN and hygiene
- Continue the management of SAM in all districts based on the need
- Ensure that the nutrition topics are covered in the training/on-site coaching of new FCHVs and in refreshers for the existing FCHVs

Implementation Arrangements

The above suggested activities will be implemented by the sectoral ministries ensuring intra and inter-sectoral coordination within the government system. Resources will be mobilised through effective partnership with the development partners.

Food production activities will be led by agriculture sector, with strong collaboration, advocacy and promotion activities led by the health sector. The health sector will conduct child care activities in close collaboration with education and women children and social welfare sector.

Assessment Methodology

This Nutrition Sector PDNA is part of the broader PDNA conducted for all sectors under the overall leadership of the National Planning Commission. It is a joint exercise of the Government and the development partners. A combination of qualitative and quantitative tools from primary as well as secondary sources have been used.

On May 24, the National Planning Commission (NPC) deployed four teams to Gorkha, Dhading, Sindhuli, Ramechhap, Rasuwa, Nuwakot, Sindhupalchowk and Kavrepalanchowk to verify the available baseline information and collect the relevant information on the nutrition needs of affected pregnant and lactating women and children under five. The team purposively selected VDCs, sites and the respondents from the agreed category and followed the methods listed below:

- Collection of basic information from the Nepal Government Disaster Risk Reduction (DRR Portal) (<http://drrportal.gov.np>) on the affected households and other nutrition related information from MICS, SAE, Health Management and Information System (HMIS) and Logistic Management and Information System (LMIS).
- Consultative meetings with the District Line Agencies and Health Workers, FCHVs and Volunteers.
- Focused Group Discussions with the pregnant, lactating women and community people.
- Observation visits to the affected Village Development Committees and Wards, health facilities, and outpatient treatment programme centers.

An analysis of secondary data from MICS 2014, DHS 2011/SAE 2014 and assessments from other sectors provided key information on both the pre and post-disaster contexts related to nutrition.

EDUCATION

Summary

The Post-Disaster Needs Assessment (PDNA) for the education sector is part of the broader PDNA conducted for all sectors under the overall leadership of the National Planning Commission. It is a joint exercise of the Government and the development partners, and has been led by the Ministry of Education (MOE).

The overall objective of this assessment is to take stock of the damages and losses faced by the sector as a result of the 7.8 magnitude 25 April earthquake and its aftershocks, and provide estimates of the recovery and reconstruction needs using the principle of ‘building back better’. The assessment covers the entire sector, which includes early childhood education and development (ECED), school education (grades 1–12), technical and vocational education and training (TVET), higher education, and non-formal education/life-long learning. The damages and losses for the sector are calculated based on the data and information provided to the MOE by the various sub-sectors—Department of Education (DOE) for ECED and school education, Council for Technical Education and Vocational Training (CTEVT) for TVET, University Grants Commission for higher education, and Non-Formal Education Centre for non-formal education/life-long learning (including community learning centers). Data on damages and losses to public and institutional libraries is also included. Additionally, the Sector Assessment Team undertook field visits and held consultations with representatives of all central line agencies, including CTEVT and University Grants Commission, representatives of private schools, and various teacher organizations to understand the effects of the disaster on the functioning of the education system and to solicit their suggestions for potential recovery strategies and interventions.

The net value of the total damages and losses to the education sector is estimated at NPR 31,317.9 million (US\$313.2 million) at pre-disaster prices. Of this, the damage to infrastructure and physical assets is estimated at NPR 28,063.8million (US\$ 280.6 million). Further, the sector encountered a loss of NPR 3,254.2 million (US\$ 32.5 million). Overall, the public sector suffered more in terms of damages and losses when compared to private sector. Of the total effect, 92% accrues to the public sector and only 8% to the private sector.

The total recovery and reconstruction needs for the education sector for the next five years (Fiscal Years 2015–2019) using the principle of building back better is estimated at NPR 39,705.8 million (US\$ 397.1 million), of which the majority (91%) is needed for the recovery and reconstruction of the school subsector. The recovery strategies and specific short, medium and long-term needs are described in the main text.

Pre-Disaster Context and Baseline

Sector Overview

Nepal’s education sector is one of the largest government departments both in terms of the size of the population served and the annual government budgetary allocations. The sector consists of pre-primary (ECED), school, Technical and Vocational Education and Training (TVET) and higher education subsectors. Table 1 below provides a summary of the size of the various sub-sectors.

Table 1: Education Sector at a Glance

Sub-sector	No. of years	Share of total Education Budget	No. of Students	Type and No. of Institutions		
				Total	Public	Private
ECED/PPC	1	^a	1,014,339	35,121	30,034 ^b	5,087
School	12	82.0	7,488,248	34,335 ^c	34,270	8,429
TVET	0.3–3	4.1	~90,000	421 ^d	21	400
Higher	3–6	8.1	569,665	1,276	96	1,180 ^e

Note:

^a ECED budget is included in the school subsector.

^b Includes school and community-based ECD centers.

^c No. of schools are counted by levels therefore may not add up to total.

^d Does not include many short-term training institutions registered with authorities other than CTEVT.

^e Includes 429 community-run and 751 private campuses.

School education comprises at least one year of pre-primary/ECED, 5 years of primary, 3 years of lower secondary, 2 years of secondary and 2 years of higher secondary education.²¹ School education is offered through at least two types of schools—public and private. With the Seventh Amendment to the Education Act 1971 in 2001, all public schools are called ‘community’ schools and private schools ‘institutional’ schools. The majority of children attend public schools; however, there has been a dramatic increase in private education institutions in recent years. At the secondary school level, about 15 percent of all children attend private schools, which increases to almost 27 percent if higher secondary education is also included. The vast majority of community schools receive support from the government in the form of teacher salaries, recurrent grants for school administration and management, student grants for textbooks and scholarships, and grants for construction of classrooms and toilets. However, only very few private schools (those that operate as trusts) are eligible to receive such grants. The majority of private schools are registered as companies and operate through user fees and are allowed to make profit.

The TVET subsector includes school-based technical schools (general schools with technical stream) as well as non-school based technical institutions overseen by the Council for Technical Education and Vocational Training (CTEVT). CTEVT has 21 constituent (public) and 400 affiliated (private) technical institutions that offer short term, technical school leaving certificate (TSLC) and diploma courses. More than 90,000 people graduate from these courses annually.

Higher education is offered through 9 universities and four medical science academies, all of which receive public funds in varying degrees. All universities have constituent and affiliated colleges that are spread across the country. While curriculum and examinations for affiliated campuses come under the jurisdiction of the affiliating university, affiliated campuses are independent vis-à-vis financing and administration. Affiliated campuses are further classified into community and private campuses. Community campuses, which are not for profit, are established through community initiatives and resources and also receive some financial support from the government, although levels of support are significantly lower than for constituent campuses. Private campuses are established through private

²¹ The ongoing School Sector Reform Program aims to restructure school education into 8 years of basic and 4 years of secondary. This will require amendments to the Education Act.

investments and receive no public grants. In 2012/13, there were 96 constituent, 429 community and 751 private campuses accounting for about 37%, 30% and 33% of the total higher education enrollment of 569,000, respectively. Tribhuvan University, the largest university in the country, accounted for nearly 88% of this enrollment.

Progress

Nepal has made good progress in enhancing access, equity and efficiency in school education, and remains committed to the achievement of the Millennium Development Goals (MDG) and Education for All (EFA) targets. The percentage of children ages 3–4 years accessing ECED has increased to 77.7% in 2014/15, and nearly 60% of the new entrants in grade 1 have ECED experience. The net enrollment rate has reached 96.1 at primary and 87.6 at the basic level. Likewise, gender parity in enrollments has been achieved at all levels of schooling. The share of hitherto marginalized groups such as Dalits and Janajatis has also increased in the total student population. Dalit children account for more than 20% of all children enrolled in primary education and Janajatis account for more than 36% of all enrolled children, which is more than their proportional representation in the total population according to the Census 2011. However, the share of Dalits gradually decreases to 14.6 in lower secondary, 10.5 in secondary and only 6.8 in higher secondary education, indicating that many Dalit children do not progress in the education ladder²². The overall literacy rate for population aged 5 years and above has also increased from 54.1% in 2001 to 65.9% in 2011.²³ However, there are marked gender disparities in literacy rates: 75.1% of males are literate in contrast with 57.4% of females. These differences are expected to narrow down as there is an increasing trend of more girls attending and completing basic education. Whilst school education has made significant progress in enhancing access, the system suffers from low quality and relevance of education. Further, school education is not completely free despite constitutional provisions of free education up to secondary level, affecting the full participation of children particularly from the poorest segments.

In TVET, more than 90,000 people graduate annually from various non-degree short-term and long-term degree courses (Technical School Leaving Certificate or TSLC and diploma), which represents a gradual increase over the years. Mechanisms have also been instituted for skills testing of these graduates. However, the employability of the TVET graduates remains low and there are challenges in responding to the market needs.

In higher education, total student enrollment increased from 173,546 in 2005/06 to 569,665 in 2012/13, with an average annual growth rate of 14.7%. Of this, approximately 40% are girls. The number of graduates increased from 25,900 in 2005/06 to 63,642 during the same period. The gross enrollment rate reached 17.1 in 2012/13, which is higher than that of most countries at comparable levels of economic development. Despite significant achievements over the past decade, weak relevance, low quality, internal inefficiency, inequity and inadequate financing continue to pose major challenges in higher education.

²² Within Dalits, the share of girls slightly decreases in secondary (49.1%) and higher secondary (48.5%) levels.

²³ Central Bureau of Statistics. 2011. *Nepal Population and Housing Census 2011: Main Report*. Kathmandu: Central Bureau of Statistics.

Sector Financing and Coordination

Education is a priority sector for the Government of Nepal. The sector has been receiving the largest share (around 14%) of the government budget in recent years. Furthermore, public investment in education as a fraction of Gross Domestic Product (GDP) has increased from less than 2.9% in 1999 to 4.2% in 2014. More than 80% of the government's education budget is allocated to school education, and within that about 60% goes to basic education. This is in line with the global commitments made by the Government to achieve the MDG and EFA targets. But this has also led to the under-financing of tertiary education. Foreign aid has been an important component of the total government spending in education. On average, development partners have accounted for more than 22% of the total education budget although it decreased to 13% in FY2015.

The school sub-sector demonstrates good evidence of sector-wide approach involving pooling of government and donor funds to support a jointly agreed national School Sector Reform Program (SSRP) through direct budgetary support.²⁴ In TVET too, there is good evidence of coordination amongst the government and different development partners supporting the sub-sector albeit in project mode. The major development partners supporting TVET include ADB, DFID, EU, Finland, KOICA, SDC, USAID and the World Bank, and interagency coordination is led by the SDC. However, development partners' engagement in higher education is limited to the World Bank.

Disaster Risk Reduction

Under the SSRP, efforts have been undertaken to mainstream disaster risk reduction (DRR) and safety in school education. The Ministry of Education (MOE) prepared a pilot school safety action plan in 2012 to undertake (i) retrofitting of 260 school buildings in Kathmandu valley, (ii) training on retrofitting to 1,050 masons, (iii) training to 30 Department of Education (DOE) and District Education Office (DEO) engineers and sub-engineers, (iv) training on detailed vulnerability assessment and design for 150 engineers and sub-engineers, and (v) earthquake awareness safety orientation for 50,000 students and 4,000 teachers. To date the government has completed retrofitting of 160 school buildings and all retrofitted buildings did not experience any damage due to the earthquake. The capacity development of 180 DOE and DEO engineers and sub-engineers has been completed. More than 50,000 students and 3,417 teachers have been given safety awareness orientation. Training has been provided to 693 masons. Based on the lessons learnt from the pilot, in 2014 the MOE approved a strategy for increasing disaster resilience for schools in Nepal. The comprehensive strategy includes nine stand-alone and six linked actions to reduce the risk of disaster in schools and has an estimated budget of US\$ 560 million for a 10-year period. However, the strategy and plan need to be revisited in the context of the current disaster and included in the post-SSRP education sector plan (School Sector Development Plan or SSDP) that is currently being formulated. Elements of DRR and education in emergencies have been incorporated in the school curriculum and textbooks, and school emergency contingency plan has also been prepared. There are

²⁴ The development partners supporting the SSRP include Australia, ADB, EU, Finland, JICA, Norway, UNICEF and the World Bank, including funds from the Global Partnership for Education.

also dedicated courses on disaster risk management (DRM) and earthquake engineering in various institutes of engineering.

Disaster Effects and Impact

This section describes the effects, including damages and losses, of the earthquake on Nepal's entire education sector. It should be noted that the effects of the 7.8 Richter earthquake could have been much more severe had it not struck on a Saturday afternoon. Had it struck on a weekday, the loss of human lives would have been much higher, particularly if it had occurred at a time when children and teachers were in school buildings.²⁵

Effects on infrastructure and physical assets

Table 2 below provides a summary of the losses to infrastructure and physical assets in the education sector. The extent of damages and losses is the highest in school education, with the subsector accounting for 88.8% of the total damages and losses faced by the entire sector. More specifically, 8,242 community (public) schools have been affected by the earthquake, with 25,134 classrooms fully destroyed and another 22,097 partially damaged. Institutional (private) schools also experienced significant infrastructure damage with 956 classrooms fully destroyed and 3,983 classrooms partially damaged. In addition, 4,416 toilets and water, sanitation and hygiene (WASH) facilities and 1,791 compound walls have been damaged. The damage to ECD centers, furniture, libraries and laboratories, computers and other equipment was proportional to the damage faced by the schools.

Likewise, in the TVET subsector, the majority of the reported damage was faced by the Jiri Technical School in Dolakha (completely damaged). A total of 356 TVET classrooms were fully destroyed and another 184 were partially damaged, together with significant damage to equipment and other assets. However, as mentioned in the Methodology section below, this may not be a true reflection of the actual damages and losses faced by the subsector since complete information on the damages and losses faced by CTEVT-affiliated public and private technical institutions is not available.

In higher education, 1,292 classrooms were completely destroyed and another 3,040 were partially damaged. Likewise, there was a very high loss to equipment as a result of damages to research laboratories. Further, there was major damage to the administrative buildings of three major universities – Tribhuvan University, Kathmandu University, and Nepal Sanskrit University. The cumulative value of damages to higher education institutions has been estimated at NPR 2,430.4 million (US\$ 24.3 million). However, the actual damages and losses faced by the sector could be much higher due to incomplete reporting of private institutions affiliated with the various universities.

The sector also witnessed losses to community learning centers, public libraries and community-based ECD centers. Again, however, it was impossible for the Sector Assessment Team to reflect the true extent

²⁵ It is reported that 584 students (571 studying in school and 13 in higher education) lost their lives. 49 teachers from schools and colleges were killed.

of damages and losses faced by such institutions in the absence of mechanisms to systematically collect and supply such information.

Table 2: Estimation of Damage to Infrastructure and Physical Assets by Subsectors

	ECD	School	TVET	Higher Education	NFE/LLL
No. of classrooms/rooms fully destroyed	784	26,090	356	1,292	40
Number of classrooms/rooms partially destroyed	-	26,080	184	3,040	7
Number of toilets and WASH facilities	-	4,416	-	-	-
Number of compound walls	--	1,791	-	6	-
Equipment (in Million NPR)	-	140.4	90.0	155.5	-
Furniture (in Million NPR)	-	1,867.6	4.5	5.6	0.6
Other assets (textbooks, education materials, uniforms) (in Million NPR)	9.8	2,086.5	1.3	16.7	0.4

Effects on teaching and learning

Whilst the effects of the quake on infrastructure and physical assets are relatively easy to estimate in monetary terms, it is more difficult to estimate the financial implications of the quake on teaching and learning processes. The earthquake and its aftershocks led to the complete closure of schools and colleges for more than a month (26 April–30 May) in the highly affected districts, forcing more than 2 million children and youth to stay out of education institutions for a significant period of time at a time when the academic year had just started.²⁶ The standard school opening days per year is 220, with 190 days for teaching-learning and the rest for examinations, extracurricular activities, and other non-teaching functions. In the consultations with the DEOs and central level agencies, it was emphasized that the number of days lost would eventually be covered through cuts in summer vacation and annual festivals. However, even as the schools have reopened, it will take some time before regular teaching-learning can take place. Most schools in the highly affected districts will not hold full-day classes for at least one month, leading to loss of learning time. The destructions of homes and displacement of families has had a severe negative impact on learning environment at home. Children reported that they have lost motivation and confidence to study as their learning habits have been disrupted. They fear that they might have forgotten what they have learned, and may have difficulty in passing their examinations (particularly children in grades 8 and 10 who need to take the district and national level board examinations). It is, therefore, likely

²⁶ The schools in the affected districts reopened on 31 May and colleges affiliated to Tribhuvan University reopened on 5 June.

that the affected schools might experience a decline in the children’s learning outcomes in the short to medium term.

There could be effects on the enrollment, attendance and internal efficiency, leading to an increase in the number of out-of-school children. There could also be an increase in the number of children with disabilities or significant injuries for whom the temporary or transitional learning centers (TLCs) could be less accessible. With the demand for additional labor both at home and in the market, it is reasonable to assume that some children particularly in the higher grades might be less regular or drop out eventually, and there might also be a decrease in their motivation to learn. These implications are discussed separately in the section on Risks and Vulnerabilities below. It is, however, impossible at the moment to gauge the effects of the quake on these parameters and quantify the resulting efficiency losses.

Effects on teachers and education personnel

The total casualty to teachers is reported at 49 (including two in higher education). While there is no reported casualty to the non-teaching personnel, many teachers from the affected areas have lost their homes and family members, and household burdens to female teachers have increased. In the field visits, teachers stated that they would be able to resume teaching-learning activities once schools reopen. However, they raised concerns regarding availability of housing, need for advance payment, and additional training to facilitate children’s return to schools, psycho-social counseling, and their management in multi-grade settings.

Effects on service delivery and governance mechanisms

During consultations with various central level agencies, it was reported that there have been no major damages to physical infrastructures of these institutions, and therefore the effects on the functioning of the key central level agencies is deemed to be minimal. At the district level, there has been some damage to DEOs, particularly in the most affected districts. The cumulative value of these damages has been estimated at NPR 79.4 million. There has been major damage to the administrative buildings of three major universities – Tribhuvan University, Kathmandu University, and Nepal Sanskrit University – affecting their day-to-day operations. There have been delays in conducting the examinations by the Universities, Higher Secondary Education Board and the Teacher Service Commission, and they have already postponed or rescheduled their examinations. This is unlikely to affect the schedules planned for next year. It is probable that there will be some effects on the normal functioning of the school management committees, as many have incurred losses to lives and property. Further, given that education personnel have been redeployed for structural assessments and relief works, service delivery at central and local levels are likely to be affected for some time, although these effects will gradually subside.

Emerging risks and vulnerabilities

Disasters affect different segments of society in disproportional ways. Nepal is a highly diverse country in terms of geography, demography, language and socio-economic status, and certain areas and groups tend to be more vulnerable to disasters than others. The vulnerabilities are likely to be exacerbated by internal displacement of people and increased risks of flooding and landslides in the rainy season.

Table 3: Prediction of internal efficiency in the affected districts

Dropout predictors												
	Grade 1						Grade 8					
	Dropout		Promotion		Repetition		Dropout		Promotion		Repetition	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
National	6.5		78.4		15.2		6.0		89.5		4.5	
Most Affected Districts	5.7	Low	79.4	High	14.9	Low	6.9	High	87.9	Low	5.2	High
Major Affected Districts	7.2	High	76.8	Low	30.4	High	5.8	Low	89.3	Low	5.0	High
Minor Affected Districts	7.1	High	78.8	Low	14.1	Low	5.8	Low	88.1	Low	6.2	High

The assessment uses pre-disaster indicators to predict education-related vulnerabilities (out-of-school, dropout, repetition and non-completion) in the most affected, major affected and minor affected districts.²⁷ It shows that there is relatively lower risk at the primary level and higher risk at the basic level in the most affected districts, whereas there is a reversed pattern in the major affected districts (Table 3). Likewise, analysis of vulnerabilities in the most affected districts shows that they have a high number of children with disabilities in ECED, requiring a special focus on this group and their transition to the primary level. However, a higher level of vulnerability at both basic and secondary levels is observed in the minor affected areas, emphasizing the need for a balanced focus that accommodates historic vulnerabilities with emerging needs. Given that the internal efficiency of the most affected districts is higher at primary level compared to the secondary level special attention needs to be paid to girls and minority groups dropout and learning outcomes at the secondary level (Annex – C).

Damage and Loss

The total value of the damages and losses to the education sector is estimated at NPR 31,317.9 million (US\$ 313.2 million) at pre-disaster prices (Table 5). Of this, the damage to infrastructure and physical assets is estimated at NPR 28,063.8 million (US\$ 280.6 million). Further, the sector encountered a loss of NPR 3,254.2 million (US\$ 32.5 million), mainly on account of activities associated the establishment of temporary learning centers, child-friendly spaces and WASH facilities, demolition of the buildings and removal of debris, and cleanup and minor repair costs associated with the use of ‘intact’ schools as temporary shelters. Overall, the public sector suffered more damages and losses compared to private sector, with the public sector accounting for 92% of the total damages/losses.²⁸

²⁷ Please refer Annex – A for the list of districts in three categories.

²⁸ Data on damages and losses to the private sector is limited, with the information provided only for 11 districts. Therefore, the value of the actual damages and losses to private sector is bound to be much higher.

More than 80% of the damages and losses are in the 14 most affected districts, in which the value of damages is NPR 22,375.1 million (US\$ 223.8 million) and losses is NPR 2,629.1 million (US\$ 26.3 million). For the remaining 42 major and minor affected districts (including the 17 major affected districts), the total value of the damages and losses are NPR 5,688.7 million (US\$ 56.9 million) and NPR 625.1 (US\$ 6.3 million), respectively. Please see Annex – A for district-wise calculations of damages and losses.

Table 4: Estimates of Damages and Losses to the Education Sector (in Million NPR)

Subsector components	Disaster Effect			Distribution by Ownership	
	Damages	Losses	Total	Public	Private
ECD	401.8	11.8	413.5	111.6	301.9
School (1-12 grades)	24,642.1	3,190.7	27,832.8	26,670.6	1,162.2
TVET	487.3	6.7	494.0	483.9	10.1
Higher Education	2,430.4	42.2	2,472.6	1,581.8	890.8
NFE/LLL	22.8	0.7	23.4	23.4	-
Administrative buildings (including libraries)	79.4	2.2	81.6	81.6	-
Total (in million NPR)	28,063.8	3,254.3	31,317.9	28,952.9	2,365.0
Total (in million US\$)	280.6	32.5	313.2	289.5	23.7

However, the damages and losses reported in this assessment should be viewed as lower bound estimates of the actual damages and losses experienced by the sector for reasons stated in the Methodology section of this report. For example, the total damages and losses to the sector would increase substantially if the value of community contributions to classroom construction in the public (community) schools were to be included (at around 40% on top of the Government contribution).

Recovery Needs and strategy

The overall focus of any recovery and reconstruction strategy in the education sector is to ensure uninterrupted education service delivery at all times. This calls for focus on both the structural and non-structural aspects of the education system to ensure that all education institutions are resilient against multi-hazards and provide an enabling learning environment. The overall recovery strategy will prioritize the 56 affected districts, but will gradually move to include all education institutions across the country through incorporation of the DRR perspective in the sub-sectoral plans and programs. The major elements of the strategy include:

- **Restructuring of MOE system:** It is recommended to restructure the existing institutional arrangements at the central and local levels to respond more effectively to multi-hazards. This would require reviewing and revisiting of existing policies related to the organization and management of the system.
- **Strengthening systemic capacity to deal effectively with post-disaster response and recovery and reconstruction:** These would include mechanisms to address the immediate needs described above as well as improving existing policies, guidelines and systems to ensure that education buildings meet higher standards and levels of safety than residential buildings. It is important to set up independent quality control and inspection requirements for the construction of school buildings. Policies and guidelines to regulate safety standards for private schools through

certification, technical and administrative support should be introduced. Likewise, there should be adequate provisioning of human resources and technical capacity at the national and district levels to ensure safety and quality at all phases of construction. Higher education institutions could play a crucial role in these aspects.

- **Building Back Better:** All new education institutions should be resilient to future disasters (resilient buildings with safe and adequately sized staircases, proper exits, furnishing and equipment installed to minimize potential harm to school occupants, displays and equipment for early warning and evacuations, etc) and ensure the provision of minimum enabling conditions for enhanced learning (such as clean drinking water supply including the harvesting of rain water where applicable, separate sanitation facilities for girls and boys, energy and communication connectivity, libraries and laboratories, playgrounds, etc). Retrofitting should be continued for prioritized vulnerable schools. Likewise, clear policy and plan to replace all school buildings with stone and mud mortar masonry should be considered a high priority. Building back better should be done in close coordination with the local bodies and communities. However, the current model of building schools through community contribution should be revisited.
- **Interventions in non-structural aspects:** Enhancing disaster resilience is not only about building back better from a structural perspective. It requires interventions in non-structural aspects of the education system such as the curriculum and textbooks to ensure that teachers and students internalize safety issues and can act in times of need. This also requires strengthened disaster preparedness and response at the school and community level through school-based DRM and community based DRM training and planning.

Table 5: Estimates of Recovery and Reconstruction Needs (in Million NPR)

Subsector	Cost of Needs
School Sector (including ECD/PPCs)	37,777.0
TVET	747.5
Higher Education	2,480.1
NFE/CLCs	42.2
General Governance and Administration	430.8
Total (in million NPR)	41,477.6
Total (in million US\$)	414.8

The specific short, medium and long-term needs are described below.

Short term needs (0–1 year)

These include the immediate and transitional needs that are required to resume the delivery of education services in the various subsectors until reconstruction and rehabilitation of permanent structures is completed.

In the **school subsector**, the short-term needs include:

- *Resumption of education services:* It is estimated that nearly 15,000 temporary/transitional learning centers with teaching-learning and co-curricular and WASH facilities (including separate

facilities for girls) need to be established to resume schooling in the affected districts.²⁹ Given that school reconstruction will require at least 2–3 years, these structures require reinforcement and upgrading to withstand storms, snow, hail and rain to ensure uninterrupted education in a safe environment while undergoing reconstruction and retrofitting.

- *Debris removal and site clearance* of damaged schools to prepare the sites for set up of transitional classrooms and permanent buildings.
- *Provision of textbooks and teaching-learning materials*: Given the massive damage to textbooks and teaching learning materials in the affected districts, it is necessary to ensure quick supply to ensure meaningful resumption of teaching-learning processes.
- *Detailed structural assessment of damaged school buildings* on a building-by-building basis and soil tests to ascertain the true extent of damages and losses and to ascertain of the feasibility of reconstruction/retrofitting in existing sites.
- *Development of appropriate designs and prototypes and institutional arrangements*: For timely reconstruction and rehabilitation of damaged school buildings, it is necessary to develop a range of appropriate designs and prototypes that take into account geography, climate, availability of land, cost effectiveness and other factors into account. Further assessment of existing steel frame structure classrooms should be done to feed into the development of such prototypes to see if they could be the most cost-effective and resilient structures in case of earthquakes and others disasters.
- *Revisiting of the existing ‘Strategy for Disaster Resilient Schools’ and mainstreaming of the reconstruction and recovery plan in the post-SSRP school sector development sector plan* that is currently being formulated by the Government.

In the **TVET** and **higher education subsectors**, there is an immediate need to:

- *Provision of temporary spaces* to resume classes and training programs that were ongoing prior to the disaster. For this purpose, it is necessary that individual institutions are instructed and provided with the requisite resources by UGC, the respective universities, and CTEVT.
- *Flexible examination dates* for the missed examinations.
- *Offering subsidized credit/loans for affected students* to ensure continuity of their higher education.
- *Provision of construction-oriented trades in short-term training programs* offered by different ongoing TVET related projects,³⁰ giving particular attention to training people in the affected communities. There is also a need to properly equip the masons and other technicians (electricians, plumbers, etc.) trained for reconstruction work so that the idea of “building back better” can be translated into action quickly and effectively.

²⁹ The Education Cluster was immediately activated on 26 April and appealed for US\$ 24.1 million to enable the set-up of 4,668 TLCs, the provision of essential education-in-emergencies supplies, and the training of teachers on psychosocial support and life-saving messages relating to disaster preparedness, protection, sanitation and hygiene promotion, nutrition and health. The Education Cluster is also supporting the DOE with a structural assessment of 7,800 schools to designate them safe or unsafe for the resumption of learning. The Education Cluster is led by the DOE, under the supervision of the MOE, and co-led by UNICEF and Save the Children. It now consists of over 70 national and international organizations, including 37 International NGOs, 32 National NGOs and 4 UN Agencies.

³⁰ These include short-term training programs conducted by the government’s Enhanced Vocational Education and Training (EVENT) project, the Skills Development Project (SDP) and the Employment Fund.

- *Facility-by-facility assessment of damages, risks and vulnerabilities* through mobilization of engineering students and graduates.

Medium term needs (1-2 years)

Medium term needs will be dominated by the reconstruction and retrofitting of school/college buildings, and allied structures (DEOs, Resource Centers, administrative buildings, libraries, laboratories, etc.). This will require reviewing and revising existing legal and oversight mechanisms for strengthening and ensuring safety in all types of educational facilities.

In the school subsector, the medium term needs include:

- *Reconstruction of fully destroyed schools* using principles of ‘building back better’ with disaster resilience technology, better learning environment and service delivery and selective additional features such as solar lighting, water harvesting structures, internet connectivity etc. Integrated school designs should be developed to replace fragmented, block wise approach to buildings.
- *Review and rationalization of school locations (including school mergers), teacher deployment, unit costs, and incentive schemes* to ensure limited resources are redirected to the most needed areas and communities.
- *Relocation of schools to safer locations*: It is estimated that around 5% of the schools in the most affected districts need to be relocated. It is essential that provision for adequate land in a safe location made for such relocation.
- *Retrofitting and repair of partially destroyed schools* through a detailed assessment of partially destroyed buildings.
- *Provisioning additional skilled human resources and technical inputs (including third party monitoring)* at the national, district and school levels to ensure compliance and quality assurance at all phases of reconstruction/rehabilitation.
- *Carrying out curriculum and textbook reforms with DRR and resilience perspective* and teacher training on the new curriculum and textbooks through existing teacher training institutes.
- *Strengthening the education management information system (EMIS)* to incorporate a module on school safety and DRR.
- *Improving policies, guidelines and systems for new school buildings* to meet higher standards and levels of safety than residential buildings. Existing school building guideline needs to be reviewed to meet ‘immediate occupancy’ criteria. School buildings should function as evacuation shelters during disasters. It is important to set up independent quality control and inspection requirements for the construction of school buildings. Policies, guidelines and building codes to regulate safety standards for private schools through certification, technical and administrative support should be introduced.
- *Strengthening disaster preparedness and response at the school and community level* through school-based DRM and community based DRM training and planning by enhancing the capacity and preparedness of SMCs/PTAs, child clubs, communities, and other in disaster risk management. An emergency response plan needs to be developed, supplemented with improvement in the existing curriculum on disaster risk education and reduction to further raise the students’ and teachers’ awareness on earthquake, floods, landslides and other key hazards and to guide them properly in responding and evacuation in the event of disasters. MOE/DOE and DEOs need to prepare school continuity plans in case of disruptions to school calendar by disasters.

Many of the medium term needs in the school sub-sector also apply to TVET and higher education. In TVET, the medium term needs include:

- *Reconstruction of TVET facilities and institutions* using principles of ‘building back better’.
- *Trainings for technical and skilled workers:* As reconstruction will lead to high demand for technical and skilled workers such as skilled masons, carpenters, bar benders and construction supervisors familiar with earthquake safety techniques, the government should effectively utilize, and if necessary extend its ongoing projects to help meet this additional demand. CTEVT should also re-organize its schools to meet the demand for relevant TSLC and diploma level training and increase the batches of training, which will require hiring of additional trainers.
- *Incorporation of DRR* in TVET programs and training in DRR for instructors/facilitators.

Likewise, in higher education, the medium term needs include:

- *Reconstruction of damaged facilities and institutions* using principles of ‘building back better’. This would include provisions to build residential colleges.
- *Extension of courses on DRM and earthquake engineering* to all engineering colleges affiliated to various universities.
- *Strengthening of higher EMIS* to enhance its capacity to collect, analyze and disseminate information on all higher education institutions in the country.
- *Offering subsidized credit/loans for affected students* to ensure continuity of their education

Long term needs (beyond 2 years)

In the long run, going beyond the response to the earthquake and reconstruction, this phase will focus on long term development issues, particularly in developing a nation-wide policy and implementation plan for education safety across the country. Adequate policies and measures will be put in place to carry out multi-hazard preparedness of education institutions and investing in making buildings resilient to different kinds of disasters. In the long term, all education institutions need to be built on the principle of ‘build back better’ following international best practice of school safety. Further, it is necessary that subsequent sub-sectoral plans and programs take on board such long term developmental measures to ensure that physical construction is extensively supported by interventions to increase the quality of education and enhance the learning environment. Major long-term needs include:

- *School area-wide planning and risk assessment* to determine cases in which existing school site needs relocating to safer location. Decision making to replace seismically vulnerable school buildings or retrofitting requires building-by-building information on risk levels. The assessment should capture school’s exposure to other hazards and information such as floods, landslides, fires, wind-storms, avalanches, rock falls and availability of drinking water source, accessibility to communities, etc.
- *Strengthening the capacity of higher education for DRR/DRM research:* This could be done through the establishment of dedicated research centers in universities or by enhancing the capacity of existing centers within and outside of universities, as also recommended by the proposed higher education policy. This needs to be closely tied to the provision of research grants for the faculty to conduct research on related topics.
- *Institutionalization of mechanisms to ensure that all education institutions/facilities are disaster resilient:* This includes restructuring/realignment of units within the MOE system to ensure continued safety in the entire education sector, including private institutions that are affiliated to the CTEVT and various universities.
- *Strengthened disaster preparedness and response* at the school and community level through school-based DRM and community based DRM training and planning. An emergency response plan needs to be developed for each school, supplemented with improvement in the existing

curriculum on disaster risk education and reduction to further raise the students' and teachers' awareness on earthquake, floods, landslides and other key hazards and to guide them properly in responding and evacuation in the event of disasters. MOE/DOE and DEOs must prepare school continuity plans in case of disruptions to school calendar by disasters.

Needs for addressing Social Impact of the Disaster

As the disaster is likely to further exacerbate existing disparities in terms of access, retention and learning outcomes based on the level of vulnerability across the different equity dimensions (gender, caste, ethnicity, location, disability, socio economic status, etc.), the context and the availability and access to resources, it is necessary to ensure that the strategies to address these disparities take into account the changed prevalence and severity of these disparities in the aftermath of the disaster. For this, the implementation of the Consolidated Equity Strategy for the School subsector (including the development and use of the equity index for needs-based targeting of resources to balance emerging post disaster needs with historic prevalence and severity in disparities of educational outcomes) is both timely and crucial. There is also a need to adapt the following existing strategies to accommodate the emerging needs:

- **Incentive schemes:** as scholarships consume a considerable part of the available resources, they present an opportunity to enhance access and retention in schools. Needs-based redirection of these incentives (in place of the current 'blanket' provision) would increase the amount of money available to the neediest children and thereby serve the immediate needs of those most vulnerable and most affected.
- **Health and nutrition programs:** The midday meals program supported by the Government which has demonstrated significant success in contributing to increased access and retention, especially among disadvantaged groups living in highly food insecure areas of Nepal in the far and mid-western hills and mountains. This scheme could be extended to the affected districts for a fixed time period to address the nutritional needs of the children attending schools. Likewise, there is a need to also extend the Multi Sector Nutrition Strategy, under which iron folic acid and deworming tablets are offered for students, to the affected areas.
- **Advocacy and campaigns:** The 'Welcome to School Campaign' has been institutionalized as an annual reoccurring event to convince parents to enroll their children and ensure that children come to school from the start of the academic year. The Government needs to build on established partnerships with national and local media to ensure that the campaign encourages affected children to return to school in the affected areas, as well as alert schools and communities in non-affected areas to cater to the additional needs of children that have migrated from the affected areas.
- **Alternative education:** In order to address the needs of those who are expected to drop out of formal education, the government's non-formal education and skill development programs will have to adapt to the increased need based on the projection of increase of out of school children that are unlikely to return to formal education. This will require need based expansion of the School Outreach Program (SOP), the Flexible Schooling Programme (FSP), and the Open Schooling Programme (OSP) within the affected areas.
- **Inclusion of Children with Disabilities:** As the current data on children with disabilities within the EMIS is limited but suggest that they are amongst the most marginalized groups within access, retention and learning outcomes, it is crucial to strengthen the monitoring and evaluation of data on children with disabilities and the diagnostic and referral mechanisms within the affected areas.

Also, inclusion should be a core component of the Build Back Better concept to ensure that safe schools also are inclusive in terms of access, acoustics and light.

PRIORITY RECOVERY AND RECONSTRUCTION NEEDS

This section describes the short, medium and long-term priority recovery and reconstruction needs with an estimate of resources required to build back better from a multi-hazards perspective. The estimation of needs covers the entire sector and includes the needs of the private sector as well. The total needs for recovery and reconstruction is estimated at NPR 39,705.8 million (US\$ 397.1 million). Of this amount, the majority (91%) is needed for the recovery and reconstruction of the school subsector (Table 6). However, as in the case of damage/loss estimates, the estimates of needs should also be viewed as lower bound estimates of the actual needs required for the recovery and reconstruction of the entire sector mainly because of the limitations in the damage and loss assessment data described in the Methodology section. Further, the recovery and reconstruction needs will increase significantly if the needs of private institutions are taken into account. Given that private education institutions (schools, TVET institutions and university colleges) are not funded by government resources, it is recommended that they be provided with access to soft loans for reconstruction in return for meeting the requisite safety standards.

Table 5: Estimates of Recovery and Reconstruction Needs (in Million NPR)

Subsector	Cost of Needs
School Sector (including ECD/PPCs)	36,105.3
TVET	710.0
Higher Education	2,417.5
NFE/CLCs	42.1
General Governance and Administration	430.9
Total (in million NPR)	39,705.8
Total (in million US\$)	397.1

The specific short, medium and long-term needs are described below.

Short term needs (0–1 year)

These include the immediate and transitional needs that are required to resume the delivery of education services in the various subsectors until reconstruction and rehabilitation of permanent structures is completed.

In the **school subsector**, the short-term needs include:

- *Resumption of education services*: It is estimated that nearly 15,000 temporary/transitional learning centers with teaching-learning and co-curricular and WASH facilities (including separate facilities for girls) need to be established to resume schooling in the affected districts.³¹ Given that

³¹The Education Cluster was immediately activated on 26 April and appealed for US\$ 24.1 million to enable the set-up of 4,668 TLCs, the provision of essential education-in-emergencies supplies, and the training of teachers on psychosocial support and life-saving messages relating to disaster preparedness, protection, sanitation and hygiene

school reconstruction will require at least 2–3 years, these structures require reinforcement and upgrading to withstand storms, snow, hail and rain to ensure uninterrupted education in a safe environment while undergoing reconstruction and retrofitting.

- *Debris removal and site clearance* of damaged schools to prepare the sites for set up of transitional classrooms and permanent buildings.
- *Provision of textbooks and teaching-learning materials*: Given the massive damage to textbooks and teaching learning materials in the affected districts, it is necessary to ensure quick supply to ensure meaningful resumption of teaching-learning processes.
- *Detailed structural assessment of damaged school buildings* on a building-by-building basis and soil tests to ascertain the true extent of damages and losses and to ascertain of the feasibility of reconstruction/retrofitting in existing sites.
- *Development of appropriate designs and prototypes and institutional arrangements*: For timely reconstruction and rehabilitation of damaged school buildings, it is necessary to develop a range of appropriate designs and prototypes that take into account geography, climate, availability of land, cost effectiveness and other factors into account. Further assessment of existing steel frame structure classrooms should be done to feed into the development of such prototypes to see if they could be the most cost-effective and resilient structures in case of earthquakes and others disasters.
- *Revisiting the existing ‘Strategy for Disaster Resilient Schools’ and mainstreaming of the reconstruction and recovery plan in the post-SSRP school sector development sector plan* that is currently being formulated by the Government.

In the **TVET** and **higher education subsectors**, the short term needs include:

- *Provision of temporary spaces* to resume classes and training programs that were ongoing prior to the disaster. For this purpose, it is necessary that individual institutions are instructed and provided with the requisite resources by UGC, the respective universities, and the CTEVT.
- *Flexible examination dates* for the missed examinations.
- *Offering subsidized credit/loans for affected students* to ensure continuity of their higher education.
- *Provision of construction-oriented trades in short-term training programs* offered by different ongoing TVET related projects,³² giving particular attention to training people in the affected communities. There is also a need to properly equip the masons and other technicians (electricians, plumbers, etc.) trained for reconstruction work so that the idea of “building back better” can be translated into action quickly and effectively.
- *Facility-by-facility assessment of damages, risks and vulnerabilities* through mobilization of engineering students and graduates.

promotion, nutrition and health. The Education Cluster is also supporting the DOE with a structural assessment of 7,800 schools to designate them safe or unsafe for the resumption of learning. The Education Cluster is led by the DOE, under the supervision of the MOE, and co-led by UNICEF and Save the Children. It now consists of over 70 national and international organizations, including 37 International NGOs, 32 National NGOs and 4 UN Agencies.

³² These include short-term training programs conducted by the government’s Enhanced Vocational Education and Training (EVENT) project, the Skills Development Project (SDP) and the Employment Fund.

Medium term needs (1-2 years)

- Medium term needs will be dominated by the reconstruction and retrofitting of school/college buildings, and allied structures (DEOs, Resource Centers, administrative buildings, libraries, laboratories, etc.). This will require reviewing and revising existing legal and oversight mechanisms for strengthening and ensuring safety in all types of educational facilities.

In the school subsector, the medium term needs include:

- *Reconstruction of fully destroyed schools* using principles of ‘building back better’ with disaster resilience technology, better learning environment and service delivery and selective additional features such as solar lighting, water harvesting structures, internet connectivity etc. Integrated school designs should be developed to replace fragmented, block wise approach to buildings.
- *Review and rationalization of school locations (including school mergers), teacher deployment, unit costs, and incentive schemes* to ensure limited resources are redirected to the most needed areas and communities.
- *Relocation of schools to safer locations*: It is estimated that around 5% of the schools in the most affected districts need to be relocated. It is essential that provision for adequate land in a safe location made for such relocation.
- *Retrofitting and repair of partially destroyed schools* through a detailed assessment of partially destroyed buildings.
- *Provisioning additional skilled human resources and technical inputs (including third party monitoring)* at the national, district and school levels to ensure compliance and quality assurance at all phases of reconstruction/rehabilitation.
- *Carrying out curriculum and textbook reforms with DRR and resilience perspective* and teacher training on the new curriculum and textbooks through existing teacher training institutes.
- *Strengthening the education management information system (EMIS)* to incorporate a module on school safety and DRR.
- *Improving policies, guidelines and systems for new school buildings* to meet higher standards and levels of safety than residential buildings. Existing school building guideline needs to be reviewed to meet ‘immediate occupancy’ criteria. School buildings should function as evacuation shelters during disasters. It is important to set up independent quality control and inspection requirements for the construction of school buildings. Policies, guidelines and building codes to regulate safety standards for private schools through certification, technical and administrative support should be introduced.
- *Strengthening disaster preparedness and response at the school and community level* through school-based DRM and community based DRM training and planning by enhancing the capacity and preparedness of SMCs/PTAs, child clubs, communities, and other in disaster risk management. An emergency response plan needs to be developed, supplemented with improvement in the existing curriculum on disaster risk education and reduction to further raise the students’ and teachers’ awareness on earthquake, floods, landslides and other key hazards and to guide them properly in responding and evacuation in the event of disasters. MOE/DOE and DEOs need to prepare school continuity plans in case of disruptions to school calendar by disasters.

Many of the medium term needs in the school sub-sector also apply to TVET and higher education. In TVET, the medium term needs include:

- *Reconstruction of TVET facilities and institutions* using principles of ‘building back better’.
- *Trainings for technical and skilled workers:* As reconstruction will lead to high demand for technical and skilled workers such as skilled masons, carpenters, bar benders and construction supervisors familiar with earthquake safety techniques, the government should effectively utilize, and if necessary extend its ongoing projects to help meet this additional demand. CTEVT should also reorganize its schools to meet the demand for relevant TSLC and diploma level training and increase the batches of training, which will require hiring of additional trainers.
- *Incorporation of DRR* in TVET programs and training in DRR for instructors/facilitators.

Likewise, in higher education, the medium term needs include:

- *Reconstruction of damaged facilities and institutions* using principles of ‘building back better’. This would include provisions to build residential colleges.
- *Extension of courses on DRM and earthquake engineering* to all engineering colleges affiliated to various universities.
- *Strengthening of higher EMIS* to enhance its capacity to collect, analyze and disseminate information on all higher education institutions in the country.
- *Offering subsidized credit/loans for affected students* to ensure continuity of their education

Long term needs (beyond 2 years)

In the long run, going beyond the response to the earthquake and reconstruction, this phase will focus on long term development issues, particularly in developing a nation-wide policy and implementation plan for education safety across the country. Adequate policies and measures will be put in place to carry out multi-hazard preparedness of education institutions and investing in making buildings resilient to different kinds of disasters. In the long term, all education institutions need to be built on the principle of ‘build back better’ following international best practice of school safety. Further, it is necessary that subsequent sub-sectoral plans and programs take on board such long term developmental measures to ensure that physical construction is extensively supported by interventions to increase the quality of education and enhance the learning environment. Major long-term needs include:

- *School area-wide planning and risk assessment* to determine cases in which existing school site needs relocating to safer location. Decision making to replace seismically vulnerable school buildings or retrofitting requires building-by-building information on risk levels. The assessment should capture school’s exposure to other hazards and information such as floods, landslides, fires, wind-storms, avalanches, rock falls and availability of drinking water source, accessibility to communities, etc.
- *Strengthening the capacity of higher education for DRR/DRM research:* This could be done through the establishment of dedicated research centers in universities or by enhancing the capacity of existing centers within and outside of universities, as also recommended by the proposed higher education policy. This needs to be closely tied to the provision of research grants for the faculty to conduct research on related topics.
- *Institutionalization of mechanisms to ensure that all education institutions/facilities are disaster resilient:* This includes restructuring/realignment of units within the MOE system to ensure continued safety in the entire education sector, including private institutions that are affiliated to the CTEVT and various universities.
- *Strengthened disaster preparedness and response* at the school and community level through school-based DRM and community based DRM training and planning. An emergency response

plan needs to be developed for each school, supplemented with improvement in the existing curriculum on disaster risk education and reduction to further raise the students' and teachers' awareness on earthquake, floods, landslides and other key hazards and to guide them properly in responding and evacuation in the event of disasters. MOE/DOE and DEOs must prepare school continuity plans in case of disruptions to school calendar by disasters.

Needs for addressing Social Impact of the Disaster

In addition to the recovery and reconstruction of infrastructure and physical assets described above, it is necessary to ensure that human recovery needs are addressed. For this, the implementation of the Consolidated Equity Strategy for the school subsector (including the development and use of equity index for needs-based targeting of resources to balance emerging post-disaster needs with historical prevalence and severity in disparities of educational outcomes) is crucial. It is also essential to adapt the following existing strategies to accommodate emerging needs:

- **Incentive schemes:** as scholarships consume a considerable part of the available resources, they present an opportunity to enhance access and retention in schools. Needs-based redirection of these incentives (in place of the current 'blanket' provision) would increase the amount of money available to the neediest children and thereby serve the immediate needs of those most vulnerable and most affected.
- **Health and nutrition programs:** The midday meals program supported by the government has demonstrated significant success in contributing to increased access and retention, especially among disadvantaged groups living in highly food insecure areas of Nepal in the far and mid-western hills and mountains. This scheme needs to be extended to the most affected districts for a fixed time period to address the nutritional needs of the children attending schools. Likewise, there is a need to also extend the Multi Sector Nutrition Strategy to the affected areas, under which iron folic acid and deworming tablets are offered for students.
- **Advocacy and campaigns:** The 'Welcome to School Campaign' has been institutionalized as an annual reoccurring event to convince parents to enroll their children and ensure that children come to school from the start of the academic year. The Government needs to build on established partnerships with national and local media to ensure that the campaign encourages affected children to return to school in the affected areas, as well as alert schools and communities in non-affected areas to cater to the additional needs of children that have migrated from the affected areas.
- **Alternative education:** In order to address the needs of those who are expected to drop out of formal education, the non-formal education and skill development programs will have to adapt to possible increase in the number of that are unlikely to return to formal education. This will require targeted expansion of school outreach program, flexible schooling program, and open schooling program in the affected areas as well as areas with in-migration.
- **Inclusion of Children with Disabilities:** Existing EMIS includes limited data on children with disabilities, who are amongst the most marginalized groups in terms of access, retention and learning outcomes. Further, the number of children with disabilities and sever injuries is likely to increase after disaster. Therefore, it is crucial to strengthen the collection of data on children with disabilities and introduce diagnostic and referral mechanisms in the affected areas. Inclusion should be a core component of building back better to ensure that safe schools are accessible to children with disabilities.

Implementation Arrangements

Implementation arrangements for reconstruction and recovery will vary by the specific sub-sectors within the education sector. However, it is necessary that dedicated mechanisms be instituted within MOE/DOE, the CTEVT and universities (including third party verification) to ensure strict adherence to norms and standards in the design and construction of education facilities. In the school sub-sector, there are a limited number of engineers and sub-engineers at the DOE and DEOs. The damage and loss figures illustrate the importance of ensuring safety and quality by providing technical supervision at the school construction site, testing materials, inspecting workmanship, and confirming that workers comply with design drawings during construction. The number of design and construction supervision engineers and sub-engineers should be increased by hiring additional human resources and technical inputs for speedy recovery, monitoring safety and quality. The TVET and higher education sub-sectors need to establish coordination committees within their respective agencies and could assign specialized institutions within their ambit (e.g., the Institute of Engineering in the case of Tribhuvan University) to manage and oversee the overall safety of their institutions.

Assessment Methodology

This Education Sector PDNA is part of the broader PDNA conducted for all sectors under the overall leadership of the National Planning Commission. It is a joint exercise of the Government and the development partners, and in the case of education is led by the MOE.

Methods, Tools, and Data Sources

The PDNA of the education sector utilizes a combination of quantitative and qualitative assessment tools. The major component of this assessment is the estimation of damages and losses for the entire sector, which includes early childhood education and development (ECED), school education (grades 1–12), technical and vocational education and training (TVET), higher education, and non-formal education/life-long learning. The estimation of damages and losses are categorized into the following four dimensions: (1) Destruction of infrastructure and assets; (2) Disruption to service delivery and production; (3) Disruption of governance; and, (4) Emerging risks and vulnerabilities.

The damages and losses for the sector are calculated based on the data and information provided to the Ministry of Education by the various sub-sectors – Department of Education for ECED and school education, Council for Technical Education and Vocational Training for TVET, University Grants Commission (UGC) for higher education, and Non-Formal Education Centre for non-formal education/life-long learning (including community learning centers). Data on damages and losses to public and institutional libraries has also been included. For the school subsector, the PDNA Team built on the data that was compiled through the Nepal Education Cluster, which was activated to undertake the relief and initial response shortly after the first quake on 25 April 2015.³³ Data on damages and losses was obtained from 57 districts, including the most affected 14 districts. All calculations are based on the pre-disaster unit costs used by the MOE system in the planning and allocation of resources.

³³ For details, see www.humanitarianrelief.info/operations/nepal/education

The Sector Assessment Team undertook field visits from 26–29 May 2015 in 10 variously affected districts³⁴ to gain additional insights into the extent of damage to physical infrastructure and assets, and to understand the broader effects of the disaster on: access and learning environment; teaching and learning processes; teachers and education personnel; service delivery and governance mechanisms; and, emerging risks and vulnerabilities. More importantly, however, these field visits were used to understand local perspectives on how the education system can be built back better to reduce multi-hazard risks in the future. For these purposes, a standard questionnaire was developed by the Assessment Team (Annex – D) to guide the interactions with various stakeholders. In each district, visits were made to ECD centers, general schools, technical schools, and universities/colleges, and discussions were held with the District Education Officers and staff, teachers, school management committee members, parents and children to the extent possible. Further, a series of interactions were held with representatives of all central line agencies including the CTEVT and University Grants Commission, representatives of private schools and various teacher organizations on 27 May to understand the effects of the disaster on the functioning of the education system and to solicit their suggestions for potential recovery strategies and interventions. Further consultations on the recovery strategies and interventions were carried out with these agencies and their suggestions have been incorporated in report. In addition, the children’s consultations organized by the Plan International, Save the Children, UNICEF and World Vision International Nepal from 25 May to 7 June 2015 has informed the PDNA education sector report by reflecting the children’s voice from 14 most affected districts.

Key Assumptions and Limitations

Damages to infrastructure and assets in all sub-sectors have been estimated on the basis of the number of classrooms/rooms damaged (not on the basis of the number building units damaged). As ‘intact’ classrooms in an unusable building³⁵ have generally not been included in the damage reports from the districts, the total number of classrooms rendered unusable is most likely higher than the figures used here. Whilst there was complete information on school-based ECD centers (which are included under school education), information on the extent of damage to community based ECD centers was available only for the 14 most-affected districts. We have assumed that the damage to ECD centers in the remaining affected districts was proportional to the damage to schools and have done the calculations accordingly.³⁶

In the case of private education institutions, many of them operate in rented buildings and the damage to classrooms could be therefore seen as damage to be included under the housing sector PDNA. This is also the case with many community based ECD centers and community learning centers. However, we have included such damages as damages to the education sector. We have applied the same standard unit costs to all classrooms in different sub-sectors irrespective of the nature of construction (e.g., mud vs. RCC). It should be noted that complete data on damages to assets in many schools and educational institutions were not available. In such cases, we have assumed that total damage to classrooms also means total damage to furniture, equipment and other assets and estimated the total damages using average cost figures provided by the respective sub-sectoral institutions. In the case of facilities experiencing partial damage, we have assumed the loss at 50% of the value of the furniture, equipment

³⁴ These included Kathmandu, Lalitpur, Bhaktapur, Lamjung, Tanahu, Gorkha, Dhading, Sindhupalchowk, Kavrepalanchowk and Sindhuli.

³⁵ A number of such cases were observed during the field visit.

³⁶ We can generally assume that community-based ECD centers are typically located in less structurally sound buildings so this estimate of damages is also highly likely to be a lower bound estimate.

and other assets owned by them. Following the standard PDNA methodology, we have also included in the loss estimates the costs of demolition/debris removal and of setting up temporary learning spaces.³⁷

Given the extremely tight timeline for the assessment, it was not possible to include data from the detailed structural assessment that is currently being undertaken in all affected districts.³⁸ The Team has, therefore, chosen to be conservative in its estimates of damages and losses. More specifically, it should be noted that damage and loss estimates reported in this assessment should be viewed as lower bound estimates of the actual damages and losses experienced by the sector for the following reasons:

- *Underreporting of damages in educational institutions run by the private sector:* Not all private education institutions were able to provide damage and loss data. This was also the case with TVET and higher education subsectors that do not have systematic mechanisms in place to collect such data under a limited time-frame. Therefore, a more systematic and comprehensive assessment of damaged buildings is needed to ascertain the true extent of damage.
- *Limitations in approach to reporting damages:* As damage reports show data on damaged classrooms as opposed to buildings, 'intact' classrooms in damaged buildings have not been accounted for even though they are unusable.
- *Limited information on damages to community run institutions:* Data on damages to many institutions such as community-based ECD centers and community learning centers are not available.
- *Use of conservative unit cost figures:* The unit costs used by the government underestimate the actual costs of classrooms as most of construction in the education sector occurs through government-community partnerships and matching contributions from the communities and other organizations.
- *Non-inclusion of damages from storms following the earthquakes:* As the PDNA was being undertaken, a series of highly destructive storms also hit the affected districts, causing additional damages to the already affected schools and communities. Particularly, roofing materials were blown away in many schools. However, these damages could not be included in this analysis. Furthermore, Nepal is about to enter the Monsoon (rainy) season, which will bring torrential rains and increase the risks of flooding and landslides. In particular, five of the most affected districts (Rasuwa, Sindupalchowk, Dhading, Dolakha and Gorkha) have suffered from Monsoon-related disasters in the past and it is highly likely that they will suffer from additional damages in the days to come. Such potential future damages are also not included in this PDNA.

14 most affected districts

No.	Districts	Damage (in mln NPR)	Loss (in mln NPR)
1	Bhaktapur	541.0	50.0
2	Dhading	2,473.0	323.0
3	Dolakha	2,259.0	251.0
4	Gorkha	2,936.0	363.0
5	Kathmandu	2,366.0	140.0
6	Kavre	1,508.0	186.0

³⁷ However, justifications could be made to include some of these 'losses' in the 'needs' part.

³⁸ However, the preliminary results of these assessments from 4 districts have been used to verify the data on damage that was reported through the District Education Officers.

7	Lalitpur	839.0	95.0
8	Makwanpur	681.0	98.0
9	Nuwakot	2,881.0	371.0
10	Okhaldhunga	692.0	90.0
11	Ramechhap	658.0	77.0
12	Rasuwa	628.0	81.0
13	Sindhuli	737.0	103.0
14	Sindhupalchok	3,177.0	403.0
Subtotal (in NPR mln)		22,376.0	2,631.0
Subtotal (in US\$ mln)		223.8	26.3

16 affected districts³⁹

No.	Districts	Damage (in mln NPR)	Loss (in mln NPR)
15	Solukhumbu	648.0	84.0
16	Syangja	551.0	74.0
17	Tanahun	374.0	50.0
18	Arghakhanchi	121.0	3.0
19	Baglung	174.0	25.0
20	Bhojpur	29.0	3.0
21	Chitwan	153.0	24.0
22	Dhankuta	85.0	8.0
23	Kaski	182.0	24.0
24	Khotang	278.0	28.0
25	Lamjung	479.0	60.0
26	Palpa	68.0	2.0
27	Parbat	247.0	32.0
28	Myagdi	96.0	4.0
29	Nawalprasi	160.0	15.0
30	Sankhusabha	187.0	23.0
Subtotal (in NPR mln)		3,832.0	459.0
Subtotal (in US\$ mln)		38.32	4.59

26 minor affected districts

No.	Districts	Damage (in mln NPR)	Loss (in mln NPR)
31	Siraha	20.0	0.4
32	Sunsari	13.7	0.1
33	Surkhet	3.3	0.2
34	Taplejung	47.3	5.7
35	Terhathum	280.6	35.1
36	Udayapur	152.8	24.7
37	Bajura	11.9	0.2
38	Bara	8.0	0.2
39	Banke	4.0	0.1

³⁹Gulmi district has not been included in the damage and losses part, but has been accounted for in the needs part.

40	Dang	539.0	10.1
41	Dailekh	7.4	1.2
42	Dhanusha	3.3	0.0
43	Ilam	96.3	12.1
44	Jhapa	21.7	1.1
45	Kalikot	20.1	0.7
46	Kanchanpur	-	1.4
47	Kapilbastu	20.9	1.5
48	Panchthar	179.8	27.6
49	Pyuthan	51.5	5.9
50	Manang	2.6	0.1
51	Morang	87.0	9.8
52	Mustang	61.1	3.2
53	Rupendehi	202.6	24.6
54	Salyan	16.3	0.6
55	Saptari	4.5	-
56	Sarlahi	0.5	-
Subtotal (in NPR mln)		1,856.39	166.6
Subtotal (in US\$ mln)		18.56	1.7

Annex B: EDUCATION RECOVERY NEEDS

Sub-levels	Description of Initiatives	Assumptions	Estimated total cost (in mln NPR)	Cost of Needs		
				Fiscal Year		
				FY 2015	FY 2016	FY 2017
School (1-12 grades) including ECD/PPCs	Rubble and debris removal	It is estimated that cost of demolition and debris removal is 15,000 NPR per fully destroyed room and 7,500 NPR per partially destroyed rooms. This covers ECD/PPCs (including institutional ones), but excludes community based ECD, which will be accounted in the housing sector	586.95	586.95	-	
	Setting up TLCs	15,000 TLCs are required to be set up. Education flash appeal plans to set 4668 TLCs and there is a remaining need for 10,000 TLCs	1,500.00	1,500.00	-	
	Provision of psycho-social support to teachers in the affected districts	It is estimated that around 20,000 teachers will receive psycho-social support/training	20.00	20.00	-	
	Provision of textbooks and TLMs	The need for textbooks and TLM is 2,096.31 mln NPR	2,096.31	2,096.31	-	
	Conducting detailed structural assessment of destroyed and damaged school facilities	Structural assessment teams will consist of 1 engineer, 1 government official and 1 data enumerator, which all will receive a per diem of 2,500 NPR and will be on average performing 3-4 structural assessments per day	33.69	33.69	-	
	Development of appropriate designs and prototypes for disaster resilient schools	It is estimated that it will take 6 months to develop design and prototypes for disaster resilient schools and this activity mainly covers TA and field travel validation.	5.00	5.00	-	

Reconstruction of fully destroyed schools (classrooms, toilets, wash facilities, compound walls, playgrounds) with BBB included to ensure quality improvements, technological modernisation, DRR and resilience features, accessibility to those with disabilities and more energy efficient systems	It is estimated that average cost of reconstruction of schools is 825,000 NPR per classroom (+ toilet, wash facilities, walls and playground) with BBB	21,524.36	1,076.22	8,609.74	7,533.
Relocation of schools to safer locations	It is assumed that 5% (240 schools) of the destroyed/damaged schools in 14 severely affected schools will be relocated. It is assumed that per one school 4 ropani of land is required. It is estimated on average 1 ropani would cost 200,000 NPR.	192.00	9.60	76.80	67.
Retrofitting and repair of partially destroyed schools	It is estimated that for retrofitting and repair of the partially destroyed classrooms 290,000 NPR would be required.	7,563.16	378.16	3,025.26	3,025.
Provision of equipment and furniture to reconstructed schools and classrooms	It is assumed that school equipment and furniture will be provided during the reconstruction period.	2,208.85	110.44	883.54	773.
Development of the mechanisms for close monitoring and reporting of enrolment and attendance within schools and use it to create equity profiles and track emerging disparities	It is estimated that this will be done by the EMIS section in the Department of education utilising expertise within the existing TA from Development Partners within the SSRP SWAp	6.00	6.00	-	
Strengthening EMIS to incorporate a module on school safety, EiE and DRR (including equity profiles and Index)	It is assumed that a separate module on school safety and DRR will be developed and integrated into the EMIS. It is expected to train DEOs and RCs on the new module. Software development is 1,500,000 NPR and training of DEOs and RCs at the RED level would cost 1,000,000 NPR per RED (5 regions)	6.50		2.17	4.

	Conduct a curriculum and textbook reform with DRR and resilience perspective	It is assumed that curriculum revision will be done for school subsector covering (ECD, 1-12 grades)	10.00		10.00	
	Conduct ToT on the new curriculum and textbooks for master trainers in the teacher training institutes (NCED)	It is assumed that after revision of the curriculum and textbooks, master trainers will have be prepared, who will in turn train teacher through regular INSET programmes	1.00		1.00	
	Strengthen the capacity and preparedness of SMCs/PTAs, child clubs, communities, and other in disaster risk management	It is assumed that all SMCs/PTA and child clubs in all districts would benefit from capacity building efforts. 35,000 educational facilities (ECD, schools, CLCs, including private schools). It is estimated that on average it would cost 10,000 NPR per school	350.00		87.50	87.50
	Conducting Welcome to School Campaign adapted to the needs of affected children (in local language) in the districts	It is assumed that this initiative will review and revise IEC materials, key messages, print additional infographics and develop and broadcast key messages through FM stations in local language. The total cost of estimated at 1,500,000 NPR	1.50	1.50	-	
Sub Total			36,105.32	5,823.87	12,696.02	11,490.00
Technical and Vocational Education and Training	Rubble and debris removal	It is estimated that cost of demolition and debris removal is 15,000 NPR per fully destroyed room and 7,500 NPR per partially destroyed rooms	6.72	6.72	-	
	Conducting detailed structural assessment of destroyed and damaged TVET facilities	Structural assessment teams will consist of 1 engineer, 1 government official and 1 data enumerator, which all will receive a per diem of 2,500 NPR and will be on average performing 1 structural assessments per day	1.013	1.013	-	
	Provision of temporary space to complete the on-going TVET trainings	It is assumed that ongoing trainings will need to be continued for the duration of 6 months on average in rented facilities which are estimated to cost 5,000 NPR per month	16.20	16.20	-	

	Reconstruction of TVET rooms with BBB included to ensure quality improvements, technological modernization, DRR and resilience features, accessibility to those with disabilities and more energy efficient systems	Reconstruction of fully destroyed technical rooms in TVET with BBB applied is estimated to cost 1,000,000 NPR per classroom	356.00	17.80	142.40	106.80
	Retrofitting and repair of partially destroyed TVETs	It is estimated that for retrofitting and repair of the partially destroyed TVET rooms 290,000 NPR would be required.	53.36	2.67	21.34	16.33
	Provision of TLMs	The need for TLM for TVET sector is 1.28 mln NPR.	1.28	1.28	-	-
	Provision of equipment and furniture to reconstructed schools and classrooms	It is assumed that school equipment and furniture will be provided during the reconstruction period.	103.93	10.39	41.57	51.97
	Developing a condensed course on mason and carpenter trainings based on identified market demands (as a result of rapid labour market assessment)	It is the assumption that this will be done in house by CTEVT	0.02	0.02	-	-
	Provision of vocational and skills trainings (including mobile trainings) and toolkits (particularly mason and carpenter) in collaboration with CTNET, EVENT, SDP, EF, NGOs and private sectors	The assumption is that 10,000 people will participate in the training and that each toolkit will cost 5,000 NPR person. The training will be for 2 months - 6,000 NPR per person per month	170.00	170.00	-	-
	Incorporate DRR in TVET programmes	It is assumed that curriculum revision will be done for TVET subsector	0.50	-	0.50	-
	Conduct ToT for master trainers of TVET training programme on DRR and resilience	It is assumed that after revision of the curriculum and textbooks, master trainers will have be prepared, who will in turn train teacher through regular INSET programmes	1.00	-	0.50	0.50
Sub Total			710.02	226.09	206.32	175.60
Higher Education	Rubble and debris removal	It is estimated that cost of demolition and debris removal is 15,000 NPR per fully destroyed room and 7,500 NPR per partially destroyed rooms	42.18	42.18	-	-

	Conduct detailed structural assessment of destroyed and damaged HE facilities through mobilizing graduates/students from Engineering Institutes	Structural assessment teams will consist of 1 engineer, 1 government official and 1 data enumerator, which all will receive a per diem of 2,500 NPR and will be on average performing 1 structural assessments per day	0.93	0.93	-	
	Reconstruction of HE rooms and libraries with BBB included to ensure quality improvements, technological modernization, DRR and resilience features, accessibility to those with disabilities and more energy efficient systems	Reconstruction of fully destroyed HE rooms and libraries with BBB is estimated to cost 925,000 NPR per room	1,197.20	59.86	478.88	359.
	Retrofitting and repair of partially destroyed Higher Education Facilities	It is estimated that for retrofitting and repair of the partially destroyed HE rooms 290,000 NPR would be required.	881.60	44.08	352.64	264.
	Provision of TLMs	The need for TLMs for HE has been estimated as 16.70 mln NPR.	16.70	16.70	-	
	Provision of equipment and furniture to reconstructed HE institutions and classrooms	It is assumed that school equipment and furniture will be provided during the reconstruction period.	177.22	8.86	70.89	53.
	Provision of flexible examinations for HE institutions	The assumption is that the arrangements that would have to be made per institution to conduct an additional exam will be 50,000 NPR	3.72	1.86	1.86	
	Provision of subsidized student credit for most affected students	The assumption is that all affected students will be in need of accessing a scholarship of 2,000 NPR per month. It is estimated that 2,000 students will benefit from this initiative.	48.00	24.00	24.00	
	Strengthen HEMIS	The assumption is that this will require national TA for 2 months at the cost of 200,000 NPR per month	0.40	-	0.40	

	Strengthen the capacity of higher education system to conduct research on disasters related topics (dedicated centre for research and management of disasters)	The establishment of the centre will cost 10,000,000 NPR and the running cost will be 200,000 per month	22.00	12.40	2.40	2.20
	Provision of public research grants in disaster related topics/areas	Each year, 20 grants will be awarded and grants will be 200,000 NPR for 3 years	20.00	4.00	4.00	4.00
	Extend course on DRM to other engineering colleges	The set up of the DRM course in at least 3 colleges in each region will cost 500,000 NPR	7.50	-	7.50	-
Sub Total			2,417.45	214.87	942.57	683.82
NFE/CLCs	Rubble and debris removal	It is estimated that cost of demolition and debris removal is 15,000 NPR per fully destroyed room and 7,500 NPR per partially destroyed rooms.	0.65	0.65	-	-
	Conducting detailed structural assessment of destroyed and damaged NFECLCs	Structural assessment teams will consist of 1 engineer and 1 data enumerator, which all will receive a per diem of 2,500 NPR and will be on average performing 1 structural assessments per day	0.24	0.24	-	-
	Reconstruction of NFE/CLC rooms with BBB included to ensure quality improvements, technological modernisation, DRR and resilience features, accessibility to those with disabilities and more energy efficient systems	Reconstruction of fully destroyed rooms in CLCs with BBB is estimated to cost 600,000 NPR per room	24.00	2.40	9.60	12.00
	Retrofitting and repair of partially destroyed NFE/CLCs	It is estimated that for retrofitting and repair of the partially destroyed NFE rooms 290,000 NPR would be required.	2.03	0.20	1.83	-
	Provision of TLMs	The need for TLMs has been estimated as 0.40 mln NPR.	0.40	0.40	-	-
	Integration of DRR in NFE programs	It is assumed that curriculum revision will be done across all program for the NFE subsector	0.30	-	0.30	-

	Expansion of School Outreach Programme (SOP), the Flexible Schooling Programme (FSP), and the Open Schooling Programme (OSP) within the affected areas	The assumption is that these programs will cost 130,000 NPR per district and it will be conducted for two years.	7.02	3.51	3.51	
	Conducting mobile skills related literacy programs to the affected VDCs and municipalities	It is assumed that an additional 10,000 NPR will be made available for all VDCs/ municipalities in the 14 most affected districts.	7.46	3.73	3.73	
Sub Total			42.10	11.13	18.97	12.00
General Governance and Administrative Needs (cross-cutting)	Rubble and debris removal (Education sector administrative buildings)	Equals to the amount indicated in the loss part.	2.18	2.18	-	
	Reconstruction of damaged administrative buildings and libraries	The damage to administrative buildings has been calculated at 79.40 mln NPR and the need is 88.34 mln NPR	88.34	4.42	35.34	26.00
	Review all different guidelines and building codes and agree on standard one (including for institutional schools)	The review will cost 500,000 NPR, which includes local technical assistance and stakeholder consultations	0.50	-	0.50	
	Review existing legal and oversight mechanisms for strengthening and ensuring school safety in all types of education facilities (revision of existing regulations regarding minimum safety standards for school infrastructure and operation, especially for private sector)	The review will cost 500,000 NPR, which includes local technical assistance and stakeholder consultations	0.50	0.25	0.25	
	Provision of vehicles for overseeing reconstruction and recovery process in the affected districts	It is estimated that 30 vehicles will be needed for this purpose. The running cost are not included and will be covered by the regular budget.	150.00	60.00	90.00	
	Expand and strengthen the current engineering unit at the DOE and DEO levels to meet reconstruction and recovery needs	It is assumed that four (4) additional FTE engineers (structural, architect and geo) will be required at DOE. One additional engineer and two sub-engineers will be required in each of the 75 DEOs	189.35	1.56	13.39	44.00
Sub Total			430.86	68.40	139.48	71.00
GRAND TOTAL			39,705.75	6,344.37	14,003.34	12,432.00

Annex C: EDUCATIONAL VULNERABILITIES IN THE AFFECTED DISTRICTS

Children with disabilities	ECD	Percentage	7.8	9.9	6.6	6.9
		Ranking		High	Low	Low
	Primary	Percentage	1.5	1.0	1.1	2.0
		Ranking		Low	Low	High
	Secondary	Percentage	1.1	0.9	0.9	1.5
		Ranking		Low	Low	High
Total	Percentage	0.013	1.0	1.1	1.8	
	Raking		Low	Low	High	
Total age wise Janajatis Total currently NOT attending in the schools	5-9 Year	Percentage	11.5	14.2	10.7	18.0
		Ranking		High	Low	High
	10-12 Year	Percentage	7.1	5.3	4.7	6.8
		Ranking		Low	Low	Low
	13-14 Year	Percentage	9.8	8.7	7.2	8.7
		Ranking		Low	Low	Low
15-16 Year	Percentage	19.5	19.1	17.9	20.7	
	Ranking		Low	Low	High	
Total age wise Dalits Total currently NOT attending in the schools	5-9 Year	Percentage	20.2	13.1	13.4	23.3
		Ranking		Low	Low	High
	10-12 Year	Percentage	15.4	5.3	6.7	11.1
		Ranking		Low	Low	Low
	13-14 Year	Percentage	18.2	10.7	11.9	15.2
		Ranking		Low	Low	Low
15-16 Year	Percentage	32.8	23.8	25.3	29.8	
	Ranking		Low	Low	Low	
Total age wise Janajatis Total currently attending in the schools	5-9 Year	Percentage	88.5	85.8	89.3	82.0
		Ranking		Low	High	Low
	10-12 Year	Percentage	92.9	94.7	95.3	93.2
		Ranking		High	High	High
	13-14 Year	Percentage	90.2	91.3	92.8	91.3
		Ranking		High	High	High
15-16 Year	Percentage	80.5	80.9	82.1	79.3	
	Ranking		High	High	Low	
Total age wise Dalits Total currently attending in the schools	5-9 Year	Percentage	79.8	86.9	86.6	76.7
		Ranking		High	High	Low
	10-12 Year	Percentage	84.6	94.7	93.3	88.9
		Ranking		High	High	High

	13-14 Year	Percentage	81.8	89.3	88.1	84.8
		Ranking		High	High	High
	15-16 Year	Percentage	67.2	76.2	74.7	70.2
		Ranking		High	High	High
Female age school population	Primary	Percentage	49.0	49.2	49.3	49.1
		Rank		High	High	High
	Secondary	Percentage	49.2	49.6	49.8	49.4
		Rank		High	High	High
	Tertiary	Percentage	50.8	51.9	52.2	51.0
		Rank		High	High	High
Female population out-of school	Primary	Percentage	53.7	54.7	50.5	48.5
		Rank		High	Low	Low
	Secondary	Percentage	49.6	47.7	46.8	49.0
		Rank		Low	Low	Low
	Tertiary	Percentage	51.4	50.2	50.2	52.5
		Rank		Low	Low	High

Annex D: PDNA FIELD TRIP REPORT

SCOPE AND OBJECTIVES

The PDNA education sector assessment is envisioned to use a combination of qualitative and quantitative assessment tools. In addition to quantitative methods, which are needed for the Damage and Loss Assessment (DaLA), assessing the human impact of the disaster requires additional of qualitative data. As such, it is decided to include field visits to sampled districts in order to validate the quantitative data that will be collected with semi structured key stakeholder interviews and focus group discussions. The objectives of the field visits are the following:

- To comprehend the effects on access and learning environment beyond the destruction of the infrastructure and physical assets;
- To explore the effects on teaching and learning processes;
- To gain a deeper understanding on the effects teachers and education personnel;
- To identify effects on service delivery and governance mechanisms;
- To collect qualitative data to validate assumptions regarding emerging risks and vulnerabilities;
- Understand interruption of services at central level and implications for the district level;
- To gain perspectives on how the education system can be built back better to reduce future multi-hazard risk;
- To apply equity, disability, age and gender lens to explore specific education needs of the marginalised groups who may have suffered disproportionately compared to others.

MODALITY OF FIELD TRIPS

The field visits will be undertaken from 26 to 29 of May 2015, the report of the field trips is also expected to be completed within this timeframe. Four groups will conduct the field trips:

- Gorkha, Tanahu and Lamjung: DOE, CTNET, UGC, ADB/NSET, UNICEF, UNESCO, JICA (3 days)
- Sindupalchok, Kavre: MOE, DOE, CTNET, ADB, WFP (2 days)
- Sinduli: NPC, MOE, ABD, UNESCO, WB, JICA (1 day)
- Dhading: DOE and ADB/NSET

- Kathmandu valley: NPC, MOE, DOE, CTNET, USAID, WB (1 day)
- In addition, Focus Group Discussions will be held with Central Level Agencies (CLA).

OVERALL COMMENT ON REBUILDING:

- As a boost to rural livelihoods, the group recommended rebuilding schools through food/cash for work
- Ensuring that the livelihoods, social protection and gender groups are connected to our work
- Teachers need additional support on how to manage students following a disaster. They require more training/preparation on what to do to facilitate students’ return to school and different non-formal activities to help students normalize in a safe, learning environment.
- School management need to be cognizant of the challenges teachers are facing and be flexible to allow teachers to take of their family situation first. School management should be mindful of teachers’ working environment and support teachers when necessary.
- Retrofitted schools that were visited remained intact and demonstrated the effectiveness of prevention measures taken for disaster risk reduction (DRR). Retrofitted schools serve as a model for the community on how to structurally strengthen existing buildings. These schools are currently serving as community shelters.
- Despite the destruction of many community schools, this is an opportunity to not only build back better but to strengthen the public school system.
- In building back better, DOE needs to consider improved school building/classroom designs with multiple exits for students evacuate in case of any emergency.
- There were significant cost variations in the construction of TLCs. This may be due to the rapid rise in prices of building materials (i.e. bamboo, CGI sheets, etc). For example, one school quoted NRs. 99,000 per TLC, while another stated only NRs. 40,000 per TLC, both were made of bamboo and the same size.
- Given the destruction of school buildings and classrooms, many schools will need to create multi-grade classroom and/or establish a shift system. MOE/CLAs will need to support schools to manage these kinds of classes and altered class schedules/timetables.
- The emergency response by the Ministry of Education and the work done through the Nepal Education Cluster was referenced in nearly all districts. It seemed to facilitate the comprehensive data on damage presented to the PDNA. It was observed that the outcomes of the ongoing structural assessment would have added significant value and detail to the DaLA but could not be reflected due to the short PDNA timeline.

Stakeholders / Domains	i. Effects on Access and Learning Environment	ii. Effects on Teaching and Learning	iii. Effects on teachers and education personnel	iv. Effects on service delivery and governance mechanisms
<i>Scope</i>	<i>This component refers to how the education system ensures that girls and boys of all ages have access to quality and relevant education. Not just aiming to restore, but to rebuild in resilient</i>	<i>This component refers to how the curricula, training, professional development and support, instruction, learning processes and assessment of learning outcomes have been affected by</i>	<i>This component refers to how the disaster has impacted the human resources within the education system? As the disaster occurred on a non-school day, the initial assessment shows that loss of</i>	<i>This component concerns the education laws and policies framework. The priorities given in terms of recovery of quality education, including free and inclusive access, as</i>

	<i>ways and with strengthened equitable access to quality education and life-long learning.</i>	<i>the disaster. In doing so, it is critical to explore the needs for psychosocial and DRR support to teachers and students and the ways to strengthen resilience and DRR.</i>	<i>teachers was less. However, this theme focuses on the physical, psycho-socio, emotional and where relevant cultural effects that the disaster has had on teaching personnel.</i>	<i>well as planning and implementation of education activities that help integrate the local, national and international standards, laws, policies and plans for learning that is delivered for the disaster-affected population.</i>
DEO	<p>DEOs have detailed status of damage, however second quake complicated this</p> <p>Blanket approach TLCs, better to invest in number of schools</p> <p>Sufficient number of TLCs committed through education cluster to address the need (111) however, only 25% to be completed within first week of reopening</p> <p>All retrofitted schools are intact</p>	<p>More planning is needed to recover 1.5 month of course time</p> <p>Parents are eager, children afraid</p> <p>Class 12 examinations are being rescheduled, but will not be significantly delayed</p> <p>Lost academic time likely to be recovered</p>	<p>Teachers, especially ones that rent, have nowhere to stay</p> <p>Out of station teachers are in contact and willing to return to their duty stations</p> <p>Psycho Socio support has been done or was planned in most districts visit.</p> <p>Female teachers likely to be more affected/ in need of Psycho Socio support</p>	<p>136 TLCs committed but implementation slow, DEO has given a deadline</p> <p>University supporting construction of 15 semi-permanent centres for surrounding schools</p>
Unive rsity	<p>Worried about how severely affected students will pay (scholarship or loan)</p>	<p>Early summer vacation to aid restoration</p> <p>New session not likely to be heavily impacted</p>	<p>Damage to teacher's livelihood not major in university, staff allowed to work remotely</p>	<p>Data on affiliated colleges incomplete</p>
Privat e school s	<p>Mobilizing scholarships through external support</p> <p>Supporting teachers and students with food</p>	<p>Priority will be given to resume grade 8, 9 and 10</p>	<p>Not much information on status of teachers</p> <p>private schools will aim to complete a full academic year by conducting missed classes over the weekends and holidays</p>	<p>Private schools in several districts had taken bank loans to 'patch up' the building that received red flag, follow up assessment crucial to safeguard children (older children are still inside)</p>

TVET	<p>New academic session will commence 28th of June</p> <p>Students who are unable to afford fees have access to scholarships</p>	<p>Exams were postponed twice as result of quakes</p>	<p>Teachers that lost homes will be accommodated in living quarters</p> <p>All teachers received salary</p>	
SMCs/ PTAs	<p>Parents expressed keenness to send children back to school</p> <p>Resuming education for grade 10, 11 and 12 is prioritized</p> <p>School used as shelter poses problems for planned opening</p> <p>Access to school for children living further away is felt unsafe</p>	<p>Instructions have been given to teachers to start first week with non-formal activities</p> <p>Class 12 exams postponed, unsure on psychological effect</p> <p>Even though school is ok, TLC constructed as students have fear being on 3rd floor</p> <p>Flexibility towards students key in the first weeks</p>	<p>Teachers expected to return despite loss of livelihood</p> <p>Female teachers challenged as children from boarding schools are at home</p> <p>Challenge to keep all staff/ pay salaries as enrolment is likely to go down</p> <p>Need to be mindful for mind-set of teachers upon returning</p>	<p>School will be supported for TLCs but no support expected for transitional learning spaces</p> <p>School received money for clearing debris from DEO</p> <p>Demolishing of condemned buildings needs to happen fast but will take time due to shortage of machinery</p> <p>In retrofitted schools all students are expected to return and schools to open on 31st of May without problems</p> <p>School observed to receive support from many (3) organizations and political parties</p>
Teachers/ CFS Facilitators	<p>Teachers had in most cases direct or indirect heard from their students to confirm whether they were safe and were coming back once schools would open.</p>	<p>Teachers in several discussions raised the concern that children will find it hard to concentrate and to take tests or exams.</p> <p>Sense of insecurity in having to teach students and awareness on PSS</p>	<p>Teachers that are form outside the village will find it hard to find space to live in terms of limited availability and increased rents</p> <p>Flexible attitude towards students is crucial</p>	<p>Teachers are requesting a postponement of the teacher service commission exams</p>

<p>Child clubs</p>	<p>Children have stated going back to school as priority among emerged needs</p> <p>Children fear to go inside the schools since they and their parents perceive that the majority are unsafe and classrooms have been damaged and/or cracked;</p> <p>They are eager to be in school, they don't like being 'bored' in the tent and feel safe with other children.</p>	<p>There is a lack of education materials. Their textbooks and other learning materials have been damaged when houses or school libraries collapsed;</p> <p>Their school uniforms were buried under the rubble of collapsed houses;</p> <p>They have lost motivation and confidence to study as their learning habits have been disrupted;</p> <p>They fear that they might have forgotten what they have learned, which may make it difficult to pass their exams (particularly with children who are in grade 8 and grade 10 (SLC)</p>	<p>Most children had been in touch with their teacher or school, either directly or through their parents.</p>	<p>School Management Committees (SMCs) should be mainly responsible to initiate rebuilding immediately with financial support from the government; communities and parents/caregivers also need to take responsibility and provide support to the SMC.</p> <p>Lost textbooks and teaching materials are the responsibility of the government to provide those materials as soon as possible.</p> <p>NGOs have been providing help for coping with their parents stress (including counselling) to those children who are stressed and worried about their education and exams.</p>
<p>Central Level Agencies</p>	<p>Private schools are not able to waive fees as they have ongoing costs (Pabson).</p>			<p>While the MOE policy is to support both community and institutional schools through emergency relief efforts (i.e. immediate response), PABSON/NPABSON expressed that there has been unequal application of this policy at the district level.</p> <p>Private schools ask for i) Extension of loan repayment schedule</p>

				for affected schools, ii) Reduction in the interest rate for that payment; and iii) provision of a soft loan for reconstruction of the school building
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Annex E: FIELD VISITS METHODOLOGY AND QUESTIONNAIRE

SCOPE AND OBJECTIVES

The PDNA education sector assessment is envisioned to use a combination of qualitative and quantitative assessment tools. In addition to quantitative methods, which are needed for the Damage and Loss Assessment (DaLA), assessing the human impact of the disaster requires additional of qualitative data. As such, it is decided to include field visits to sampled districts in order to validate the quantitative data that will be collected with semi structured key stakeholder interviews and focus group discussions. The objectives of the field visits are the following:

- To comprehend the effects on access and learning environment beyond the destruction of the infrastructure and physical assets;
- To explore the effects on teaching and learning processes;
- To gain a deeper understanding on the effects teachers and education personnel;
- To identify effects on service delivery and governance mechanisms;
- To collect qualitative data to validate assumptions regarding emerging risks and vulnerabilities;
- Understand interruption of services at central level and implications for the district level;
- To gain perspectives on how the education system can be built back better to reduce future multi-hazard risk;
- To apply equity, disability, age and gender lens to explore specific education needs of the marginalised groups who may have suffered disproportionately compared to others.

MODALITY OF FIELD TRIPS

The field visits will be undertaken from 26 to 28 of May 2015, the report of the field trips is also expected to be completed within this timeframe. Four groups will conduct the field trips:

- Gorkha, Tanahu and Lamjung: DOE, CTNET, UGC, ADB/NSET, UNICEF, UNESCO, JICA (3 days)
- Sindupalchowk, Kavrepalanchowk and Dhading: MOE, DOE, CTNET, ADB, WFP (2 days)
- Sindhuli: NPC, MOE, ABD, UNESCO, WB, JICA (1 day)
- Kathmandu valley: NPC, MOE, DOE, CTNET, USAID, WB (1 day)
- In addition, Focus Group Discussions will be held with Central Level Agencies (CLA).

FIELD TRIP QUESTIONNAIRES

Stakeholders / Domains	v. Effects on Access and Learning Environment	vi. Effects on Teaching and Learning	vii. Effects on teachers and education personnel	viii. Effects on service delivery and governance mechanisms
Scope	<i>This component refers to how the education system ensures that girls and boys of all ages have access to quality and relevant education. Not just aiming to restore, but to rebuild in resilient ways and with strengthened equitable access to quality education and life-long learning.</i>	<i>This component refers to how the curricula, training, professional development and support, instruction, learning processes and assessment of learning outcomes have been affected by the disaster. In doing so, it is critical to explore the needs for psychosocial and DRR support to teachers and students and the ways to strengthen resilience and DRR.</i>	<i>This component refers to how the disaster has impacted the human resources within the education system? As the disaster occurred on a non-school day, the initial assessment shows that loss of teachers was less. However, this theme focuses on the physical, psycho-socio, emotional and where relevant cultural effects that the disaster has had on teaching personnel.</i>	<i>This component concerns the regular framework, education laws and education policy formulation. Most authorities prioritize continuity and recovery of quality education, which often include free and inclusive access to schooling or suspending school fees or associated costs during the recovery period. In addition, this domain involves planning and implementation of education activities that help integrate the local, national and international standards, laws, policies and plans for learning that is delivered for the disaster-affected population.</i>
DEO	<ol style="list-style-type: none"> 1. # of schools closed to date 2. # of children not likely to return to school (due to migration, fear, economic issues, additional tasks and needs created by the disaster) 	<ol style="list-style-type: none"> 9. What damages on teaching and learning materials will cause the main challenge for resuming the education? 10. What are the examinations that have been disrupted (if any) 	<ol style="list-style-type: none"> 17. How many teachers are from outside of the district, VDC? 18. How many teachers are from the affected district, VDCs? 19. How many have teachers have gone back home and 	<ol style="list-style-type: none"> 27. What are the effects on service delivery of DEO, ETC, RCs, Technical schools and others? (e.g., physical damages to building/office, disruptions in lines of communication, access, etc.)

	<p>3. Are these children from certain groups? And, what are the reasons/barriers (for example gender/disability/ethnic/caste/location/socio-economic status)?</p> <p>4. Is there equal access to schools/learning centres for boys and girls, different caste/ethnicities? Are there safety issues in getting to school?</p> <p>5. Have schools been temporarily used for other purposes, like shelter? If yes, what are they?</p> <p>6. Are children from the severely affected communities attending the schools in the non- or marginally affected communities? If so, what are the capacity of schools to accommodate those children?</p> <p>7. What learning and development opportunities had been offered for children 3-5 years before the</p>	<p>and rescheduling plans (if any)?</p> <p>11. What is the estimated % of schools where teaching-learning activities have resumed?</p> <p>12. What % of children had already received textbooks and TLMs?</p> <p>13. What is the new requirement for additional textbooks?</p> <p>14. Are there any specific concerns related to different levels of schools (primary, lower secondary, secondary), technical and HE institutions?</p> <p>15. What are the plans for training of teachers to resume the education process (i.e. psychosocial support, etc.)?</p> <p>16. What support is needed to resume teaching and learning?</p>	<p>how many of those would you expect to come back when the schools open?</p> <p>20. How many teachers are expected to return when schools open?</p> <p>21. What % of teachers affected by the disaster in terms of being injured or displaced?</p> <p>22. Have teachers been receiving monthly salaries regardless of the fact that schools were closed? If not, have they been receiving any compensation?</p> <p>23. Do you think the disaster will affect female teachers disproportionately compared to male teachers?</p> <p>24. Has any teacher in private schools been laid off or will be laid off as a result of the disaster? If so, how many?</p> <p>25. Will closure of private schools have impact on male and female disproportionately? If yes, how?</p>	<p>28. What is the extent of effects to SMCs and PTAs in schools and management committees of CTEVT schools and colleges?</p> <p>29. How are displacement and migration patterns, such as loss of families and orphan hood tracked?</p> <p>30. What measures are required to minimise the likelihood of children discontinuing the education?</p> <p>31. What could be done to reactivate management committees?</p> <p>32. How many child friendly spaces and/or temporary learning centres have been established in the district? By who? And, how do you receive information on this?</p> <p>33. How will the monsoon affect the situation in provision of education services? And, how</p>
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	<p>disaster? If yes, is it still on going?</p> <p>8. Are parents sending their children to ECD services? What are the reasons for non-access?</p>		<p>26. What are the strategies to promote the return of teachers to duty?</p>	<p>are you planning to preparing for the monsoon?</p> <p>34. Do you expect a loss of revenue for private schools (including ECD centres) because of school closures and the fact that parents would demand fees to be waived?</p> <p>35. What mechanisms need to be in place to resume service delivery and to protect the education system from future shocks and strengthen the resilience of children, teachers and communities?</p>
Teachers	<p>36. # of children not likely to return to school (due to migration, fear, economic issues, additional tasks and needs created by the disaster)</p> <p>37. Are these children from disadvantaged groups? And, what are the reasons/barriers (for example gender/disability/ethnic/caste/location/socio-economic status)?</p>	<p>41. What have been the damages and losses to teaching and learning materials?</p> <p>42. Will you be involved in any other temporary teaching activities?</p> <p>43. What % of children had already received textbooks and TLMs?</p> <p>44. What is the new requirement for additional textbooks?</p>	<p>48. How many teachers are from the affected district, VDCs?</p> <p>49. How many have teachers have gone back home and how many of those would you expect to come back when the schools open?</p> <p>50. Do teachers, which are not from the area, feel their work will be complicated because of the fact they are not from the community?</p>	<p>59. Have you received any guidance and instructions from SMC/DEO? What kind of instructions?</p> <p>60. What mechanisms need to be in place to resume service delivery and to protect the education system from future shocks and strengthen the resilience of children, teachers and communities?</p>

	<p>38. What non-formal activities have been offered to support children to return to a learning environment (recreational activities, drawing, dancing)?</p> <p>39. What are the plans to conduct non-formal, recreational and learning activities?</p> <p>40. Is there equal access to schools/learning centres for boys and girls, different caste/ethnicities? Are there safety issues in getting to school?</p>	<p>45. What are plans to resume formal/actual lessons? What are challenges to resuming actual lessons?</p> <p>46. What is needed for you and for the school to resume education and teaching learning?</p> <p>47. What measures (structural, preparedness and teaching/learning), if any, had the schools taken to reduce the risks posed by earthquakes as well as other disasters?</p>	<p>51. Are the teachers involved in any form of teaching and learning activities? If yes, where and how?</p> <p>52. Is P-S support provided? If so, was this according to your needs?</p> <p>53. Have you been receiving your monthly salaries regardless of the fact that schools are closed? If not, have you received any compensation?</p> <p>54. Thinking back, what would have reduced the impact of the disaster on you, the school and teaching and learning?</p> <p>55. What is the impact on housing for female and male teachers?</p> <p>56. Will closure of private schools have impact on male and female disproportionately ? If yes, how?</p> <p>57. Has any teacher in private schools been laid off or will be laid off as a result of the disaster? If so, how many?</p>	
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			58. What are the strategies to promote the return of teachers to duty?	
CFS Facilitators / TLC Teachers (<i>in case we come across the CFS/TLCs</i>)	61. Are you keeping track of children's attendance? 62. What are the profile of children attending? (boys and girls, children with disabilities, other marginalised groups)	63. What has been done to support children to return to a learning environment? 64. What are your current activities? 65. What measures (structural, preparedness and teaching/learning), if any, had the schools taken to reduce the risks posed by earthquakes as well as other disasters?	66. Where were you teaching in this community before you became a CSF facilitator or TLC teacher?	
Child clubs	67. Are you going to school or TLC? 68. Are you willing to go to school? If not, why? 69. Are your friends willing to go to school? If not, why? 70. Do you think someone would not come back to school? Who and why not? 71. Have any children left the village after the disaster? Do you know	72. Do you still have all necessarily learning materials for you to go back to school? If not, what are you missing? 73. What have you been doing during closure of schools? Have you been reading lately? Have you been involved in recreational activities? Sport activities? Household chores? Anything else? Are these activities different	76. Has anybody from the school come to you after the disaster and if so, who? And, for what purpose?	77. What is required to resume schools? 78. Thinking back, what would have reduced the impact of the disaster on you and the school? 79. What is required to protect schools from future disasters and strengthen the resilience of children?

	<p>where they went? Do you think they will come back?</p>	<p>for boys and girls? If so, how?</p> <p>74. What support do they need to be able to go to school again?</p> <p>75. What activities had the schools conducted to reduce the risks posed by earthquakes as well as other disasters?</p>		
SMCs/ PTAs	<p>80. Are parents willing to send children to school? If not, what are the challenges to sending children to school? (i.e. security, safety, etc.)</p> <p>81. Has your school lost any students?</p> <p>82. Do you think students will return to school? Why/ why not?</p> <p>83. What learning and development opportunities had been offered for children 3-5 years before the disaster? If yes, is it still on going?</p> <p>84. Are parents sending their children to ECD services? What are</p>	<p>86. What have been the damages and losses to teaching and learning materials?</p> <p>87. What measures (structural, preparedness and teaching/learning), if any, had the schools taken to reduce the risks posed by earthquakes as well as other disasters?</p> <p>88. What support is needed to resume teaching and learning?</p>	<p>89. Have you been in contact with all your teachers?</p> <p>90. Are all your teachers from this community?</p> <p>91. If not, have teachers, which are not from this community left?</p> <p>92. Do you expect they will return? When?</p> <p>93. What is the impact on housing for female and male teachers?</p> <p>94. Have you met as an SMC/PTA?</p> <p>95. If so, have you planned in providing any psycho-social support for teachers and or students?</p>	<p>96. What is the extent of effects to SMCs and PTAs in schools and management committees of CTEVT schools and colleges?</p> <p>97. Do you expect a loss of revenue for private schools (including ECD centres) because of school closures and the fact that parents would demand fees to be waived?</p> <p>98. What could be done to reactivate management committees? What support mechanisms are required for their proper functioning?</p> <p>99. What mechanisms need to be in place</p>

	<p>the reasons for non-access?</p> <p>85. What kind of support / contribution for rehabilitation / reconstruction of classroom can be done from community?</p>			<p>to resume service delivery and to protect the education system from future shocks and strengthen the resilience of children, teachers and communities?</p>
Central Level Agencies	<p>100. For comprehensive mid-term and long-term planning of school reconstruction, what aspects need to be considered?</p>	<p>101. What are the examinations that have been disrupted (if any) and rescheduling plans, if any? (HT, College, HSEB, CTEVT)</p>		<p>102. What are the effects on textbook development and printing at national level?</p> <p>103. What contingency mechanisms need to be in place to resume printing and supply of textbooks?</p> <p>104. What are the effects on higher secondary, CTEVT and Universities/colleges in terms of loss of teaching-learning materials and processes?</p> <p>105. What are the effects on service delivery of DEO, ETC, RCs, Technical schools, etc. (e.g., physical damages to building/office, disruptions in lines of communication, access, etc.)?</p>

				<p>106. What is the extent of effects to SMCs and PTAs in schools and management committees of CTEVT schools and colleges?</p> <p>107. What mechanisms need to be in place to resume service delivery and to protect the education system from future shocks and strengthen the resilience of children, teachers and communities?</p>
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FIELD VISIT SCHEDULE (26–28 MAY 2015)

Date	District	Night Stay	Team members	Vehicle/ Logistic
Group 1: Kathmandu Valley				
26 May (1 day)	Kathmandu Valley		Bishnu Nepal (NPC), Lava Deo Awasthi (MOE), Uddhav Nepal (DOE), Laxman Basyal (MOE), Jannie Kwok (USAID), Ram Krishna Rijal (WB), Manoj Sharma Neupane (CTEVT)	USAID + MOE vehicle
Time	Activity			
9.00	Departure for Bhaktapur			
9.30-10.00	Meeting DEO Bhaktapur			
10.30-11.15	Visit community school			
11.30-12.15	Visit community school (retrofitted)			
12.30-13.15	Lunch in Bhaktapur			
13.30-14.15	Visit technical school			
14.30-15.15	Visit Lalitpur DEO			
15.45-16.30	Interaction with SMC/PTA			
16.50-17.30	Visit Kathmandu DEO			
17.30-18.00	Visit institutional school management			
18.15	Return home			
Group 2: Gorkha, Lamjung, Tanahu				
26 May-28 May (3 Days)	Depart for Tanahu and conduct field work in Tanahu	Damauli Tanahu	Youb Raj Paudyal (DOE), Surya Acharya (ADB/NSET), Ang Sherpa (JICA) and Damodar Kandel (CTEVT), Serena Rossignoli, Aagat Awasthi (UNESCO),	JICA, ADB, UNESCO
26 May				
6.00	Departure to Tanahu			
10.30	Arrival in Damauli			
10.30-11.30	Meeting with DEO Tanahu			

11.30-16.00	Visit three types of schools with interaction program, including lunch	Mountain River View (Tel – 065-562362)		
16.00	Return to hotel in Damauli			
27 May				
7.00	Depart from Lamjung	Mountain River View (Tel – 065-562362)		
9.30	Arrive in Besi Shahr (Lamjung)			
10.00-11.00	Meet with DEO Lamjung			
11.00-12.30	Visit 1 CTEVT school			
12.30-13.30	Lunch			
13.45-15.30	Visit one community school			
15.30-17.00	Travel back to Damauli			
28 May				
7.00	Depart to Gorkha (Gorkha)			
9.30	Arrival in Gorkha			
9.30-10.30	Meeting with DEO Gorkha			
10.45-11.30	Visit one higher education institution (campus)			
11.30-12.15	Visit community school in Therakilo (13 kilo, Gorkha)			
12.15-13.00	Lunch			
13.00-15.30	Travel Gajuri (Dhading)			
15.30-16.30	Visit Community school in Gajuri			
16.30-18.30	Travel to Kathmandu			
Group 3: Sindhuli				
26 May (1 Day)	Sindhuli		Sanjay Khanal (NPC), Mukunda Mani Khanal (MOE), Pramod Bhatta (ADB), Tap Raj Pant (UNESCO), Saurav Dev Bhatta (WB), Yasumasa Nagaoka (JICA), Parviz Abdurahobov (UNICEF)	ADB, JICA
6.00-10.00	Travel to Sindhuli Madi (Sindhuli)			
10.00-11.00	Meeting with DEO Sindhuli			
11.15-12.00	Visit higher education institution (campus)			

12.15-13.00	Visit technical school			
13.00-13.45	Lunch			
14.00-14.45	Visit community school (Pipal Bhanjang)			
15.00-19.00	Return to Kathmandu			
Group 4: Sindupalchok and Kavrepalanchok				
26 May – 27 May (2 days)	Sindupalchok and Kavre		Jhum Rai (MOE), Shiva Upreti (DOE), Kanta Mainali (CTEVT), Nikhila Gill (WFP)	WFP
7.00-10.30	Departure to Chautara (Sindupalchok)			
10.30-11.15	Meeting DEO Sindupalchok			
11.30-12.15	Visit Higher Secondary School (Krishna Ratna, Chautara)			
13.00-13.45	Visit Primary school (Setidevi, Irku)			
13.45-14.30	Lunch			
15.15-16.00	Visit primary school (Pokhare, Sangachok)			
18.00	Arrival in Dhulikel	Hotel Mirabel (Tel - 011-490973)		
27 May			Rajendra Paudel (DOE), Shanti Jagannathan and Kenichi Yokoyama (ADB), Daud Khan (WFP)	ADB
7.30	Departure 2 nd group from KTM to Dhulikel			
9.00	Joint Departure from Dhulikel			
9.15-10.00	Visit DEO Kavre (Dhulikel)			
10.15-11.30	Visit Kathmandu University (Dulikhel)			
11.45-12.30	Visit technical Dhulikel			
12.30-13.15	Lunch in Dhulikel			
13.30-14.15	Visit institutional school in Banepa			
14.30-15.15	Visit community school in Banepa			

15.30	Return to Kathmandu			
Group 5: Dhading				
28 May (1 day)			Youb Raj Paudyal (DOE), Surya Acharya (ADB/NSET), Anil Pokhrel (ADB)	ADB
7.00	Departure to Dhading Besi			
11.00-11.45	Meeting DEO Dhading (Dhading Besi, Dhading)			
12.00-12.45	Visit school			
13.00-14.45	Lunch			
15.00-17.00	Visit 3 schools			
17.00	Return to Kathmandu			
Focus Group Discussions at Central level				
27 May	Group discussion with CLAs: 10.00 – 12.00. Group discussion with private school operators: 2.00–3.00. Group discussion with teacher and parent organizations: 3.00–4.00	MOE/DOE	Lava Deo Awasthi (MOE), Dilli Ram Rimal (DOE), Rajendra Paudel (DOE), Sanjay Khanal (NPC), Mukunda Mani Khanal (MOE), Pramod Bhatta (ADB), Jimi Oostrum (UNICEF)	ADB

CODE OF CONDUCT

As the field visits are taking place in a post disaster context where people’s needs are likely to outweigh the needs in terms of basic necessities like shelter, food, health, etc., the consultations should be undertaken with extreme sensitivity to the physical, mental and psycho-social impact that the disaster has had on people. As such, it is important that all teams that visit the districts endorse and actively enforce the following principles:

Flexibility: As there might be many emerging and urgent needs, the schedule that was agreed upon might need to be revised once arriving in the districts. In these cases, the team should not put any pressure on DEOs or communities to pursue the initial schedule and try to avoid stakeholders feeling obliged to redirect their time away from emerging priorities in order to accommodate the team or planned activities.

Sensitivity I: Please respect that people might not be in the right mental capacity or mindset to interact or reflect during the consultations. Do not pursue asking questions or posing any type of pressure on having people answering if they are unwilling to. However, this does not mean you could not check whether people have understood the question.

Sensitivity II: Please refrain from taking pictures unless people have explicitly given clear consent for this.

Child rights: It is crucial the PDNA process (data collection, analysis and consultations) involve all affected groups. Particularly, it is important to reflect the voice of children. In doing so, make sure that ethical considerations are adhered to in order to avoid putting the affected groups, especially children, at risk. For surveying children, we have to ensure appropriate approaches and consent procedures are established. Remember that we are dealing with children in a post-traumatic stress context. However, children will be likely to randomly engage and initiate conversation upon which it would be good to talk to them on whether they have been going to school, if not whether they miss it, etc.

Annex F: PDNA EDUCATION SECTOR TEAM MEMBER

No.	Name and Surname	Organisation	Position	Responsibility within the team
1	Dr. Yagya Bahadur Karki	NPC	Honorable Member	Lead from NPC
2	Mr. Bishnu Prasad Nepal	NPC	Joint Secretary	Lead from NPC
3	Dr. Lava Deo Awasthi	MoE	Joint Secretary	Lead from MoE
4	Dr. Mukunda Mani Khanal	MoE	Under Secretary	Lead from MoE
5	Ms. Smita Gyawali	ADB	Education Specialist	Co-lead from Development Partners
6	Mr. Parviz Abduvahobov	UNICEF	Education Specialist	Co-lead from Development Partners
7	Dr. Pramod Bhatta	ADB	Education Consultant	Co-lead from Development Partners
8	Mr. Jimi Oostrum	UNICEF	Education Consultant	Co-lead from Development Partners
9	Ms. Shanti Jagannathan	ADB	Education Specialist	Co-lead from Development Partners
10	Mr. Sanjay Khanal	NPC	Under Secretary	Member
11	Dr. Dilli Ram Rimal	DoE	Director General	Member
12	Mr. Rajendra Kumar Paudel	DoE	SESP Director	Member
13	Mr. Jhapper Singh Vishokarma	DoE	SDE	Member
14	Dr. Youbraj Paudyal	DoE	Civil Engineer	Member
15	Mr. Narayan Krishna Shrestha	DoE	Deputy Director	Member
16	Mr. Jhum Prasad Rai	MoE	Under Secretary	Member
17	Dr. Saurav Dev Bhatta	World Bank	Senior Education Specialist	Member
18	Mr. Ram Krishna Rijal	World Bank	Education Specialist	Member
19	Mr. Surya Acharya	NSET	Director	Member
20	Mr. Tap Raj Pant	UNESCO	Program Manager	Member
21	Ms. Serena Rossignoli	UNESCO	Education Specialist	Member
22	Mr. Aagat Awasthi	UNESCO	Education Consultant	Member
23	Ms. Sarah Bernhardt	EU	Program Manager	Member
24	Ms. Jannie Kwok	USAID	Deputy Director	Member
25	Mr. Ang Sherpa	JICA	Program Manager	Member
26	Mr. Yasumasa Nagaoka	JICA	Education Advisor	Member
27	Ms. Mamta Gurung	WFP	Program Manager	Member
28	Ms. Nikhila Gill	WFP	Education Advisor	Member

CULTURAL HERITAGE

Summary

Nepal is extraordinary in that its tangible heritage is deeply connected to the nation's people and their souls, beliefs, identity and pride. Visitors from other cultures and countries far and wide are drawn to Nepal to experience its culture and heritage. In the aftermath of the 2015 earthquake, Nepal suffered its worst loss of heritage since the earthquake of 1934. Major monuments in Kathmandu's seven World Monument Zones were severely affected and many collapsed completely. In addition, in more than 20 districts, thousands of private traditional homes and historic public buildings, as well as ancient temples and monasteries, were damaged or collapsed completely. Bringing the country's heritage back to its former glory will result in a range of economic benefits, in particular for Nepal's world class craftsmen, artists, architects, conservators, historians and engineers. The estimated damage to heritage structures cultural institutions is about USD 169 million and related losses from damage and impact on livelihoods totals around USD 23 million.

The long-term recovery plan envisages complete restoration of all destroyed structures and to substantially reduce negative impacts from possible future earthquakes. Benefits of massive internationally supported restoration and rebuilding programs will strengthen Nepal's professional corps and its institutions. Based on the principles of "building back better" and conforming to the challenges of "disaster risk reduction" the restored historic monuments will emerge more strongly built and long-lasting, to be cherished by Nepalese citizens and international visitors alike as was before the earthquake, for years to come. Further, tourism during the reconstruction period would continue to benefit local businesses such as hotels, bed and breakfasts, restaurants, and crafts stores.

The PDNA addresses loss to intangible heritage and recovery strategies in the forms of support for documentation and revitalization of culture traditions and crafts, particularly by working with youth and local communities.

One objective of this report is to provide a preliminary description of the damage and losses caused by the 2015 earthquake to Nepal's heritage structures. In view that tourism is a key economic driver for the nation's GDP, restoration of Nepal's renowned heritage is given special focus. This report provides an initial assessment of short, medium, and long-term intervention needs, adopting a "building back better" approach.

Pre-Disaster Context and Baseline

The Ministry of Culture, Tourism & Civil Aviation (MOTCA) gives equal importance to conservation of natural, cultural and human resources. Being one of the highest contributors to Nepal's economy, tourism plays a significant role in the administration. Numerous organizations under the Ministry include the Department of Archaeology, The Patan Museum, the National Museum, and the Pashupati Area Development Trust.

The Department of Archaeology (DoA) was established in 1953 and is the responsible organization for the archaeological research and management of the cultural heritage of the country. As per the provision of the Ancient Monument Preservation Act (1956) the DoA has been authorized to protect and preserve Nepal's extensive cultural heritage, maintain inventories of cultural heritage, and provide technical assistance for conservation. It is also the DoA's role to establish museums, safeguard moveable cultural property and raise awareness for the protection of cultural heritage.

The Kathmandu Valley features seven World Heritage zones inscribed as one UNESCO World Heritage Site: i.e. (i) the three town centers of the Royal Cities Kathmandu, Patan, and Bhaktapur; (ii) the two important Buddhist monument sites of Boudha and Swayambhu and (iii) the two major Hindu sites of Pashupatinath and Changu Narayan. In addition, the Government of Nepal has listed Panauti, Gorkha and Dakshinkali as national protected monument zones. According to the DoA there are close to 1000 historic religious sites and heritage buildings within the small domain of the Kathmandu Valley. No comprehensive inventory has yet been created and published by the DoA. Most available records are in Nepali language and compiled in loose documents that are spread across various locations.

Carl Pruscha's "Kathmandu Valley, The Preservation of Physical Environment and Cultural Heritage: A Protective Inventory", published in 1975, is the most comprehensive record available to date and continues to serve as the prime source of information on the valley's built heritage. The two volumes provide location drawings and photographic documentation of over 800 buildings and sites in the valley that are of heritage value. This data is important for future restoration work.

Records of heritage structures in Nepal's districts are relatively scarce with the exception of data for major sites such as Lo Mantang, Gorkha, Panauti, and Nuwakot. According to undocumented sources within the DoA, there are approximately 1000 sites in the districts outside of the Valley that are classified in three categories of national, regional and local importance. In Nepal, tangible cultural heritage is inextricably associated with a living culture of daily worship and ancient festivals. Cultural sites are where people come daily to pray, to meet, to celebrate, and to find solace.

The Kathmandu Valley has a number of museums with a wide range of collections. The internationally acclaimed Patan Museum located in a former Royal Palace features professionally curated exhibitions on Hindu and Buddhist Art. The National Museum collections include some exquisite pieces but many exhibits are poorly displayed and labeled. The Hanuman Dhoka Royal Museum in Kathmandu displays mostly objects related to three Nepali Monarchs (King Tribhuvan, King Mahendra, and King Birendra). The National Art Gallery and two small neglected museums featuring bronze and woodcarving are located in the town of Bhaktapur. In general, all museums are in serious need of physical upgrading and professional curating.

Intangible culture in Nepal, with its incredible richness of over 120 languages and countless religious traditions and festivals, has been widely researched by international scholars and documented extensively. The richness of expression in Kathmandu Valley, where rituals and processions can be observed on a daily basis, may be unmatched elsewhere. However, there has been a decline in traditional cultural activity that is without a doubt connected to globalization, people's migration for income reasons, and compounded by the negative effects of a growing consumer society. Nevertheless, the wealth of intangible cultural activity continues to be an aspect of national pride and an attraction for foreign visitors.

Disaster Effects and Impact

Effects on infrastructure and physical assets

The Department of Archaeology (DoA), Nepal's executive agency managing historic preservation and looking after World Heritage Sites, was the prime source of information regarding the extent of destruction to historic sites. Employees of DoA conducted extensive field visits and collected data through their agents. Based on this research, the planning section of the DoA provided the damage assessment of the historic structures.

According to the assessment, the earthquake affected a total of 691 buildings of historic value in 16 districts. Of these buildings, 131 were fully destroyed and 560 were damaged. DoA's researchers compiled information mostly in the form of handwritten notes with some digital photographs to support their remarks. The compilation of a consolidated digital database consisting of systematic description of damage and photographic documentation is still pending.

Several UNESCO teams, including volunteers, conducted independent surveys of historic sites in the Kathmandu Valley. UNESCO contracted Kathmandu Living Labs, a private company based in Kathmandu that makes databases and mapping information available online through its open-source software. The initiative involves training volunteers with backgrounds in architecture, engineering, and art history to collect condition reports of monuments and historic houses in cultural sites quickly and easily using their smartphones. Data collected includes information about the site, type of structure, level of damage, photographs, GPS coordinates, and local contact information. The purpose of this documentation is to start an interactive map and database for the benefit of the Department of Archaeology, researchers, the general public and tourists. This recently collected data represents a follow-up to the 1975 inventory, and will be useful for educational purposes, fundraising and generating public-awareness about the cultural significance of the sites. Access to the website is currently restricted while sites are being secured and inventories are being made of valuable loose cultural artifacts. This effort to further map damage to cultural sites is ongoing and not all data could be included in this PDNA. To date data has been collected on 1145 monuments within the Kathmandu Valley. In addition several private religious organizations provided their own data of damage suffered in remote districts and conveyed their findings to DoA. Data approved by the Ministry of Culture specifies that close to 1,400 monasteries in remote areas have suffered damage or collapse.

In the Kathmandu Valley, two cultural institutions (The Nepal Academy and The Nepal Academy of Fine Arts) and three museums (National Museum, Chauni; Hanuman Dhoka Palace Museum, Kathmandu; and the National Art Gallery in Bhaktapur) suffered major damage. All buildings will need extensive restoration works to bring back some semblance of their past glory, however, available data now indicates that the collections remain unharmed.

Emergency response was initiated immediately after the first earthquake and carried out with widely different results and speed in the seven locations within the World Heritage Site.

In Patan, for example, the temple-studded Durbar Square with the adjacent Royal Palace suffered considerable damage but many recently restored palace buildings and temples survived the earthquake, often without any or only minor damage. Representatives from the DoA took the lead in coordinating security and clean-up efforts immediately after disaster had struck. Remnants of three completely destroyed Pagoda temples were secured with the help of hundreds of volunteers, soldiers and police, and brought to a safe adjacent palace courtyard. All valuable building and artistic components are now securely stored at the Patan Museum where they will be documented, inventoried and cleaned for future restoration. A team of master carpenters is currently engaged in re-assembling doors and windows that have been damaged by the temples' collapse. A storage shed is under construction where all timber components and stone elements will be securely stored.

Progress at Kathmandu's Durbar Square is less evident as mounds of debris remain on the square – even today – more than a month after the earthquake. The fragile condition of the Royal Palace that houses the collection of the Hanuman Dhoka Museum, poses a difficult challenge to heritage conservationists. The building is yet to be secured to facilitate collection, removal and safely storage of items of heritage value. Similar activities are underway at many other sites where temporary shoring and protection of buildings with

tarpaulins need to be completed before the onset of the monsoon in June.

Effects on service delivery and access to goods and services

The destruction of buildings has caused the closing of cultural institutions such as libraries, museums, and archives as well as places of religious worship, such as temples, churches, mosques, and monasteries. The lack of data makes an assessment regarding the concrete effects and possible duration of the effects within the brief period of the PDNA difficult. Closings will most likely be temporary with some noted exceptions like the National Museum in Chauni and the Hanuman Dhoka Palace Museum. Both buildings were so severely damaged that it will take many years for a full recovery. More in-depth research is needed to assess the impact on thousands of religious institutions that are widely distributed, often in remote areas of affected districts. Religious national tourism (pilgrimages) has come to an almost complete halt as people are preoccupied dealing with the immediate effects of the disaster on their livelihoods. Many roads and access trails to remote pilgrimage sites have been cut off. All seven World Heritage zones in the Kathmandu Valley have been closed and ticket collection from tourists has been suspended.

Effects on governance

The effects on governance in the cultural sector have been limited. The closing of government offices and institutions, such as cultural centers and museums, has slowed down the implementation of ongoing restoration projects. The need to respond swiftly to the disaster took a priority over ongoing program activities.

Effects on risks and vulnerabilities

Preservation efforts in general have never been well-funded. Recent urban development programs within the city showed a shift in values from preservation to "modernization". Basic infrastructure areas such as electricity and water supply were already poor, and comparatively, preservation was an even lower priority. Therefore before the earthquake there was already a huge backlog of cultural sites that needed restoration. Over the years religious institutions have lost their land for various reasons. The loss of the income from the landholdings that traditionally supplied funds for religious activities caused further pauperization of historic sites. Some traditional festivals and rituals have suffered because of decrease in financial support from communities and the government.

Effects on intangible cultural heritage

The intangible cultural aspects of worship, rituals, and festivals are severely interrupted at temples that have completely collapsed. Nepal's tangible heritage, exemplified by its architecture and exquisitely built temples, is a source of great interest to people visiting Nepal and a pride for its people. Loss of important tangible heritage is interrelated with loss of intangible heritage and identity, just as loss of traditional family dwellings is intrinsically entwined with the day-to-day lives of the people. Loss of intangible cultural heritage could be treated in parallel with loss of tangible heritage. Traditional architectural styles of building, just like clothing, are integral to ethnic and cultural identity of the people. Displacement of people will further weaken their links to community centers and rituals.

Significant economic losses will incur in communities that rely on the revenue generated with the interruption of annual ritual activities. Ritual performances and religious dances associated with these temples will be severely curtailed, or may not occur, leading to a potential loss of this intangible heritage. Stone and metal sculptures, often revered as living gods, will need to be relocated from badly damaged sites to new structures, which are safe for worship. Costs will be associated with inventorying, storing, and safeguarding valuable cultural objects associated with the intangible heritage, including masks, costumes,

ritual objects and jewelry used in the ritual performances. Additionally, these will also include original timber beams, and carved wooden and stone architectural elements.

Temples have been badly damaged, which has affected daily worship, rituals, and festival celebrations have been interrupted. While some structures have withstood the quake, many are unsafe for devotees to use to conduct rituals and commune to the deities housed inside. Many communities will need to relocate their religious objects or build temporary structures to allow worship and festivals to continue. Safeguarding measures for the continuity of ritual public performances (essential for the cultural identity of a given community) must be undertaken.

Many public rest houses (*patis*) have also collapsed or have been badly damaged. These community structures provide a meeting place for people of all generations to share news and stories. Damage to these structures could mean a loss in the continuation of oral narratives, which is intrinsically linked to community culture in Nepal.

Effects on cultural industries

There may be positive effects in the knowledge, transmission, and implementation of traditional craftsmanship, as more craftsmen will be needed to restore the many historic houses, temples and other monuments that were damaged. Opportunities presented for rebuilding on such a large scale could revitalize traditional crafts, such as traditional masonry techniques, wood-carving, stone-carving, and metal repoussée techniques. While Nepal does not have enough craftsmen to handle the current need, a small number of local master-craftsmen could take lead in transmitting traditional knowledge to the next generation, and document the same to contribute to retention of knowledge economy that values cultural heritage. If adequate training can be conducted to aspiring craftsmen, the number of craftsmen would certainly grow and rebuilding would provide a source of livelihood for thousands of families.

Most of the buildings that collapsed were older structures built using traditional materials and had not been properly maintained. Following the earthquake, a concern that is widely shared, is that local people may view traditional materials and craftsmanship as “unsafe” and would be more inclined towards accepting concrete structures as a safer alternative.

Damage and Loss

Estimation of damage to infrastructure and physical assets

The planning section of the Department of Archaeology, with inputs from the Ministry of Culture, the Pashupati Area Development Trust, and the Buddhist Philosophy Promotion & Monastery Development Committee estimated the total damage to cultural heritage properties at USD 169 million.

The total financial requirement for a full recovery comes to approximately USD 205 million. A budget of 20% over the USD 169 million damage assessments is estimated to cover substantial investments in retrofitting damaged buildings with earthquake resilient strengthening features. For structures that require rebuilding from ground-up, the cost of construction of proper earthquake resistant foundations have also been included in the estimate.

The anticipated shortage of qualified labor and building materials, especially of custom-made brick and hardwood timber, could cause further substantial cost increases for restoration works.

Estimation of losses to service delivery and access to goods and services

Losses from reduced revenues from the sale of tourist entry tickets to World Heritage Sites and museums is estimated at USD 6.2 million over the next 12 months. The calculation is based on a 75% reduction in income due to a drastic decline in tourism and the fact that no entry fees have been collected since the earthquake and all museums have remained closed for the time being.

There are many people whose livelihood is dependent on the temples and places of worship. The income they make may come from the following:

- Direct income from the shrines as salaries
- share from the income of the temples
- incomes during special festivals and performance of various religious rites
- income to communities during special occasions subsidized by the place of worship

While this is something that can't be quantified without a detailed survey, it is assumed that around 10% of the total damage should be allocated as "impact on livelihood", which amounts to approximately USD 17 million.

Estimation of losses to governance

Due to the closing of government cultural institutions, such as museums, many employees have been unable to return to their workplace. Since all of them are permanently employed with the government there has been no loss of income. The government should make provisions at the earliest to find other meaningful engagement for them e.g. join in on restoration and conservation work related activities.

The detailed damage, losses and reconstruction costs are given in the table below:

Sr.No.	Districts	Damage USD	Losses USD	Losses USD	Losses USD	Cost of Recovery and Reconstruction USD
		Damage to physical assets and infrastructure	Impact on livelihood estimated at 10% of damage	Losses from tourist ticket sales	Total value	20% added for the cost of retrofitting and improved seismic design of new structures
1	Bhaktapur	\$5,330,000	\$533,000	\$2,275,849	\$2,808,849	\$6,396,000
2	Dhading	\$300,000	\$30,000		\$30,000	\$360,000
3	Dolkha	\$500,000	\$50,000		\$50,000	\$600,000
4	Gorkha	\$632,000	\$63,200		\$63,200	\$758,400
5	Kaski	\$150,000	\$15,000		\$15,000	\$180,000
6	Kathmandu	\$49,915,000	\$4,991,500	\$3,044,027	\$8,035,527	\$59,898,000
7	Kavrepalanchowk	\$2,082,000	\$208,200		\$208,200	\$2,498,400
8	Lalitpur	\$9,190,000	\$919,000	\$897,649	\$1,816,649	\$11,028,000
9	Lamjung	\$480,000	\$48,000		\$48,000	\$576,000
10	Makawanpur	\$200,000	\$20,000		\$20,000	\$240,000
11	Nuwakot	\$7,326,000	\$732,600		\$732,600	\$8,791,200
12	Ramechhap	\$325,000	\$32,500		\$32,500	\$390,000
13	Rasuwa	\$300,000	\$30,000		\$30,000	\$360,000
14	Sindhuli	\$320,000	\$32,000		\$32,000	\$384,000
15	Sindhupalchowk	\$1,500,000	\$150,000		\$150,000	\$1,800,000
16	Tanahun	\$200,000	\$20,000		\$20,000	\$240,000
17	Monasteries, historic structures (older than 100 years)	\$53,003,532	\$5,300,353		\$5,300,353	\$63,604,238
18	Monasteries less than 100 years old	\$28,345,340	\$2,834,534		\$2,834,534	\$34,014,408
19	Temples in remote areas	\$9,000,000	\$900,000		\$900,000	\$10,800,000
20	External technical experts					\$600,000
21	Capacity building work shops, specialized training, ICH conference, marketing training, festivals and exhibitions					\$650,000
22	Professional support to the Department of Archaeology: equipment and additional staff					\$1,500,000
	SUB TOTAL:		\$16,909,887	\$6,217,525		
	TOTAL:	\$169,098,872			\$23,127,412	\$205,668,646

Estimated income from tourist ticket sales and museum admissions for the Nepali fiscal year 2013/14:

Income from World Heritage Sites and Museum entrance fees:					
Site/ Museum	Visitors for fiscal year 2013/14	Current ticket price NRs.	Sub total NRs.	Total NRs.	US\$
Hanuman Dhoka ticket					
SAARC	27,546	150	4,131,845		
Foreigners	258,553	750	193,914,998		
				198,046,842	\$1,980,468
National Museum (Chauni)					
SAARC	880	50	44,023		
Foreigners	2,425	150	363,689		
				407,712	\$4,077
Swayambhu					
SAARC	133,741	50	6,687,041		
Foreigners	268,092	200	53,618,418		
				60,305,459	\$603,055
Boudha					
SAARC	103,075	100	10,307,500		
Foreigners	223,174	250	55,793,500		
				66,101,000	\$661,010
Pashupatinath					
SAARC					
Foreigners	110,000	1,000	110,000,000		
				110,000,000	\$1,100,000
TOTAL FOR KATHMANDU:				434,861,012	\$4,348,610
Patan					
SAARC	100,000	200	20,000,000		
Foreigners	200,000	500	100,000,000		
				120,000,000	\$1,200,000
Patan Museum					
SAARC	6,560	250	1,640,000		
Foreigners	16,489	400	6,595,600		
				8,235,600	\$82,356
TOTAL FOR PATAN:				128,235,600	\$1,282,356
Bhaktapur					
SAARC	136,975	500	68,487,685		
Foreigners	169,016	1,500	253,524,600		
				322,012,285	\$3,220,123
Changuu Narayan					
SAARC	2,810	40	112,412		
Foreigners	23,582	100	2,358,223		
				2,470,635	\$24,706
Living traditions museum					
SAARC	399	100	39,900		
Foreigners	2,394	250	598,500		
				638,400	\$6,384
TOTAL FOR BHAKTAPUR:				325,121,320	\$3,251,213
				TOTAL VALUE	\$8,882,179

Recovery Needs and strategy

A 6-year recovery period (requiring on average USD 34 million per year) is proposed for the restoration and reconstruction of all damaged and collapsed historic buildings including refurbishment of cultural institutions and museums.

The recovery plan should include substantial support to the Department of Archaeology in financing necessary equipment and additional professional staff over the next 6 years.

International and local experts will be needed in the fields of structural and seismic engineering, architecture, conservation, curating and museum design, as well as other necessary areas of expertise related to preserving cultural heritage. It will be imperative to contract specialists in intangible heritage (e.g. anthropologists, ritual specialists, art historians, linguists, ethno-musicologists, etc.) to investigate losses and help communities identify ways to revitalize their traditions. It is anticipated that large-scale donors will choose and hire their own experts.

The recovery plan should include a strong commitment to conduct extensive training at all levels of project planning and restoration implementation. Educational support also needs to be provided for advanced studies in conservation-related professions.

It is envisioned that following the 6-year recovery period, Nepal will be more resilient to any future calamities. The impact of investing generously in the preservation and conservation of Nepal's cultural heritage, including capacity building and upgrading of skills and knowledge, will positively affect Nepal's intangible culture in the years to come.

Implementation Arrangements

The Department of Archeology, the government executing agency for heritage conservation and also the custodian of Nepal's Museums, has in the past, handled an average budget of less than USD 2 million per year. New ways of sharing responsibilities and engaging different partners and agencies must be identified for accelerating the restoration processes. It is therefore recommended to establish a mechanism for the coordination of all cultural heritage activities, under the overall authority of the Minister of Culture, Tourism and Civil Aviation, with participation of the Ministry of Physical Planning, Ministry of Urban Development, Ministry of Local Development, Home Ministry, UNESCO Kathmandu and selected international experts and, when appropriate, representatives from major donor agencies. The mechanism's mandate would be to advise Nepal's Government in the implementation of all cultural heritage activities and their quality control. It would coordinate between donors, public, private and local institutions, and different Ministries and administrations.

Implementation of building restoration responsibilities should be divided into three sectors:

- **Sector 1:** Restoration of village monasteries, temples and non-listed monuments shall be the responsibility of local communities. The DoA should act as the overall advisory agency but day-to-day responsibilities in the management, procurement of materials, reporting and financial accounting will be with the local communities.
- **Sector 2:** The restoration of listed monuments, including those in World Heritage Sites, will continue to be under the direct supervision and management of the DoA.

- **Sector 3:** Large scale restoration projects (e.g. above USD 500,000) which are financed by private and/or international donor agencies should be implemented on a turn-key basis under appropriate national or bilateral agreements with the GoN. Such large projects should bear the responsibility to engage their own national and international experts to conduct research, carry out architectural and conservation planning, before provide engineering solutions, and be in charge of project supervision and monitoring till the restoration/reconstruction is completed. The DoA will provide guidance and act as the overall supervising agency.

Response phase (June – September 2015):

The Earthquake Response Coordination Office (ERCO), established by the Department of Archaeology, will remain the coordination center until all salvage and stabilization efforts have been completed and sites along with valuable art objects are fully secured and recorded. The Kathmandu site poses the biggest challenge with large parts of the Royal Palace destroyed or threatened by collapse. Removal of the large collection of the Hanuman Dhoka museum, particularly the very heavy 18th century royal thrones needs to be addressed as soon as possible and a safe storage location needs to be found.

The partial opening of all World Heritage zones to the public by June 15, 2015 is an ambitious aim announced by the Government. Unstable structures will need to be dismantled and unsafe areas fenced off in order to provide a safe environment for visitors.

Temporarily stored remnants of collapsed temples need to be photographed and inventoried and stored safely, if necessary in newly constructed repositories.

The situation in remote areas has not been assessed professionally. Till now the focus has been on supplying humanitarian aid and so collapsed or heavily damaged religious buildings have been left to the communities to look after.

First year activities, starting in August 2015:

Creation of an inventory including condition reports of historic sites and buildings

DoA is the responsible party to create an inventory (preferably in digital form) of all historic sites and buildings not only in the disaster-affected districts but for all of Nepal. In view of being prepared for the event of another disaster it is important to complete this task as soon as possible.

Given the large amount of research and data input necessary the DoA might request the Ministry of Culture to authorize the hiring of additional staff and/or external experts and provide required funding support for the same. A clearly laid-out database program needs to collate baseline information of each site: i.e., exact location details including GPS data; photographic documentation; historic information; a brief description of damage suffered (if any); and a detailed needs assessment to support restoration planning. This database should be linked to other sources of information such as the DoA's own hand-written archive, Pruscha's 1975 inventory, and the "Living Apps" online database.

Creation of a comprehensive digital inventory of all museum collections

Most inventory records of Kathmandu's museums are handwritten, possibly incomplete and difficult to access. Only the Patan Museum publishes a printed museum guide book that records all objects and texts on display. It is of utmost importance to create complete, digitally accessible museum inventories for all museums as soon as possible. This will support the safeguarding of the collections, and help evaluation and

planning professional restoration of all objects. The database should be stored in the museums and at the DoA and should be made available online.

Master plan development and project planning

DoA, with the support of UNESCO and international experts should develop a master plan/schedule for the repair, restoration and reconstruction of all collapsed and damaged monuments and sites. The master plan shall be based on the comprehensive documentation of all affected 694 historic structures with detailed information regarding the type and degree of damage. The master plan needs to state a clear sequence of and a rationale for implementation. Restoration activities should be distributed between all districts, cities, and sites as evenly as possible. In general, priority should be given to repair and restore damaged structures before tackling ground-up reconstructions. Attention needs to be given not only to sites on the World Heritage list but to other smaller and significant monuments as well.

Detailed project proposals, customized to the requirement of each building, need to address structural and seismic retrofitting solutions. Based on the analysis of how past restorations performed and how the particular building withstood the earthquake, DoA should seek the advice of international experts to develop methods for new earthquake resilient construction. The project plan should include detailed documentation of each building's history, religious and artistic elements, past restoration efforts, and architectural drawings.

Immediate repair

Immediate attention is needed for buildings that are under the threat of collapse. Many important monuments (e.g. Krishna Mandir, Vishveshvara and Bhimsen Temples in Patan, Svayambhu Stupa, Changu Narayan Temple) have only temporarily been shored up but need immediate major restoration and structural interventions to ensure that they will not suffer more damage or collapse in a future earthquake.

Smaller restoration and repair schemes, which do not need much lead-time and large quantities of materials, should also be initiated immediately. Many smaller structures, monasteries and temples in outlying districts can often be restored with relatively modest amounts of funding and with community involvement.

Material procurement

The large volume of expected construction may cause bottlenecks in the supply of timber and special bricks used for restoration. It would be prudent to immediately research the feasibility of creating and supporting environmentally-friendly methods of brick production and to increase output, as future restoration projects will require a ten-fold increase in bricks. Such bricks are unique to the valley and cannot be procured from anywhere else.

Depending on government approval the tendering and procurement of large quantities of timber from other countries needs to be explored. In order to preserve Nepal's scarce natural resources it might be justifiable to to import plantation-grown hard and soft woods from other countries.

Preservation of museum collections

Conservation of artifacts and safeguarding of museum collections needs to start as soon as possible, preferably under the guidance of specialists in the field of metal, wood, ivory and painting restoration.

Proposed capacity-building workshops and on-the-job-training for new DoA staff

Workshops on data collection and management should be conducted for DoA's new staff to accelerate the production of an inventory of monuments and detailed condition reports.

Many young professionals will be new in the heritage field and will require adequate training to become familiar with principles and guidelines in the conservation of heritage buildings. During the first year (2015/16) many emergency repairs and smaller projects that do not require huge quantities of materials or time-consuming preparations will give the perfect opportunity for new professionals to learn and familiarize themselves with ground realities.

Workshops for craftsmen and artisans

DoA, restoration contractors, and private agencies rely on a network of excellent craftspeople (carvers, carpenters, masons, metal workers, etc.) Hence, a comprehensive resource mapping of these artisans should be carried out immediately to ensure the knowledge, techniques and approaches are documented for future reference. It is expected that projects will face a severe shortage of craftsmen and will have to rely on less-experienced craftsmen who will require adequate training before working on major projects. Initial training should be carried out as on-the-job-training where newly hired staff will work alongside the best in their trade.

Specialized training for structural analysis, seismic retrofitting and earthquake resistant construction

Internationally experienced structural engineers are immediately needed to develop, along with local seismic engineering experts, adequate structural solutions for safer reconstruction. It would be beneficial to engage some of the best engineers to actively design concrete projects. These projects would be models for others to follow.

Design and engineering assistance to communities and public awareness campaigns

Even though construction of private homes doesn't fall within the responsibility of the cultural heritage sector it is highly recommended that lessons learned through cultural preservation activities should be shared with historic towns and villages. The fabric of urban ensembles surrounding monuments needs to be considered. Already several initiatives of young architects and engineers have started this work in communities such as Sankhu, Bungamati and Bhaktapur. A public awareness campaign would help to educate the public on safe building techniques and that traditional materials can be used in ways that are structurally sound and strong enough to withstand future earthquakes, as long as the structures are properly maintained. Providing direct technical and design support coupled with extensive training programs will be important to increase knowledge and capacity.

2nd-6th year activities:

The activities of the 2nd-6th year will be adjusted following achievements of the first year, the priorities of the master plan and of course largely will depend on secured funding.

Restoration of all structurally threatened monuments will continue and only after this work is completed the ground-up reconstruction of fully collapsed structures should begin.

The activities of the first year (inventory, planning, documentation) lay the foundation for larger scale projects initiated by UNESCO and bi-lateral donors. Completed restoration projects must be professionally documented with a comprehensive historic structure report produced and shared with other projects. In order to disseminate information such data should be available online. An additional output would be publication of relevant training and conservation manuals.

Training programs and specialized workshops as described in first-year activities should continue on a needs basis.

Restoration activities could be made a special attraction for both foreign and local visitors including volunteer participation, hands-on restoration training, specialized workshops, and guided tours. Several thousands of jobs would be created over the years.

Support to Preserve Intangible Cultural Heritage

While costs associated with losses to intangible cultural heritage are more difficult to quantify than physical damage, significant immediate and long-term losses are predicted following the earthquake, particularly in social practices – rituals, worship, and festivals.

National capacity building

The Ministry of Culture needs to expand its capacity to include professional staff with expertise necessary to properly monitor and evaluate losses to intangible cultural heritage. The technical personnel working on ICH in the Ministry of Culture numbers only 3-4. As a whole, the culture division within the Ministry is limited, with a high frequency of staff transfers from one department to another. A strong ICH division needs to be established, with capacity building workshops and training the staff as a follow on from the three workshops on Implementation, Inventorying and Nomination held in Nepal between 2012-2013. Workshops should be held for different audiences with the participation of the line Ministry, local officers, experts, INGOS and community members to enhance their capacity and knowledge. Community-based ICH workshops should provide hands-on technical training for conducting inventory. Data Management training is also required at central, district and local levels to complete efficient mapping of Nepal's ICH and to develop a comprehensive ICH database.

It is also imperative to create an awareness campaign about ICH and engage dialogue on local levels, perhaps working through Village Development Committees and District Administration Offices. This will require training of local facilitators, who can engage people of all ages (and youth in particular) in discussion of community values, identifying key traditions, needs for support and strategies for sustaining these traditions (in effect, making participatory SWOT analyses.)

Furthermore, there must be stronger links established between communities and national institutions so that the latter are equipped to quantify and respond to these needs and strategies. A small grant fund could support activities such as purchase of musical instruments, digitalization of texts, or creation of small community museums.

Community fund for safeguarding intangible heritage

It is important to earmark funds that communities could apply for, as they identified needs, to allow worship and festivals to continue. The funds could be used to temporarily relocate and safeguard individual cultural objects necessary for worship, or entire festivals, performances, or other cultural events.

National recognition of masters/knowledge bearers

During the post-disaster period, greater national recognition in the form of awards to master craftsmen and performers, or bearers of unique traditional knowledge, will raise the status of these masters and knowledge bearers and support the continued use of their skills. The recognition will also provide encouragement to younger generations who aspire to be craftsmen, musicians, etc.

Educational outreach

A Kathmandu-based ICH conference that invites international scholars on Nepal as well as local professors and students in ICH-related fields will allow for the sharing of information about traditions that may be

endangered, and methods for safeguarding and revitalizing them. The conference might also address establishment of an ICH digital archive, on the model of Digital Himalaya or other international digital archives.

Through a program for scholars, international and local cultural anthropologists and cultural historians should be encouraged to work with vulnerable community groups who have suffered loss and seek to revive their heritage. This program could be supported through a program of one or more of Nepal's universities.

Particular attention should be paid to involving youth in ICH programs. As cultural heritage is a living phenomenon that is constantly recreated and transmitted from each generation to the next, there is a risk that the destruction of so many cultural sites could leave a younger generation feeling disconnected from their past and cultural heritage. The strength of a nation's tangible and intangible cultural heritage has a strong connection to cultural identity, continuity of communities, and overall well-being. It is this strength, this sense of cultural and national pride, that will help communities unite to rebuild their cultural sites as they rebuild their lives and homes.

Programs that engage youth in learning about ICH and engaging in its safeguarding can be conducted on many levels. These can range from local participatory workshops implemented by NGOs to workshops within colleges.

Cultural industries

Numerous cultural festivals are held in Kathmandu each year that highlight the tremendous creativity of Nepal's writers, film-makers, musicians and artists. Already film, music and art and other media is responding to the crisis created by the earthquake. Victims of trauma are being helped through therapy that includes dance, art and music.

Most of this activity takes place in Kathmandu. More effort is needed to encourage and recognize artistic expression in communities outside the valley. Regional and local festivals will give impetus for people, particularly the youth, to express themselves through the arts. This will bring recognition (in the form of awards and media) as well as income.

Traveling exhibitions (as with Book Bus) will help communities to share art and other forms of expression. This sharing will inspire new expression.

Artists and craftspeople often depend on a tourist market. The tourist market is likely to decline for some time, and local purchases may also decline because of less disposable income. Support will be needed for organizations such as Fair Trade Group Nepal or HAN to reach markets overseas through participation in International trade fairs, Folk Art Markets, etc. A combination of training for artisans in skills and product development as well as market-readiness support can be provided by international and local experts.

Gender issues

Religion should be seen as a form of cultural capital for women and men, which also provide support mechanisms and forge spiritual connection between individuals, and which can play a critical role in maintaining a good mental balance. Loss of livelihood assets could also compromise the continuity and

preservation of traditional skills in textile products such as Dhaka traditional cloth weaving, predominantly done by women and non-textile products such as metal work done by men. Indigenous and ethnic communities have a strong and unique cultural heritage, which is an important part of their identity. Recovery interventions, particularly to do with housing and relocation should preserve rather than undermine these cultural heritages. In many government sectors women are under-represented. Government initiative is required to change this situation.

There is an increased opportunity for women in the unskilled labor market, with little chance to learn a craft. One positive development noted in recent years is that women have been very careful and attentive in cleaning woodwork and bricks. Special teaching courses for women should be developed to train them in various fields of object conservation.

On a professional level, the number of women architects and engineers has been steeply rising and so equal opportunity for conservation jobs is a potential avenue for employment of qualified women.

Policy Needs and Recommendations:

Review of restoration and conservation by-laws

The massive loss of life caused by collapsing historic buildings makes it mandatory to rethink existing conservation laws. Restrictions on modern materials in conservation work need to be reviewed and newly defined according to the concepts of disaster risk reduction and building back better. It would be expected that restoration building laws would have similar safety standards as those of residential buildings.

Change in import regulations

The government should consider the possibility to import hard and soft plantation-grown wood, duty-free. The acute timber shortage and extreme cost increase of over 500% in the past years requires a revised import policy. Considering the depletion of Nepal's forests and natural resources, importing large quantities of timber required for reconstruction might be justifiable, but subject to quality and material tests to confirm suitability of the same for conservation works.

Professional support to the Department of Archaeology

It is estimated that DoA's workload will increase by at least 6-fold over the coming 6 years. This will require upgrading of facilities and equipment (vehicles, computers, professional tools) and hiring of professional staff in all sectors. Modalities have to be found to allow DoA to recruit professionals from the free market, which will require competitive remuneration. The minimum required number of professionals to be engaged in assisting the current staff of DoA is estimated at:

1.	Project managers	10
2.	Civil engineers	10
3.	Conservation Architects	8
4.	Archaeologists	2
5.	Surveyors/Draftsmen	10
6.	Accountants	5
7.	Office assistants	5

Review of revenue generation and investments in cultural preservation

Over the past decade Nepal has developed a system of not only charging entry fees to museums, cultural institutions and specific sites such as temples and palaces but also levying fees for visiting historic town centers and villages. Bhaktapur was the first of the three former royal cities in the Kathmandu valley that

started collecting tourist fees for entering the town. In Bhaktapur the municipality oversees and manages the collection system and has been responsible for investing a good portion of the income for preservation work. An estimated yearly income of over USD 3 million has provided substantial progress in restoring and preserving historic monuments.

Kathmandu and Patan municipalities followed Bhaktapur's example and set up similar systems with estimated yearly incomes of USD 2 million and USD 1 million respectively. The chart under section 4 "Income from World Heritage Sites and Museum Entrance Fees" provides an overview of the substantial income potential.

It is highly recommended to develop and strengthen a streamlined collection system that is administered in a transparent and fair manner and ensures that tourist dollars collected for visiting cultural heritage sites will be invested directly in the restoration effort and not diverted to other purposes.

Section B: Productive Sectors

AGRICULTURE

Summary

Damages and losses in agriculture sector due to the earthquake are prominent affecting around 1 million already poor small farming households in the 24 districts¹. Among the farmers affected, women headed farm households and those managed by elderly people suffered the most.

The earthquake has damaged crop lands, physical infrastructure, mainly small irrigation system, poly houses, livestock shelters, agriculture tools, equipment and machineries; mills, office buildings, service centres, laboratories, and residential premises for the Government installations. Production losses occurred especially in the agricultural crop and livestock subsectors, specifically for different crops, animal fodder, fruit, potatoes, mushroom and vegetables, livestock, poultry, fish production and fingerlings, cash crops, stock for seed and animal feed, egg and honey production, and stored food grains. The production loss also includes the value of production of the lost crops, increased costs of production and estimated production loss in subsequent seasons.

Recovery in agriculture sector focuses on immediate activities aimed at the restoration of production levels in crop, livestock and fisheries over a period of 12 months. Reconstruction meanwhile focuses on the replacement of destroyed equipment and machineries and reconstruction/rehabilitation of damaged physical infrastructure with improved, disaster-resilient standards over a period of 36 months. Agricultural sector recovery strategy and plan spans across different agencies in the government and other stakeholders. The executing agency of the recovery and reconstruction plan in agriculture will be MOAD and the implementation will be done by Department of Agriculture (DOA), Department of Livestock Services (DLS), Department of Food Technology and Quality Control and NARC with support of development partners, specifically the ones with proven technical expertise and comparative advantages in agriculture sector. Given the urgency of the situation, a 'fast track' mechanism with required delegation of authority within the institutional framework of the Government of Nepal will be applied and the activities under both recovery and reconstruction will have to start simultaneously.

Pre-Disaster Context and Baseline

Agriculture sector in the Post Disaster Needs Assessment includes the subsectors of crop, livestock, fisheries, and small irrigation system that falls under the jurisdiction of the Ministry of Agricultural Development. Forestry is included under Environment.

Agriculture is the biggest employer in Nepal, particularly in the rural areas, and the main contributor to household level food and nutrition security of rural population. Nearly 80% of Nepal's nearly 28 million inhabitants and 60% of the labour force are dependent on agriculture. Male out migration in large number has left women in the villages to perform farm activities. Women contribute 60% in crop production and 70%

¹ Though the government reports that the earthquake affected 39 out of 75 districts, this need assessment was conducted in 24 most affected districts, namely, Okhaldhunga, Ramechhap, Dolakha, Sindhupalchowk, Rasuwa, Dhading, Nuwakot, Kathmandu, Lalitpur, Bhaktapur, Kavre, Makwanpur, Gorkha, Sindhuli, Gulmi, Lamjung, Solukhumbu, Tanahun, Bhojpur, Kaski, Palpa, Khotang, Chitwan, and Syangja.

in livestock and poultry production². The agriculture sector contributes approximately one-third of the national GDP in a country with low per capita annual income (NPRs 72,000 or US\$720). Farmers are smallholders with an average farm size of 0.68 ha with low productivity and the agriculture is largely for subsistence. The landholding is not equally distributed among different ethnic groups. Dalit community has smaller size of land and ethnic communities have land mostly in hill slopes. In value terms, crop production is dominant together with rice, maize, wheat, potatoes and vegetables as the main products. Monsoon rice is the single most important product with an average production of 4.62 million tonnes over last five years from a planted area of 1.48 million hectares. Wheat production is about 1.78 million tonnes from about 0.75 million hectares.

Green vegetables are largely grown in districts neighbouring major cities like Kathmandu, Pokhara and Biratnagar, and the total area covered by vegetables is about 0.25 million hectares over the last five years. Average vegetable production is 3.24 million tonnes that include cabbage, cauliflower, radish, onion, tomato, leafy vegetables, cucumber, okra, aubergine and others. Off-season vegetables and mushroom are grown commercially with many small farmers using poly houses in peri-urban areas. Volume of vegetables and mushroom production has increased in recent years, which is attributed to increased investments in equipment, machinery and inputs. Though around 54% of farmland is irrigated in the country, majority of the small farmers with marginal land in hill tracts are deprived of the irrigation services. Cultivation of cash crops, such as tea, coffee, cardamom and ginger are on the rise, and around 0.06 million hectares of land is occupied by these cash crops. Average area under fruits (including apple and mango) during the last five years is 0.15 million ha. Over the last decade due to increased outmigration of youth, agriculture sector has experienced severe shortage of labour force, and has become increasingly dependent on women, and other vulnerable and older people. Unattractive income from agriculture pushed majority of rural male members to urban areas or abroad seeking jobs which increased burden of farming mostly to women. Due to this ever-increasing trend, 26% of rural households are headed by women, who also take care of farm management in addition to all other household works. Moreover, over 70% of agricultural labour contribution comes from women³. Though remittance flow is on rise, it is mainly used for consumption than investment in productive sector.

Ministry of Agricultural Development (MoAD) is the main line ministry responsible for agricultural development. Department of Agriculture oversees the crop and fisheries sub-sectors whereas Department of Livestock Services is responsible for the livestock sub-sector in the country. MoAD is also responsible for supporting farmers for small farmer-managed irrigation schemes.

Table 1: Baseline production of major agricultural products in the most affected 24 districts (2013/14) (tons)

	District	Cereals	Cash crop	Fruits	Vegetables	Fish	Milk	Meat
1	Rasuwa	11,199	11,199	1,247	40,457	1	4,544	949
2	Nuwakot	149,465	149,465	4,134	103,623	27	33,586	5,769
3	Gorkha	108,111	108,111	9,843	49,477	20	17,166	4,174
4	Dhading	114,116	114,116	6,314	100,945	37	36,280	4,804
5	Dolakha	28,302	28,302	2,651	45,906	1	16,886	1,831

² CBS, 2014, Population Monograph of Nepal, Volume III

³ National Sample Census of Agriculture, CBS Nepal, 2011/12

	District	Cereals	Cash crop	Fruits	Vegetables	Fish	Milk	Meat
6	Sindhupalchowk	111,718	111,718	4,050	96,590	11	24,954	4,196
7	Kathmandu	92,404	92,404	2,190	83,196	23	14,705	10,872
8	Bhaktapur	46,821	46,821	299	75,971	14	11,474	2,478
9	Lalitpur	62,895	62,895	1,248	66,400	21	17,967	5,864
10	Kavre	105,236	105,236	13,772	314,783	19	80,767	6,394
11	Ramechhap	96,522	96,522	12,335	42,681	1	21,461	2,917
12	Sindhuli	130,138	130,138	10,583	48,177	9	19,248	4,196
13	Okhaldhunga	54,044	54,044	1,782	49,737	1	15,544	2,964
14	Makwanpur	121,564	121,564	1,510	115,376	129	36,189	4,654
15	Gulmi	96,290	96,290	3,047	12,846	6	20,155	2,095
16	Lamjung	109,024	109,024	8,306	59,775	24	15,792	2,069
17	Solukhumbu	41,519	41,519	2,133	161,085	0	9,695	2,330
18	Tanahun	139,660	139,660	10,892	39,542	42	39,953	4,435
19	Bhojpur	183,434	183,434	5,532	57,527	1	16,219	2,694
20	Kaski	166,000	166,000	7,571	52,455	78	39,477	6,940
21	Palpa	92,623	92,623	10,397	42,683	18	29,051	3,336
22	Khotang	148,815	148,815	11,575	187,603	5	21,487	3,152
23	Chitwan	161,349	161,349	3,756	121,649	1644	43,629	12,551
24	Syangja	174,009	174,009	13,700	57,430	44	57,473	4,101
	Total	2,545,258	2,545,258	148,866	2,025,914	2,174	643,701	105,765

Source: Data from MOAD 2014

A diversity of crops is grown in Nepal, rice being the major staple in low altitude areas and maize, millet and barley in high altitude areas. Potato is another important crop widely grown by the rural farmers as a staple crop in mountain region. Maize is planted during April and millet planting starts in June. Farm households generally maintain a small kitchen garden in the backyard. Farmers have cowsheds and pens for goat and poultry at home. A few livestock like buffaloes, cows, bullocks, yak, goats, sheep and pigs are raised by most households depending on altitude and ethnicity. Yak, goat and sheep are mainly reared in high altitude areas. The animals are generally fed with home-made feed and fodder, sometimes also mixed with feed concentrates. Bullocks are the main source of draft power in hill areas. Some poultry birds are reared at homestead. Livestock and poultry supplements not only household level food security and nutrition, but also generates some cash for the families through sales of live animals, milk and meat products, and use of them for ploughing and transportation in mountain areas.



Figure1: Livestock kept under a tarpaulin at the back of the damaged house

Farmers store their farm produce and seed at home, generally at the top floor of their typically two-story mud-wall houses. Most farmers use their home saved seeds stored in jute or polythene bags or earthen pots. Only a few farmers use metal bins for food and seed storage. Seed replacement rate in Nepal is only 12%

meaning that farmers on an average change their seed stock only after 8.5 years. Animal feed is stored at home to protect against sun and rain. Hand tools normally used for farming are also generally stored inside the house whereas other bigger farm implements and machineries are kept closer to the houses.

Despite being an agriculture dominant country, approximately 15% of the population still suffers from inadequacy of food, with female-headed households and subsistence farmers as the most food insecure. Nearly half of the districts in Nepal (31 out of 75) are considered food deficit. Ironically, nearly half of the 24 earthquake affected districts fall within the net food deficit area. Most farmers in this area depend more on coarse grains than preferred staple food rice. Nearly 20% of rice and 60% of maize and millets in Nepal are produced in in this area inhabited by 31% of the population in Nepal.

Post - Disaster Context

The devastating earthquake of 25 April followed by frequent aftershocks and a second quake of 12 May caused deaths and injury of thousands of people in the country. Several key infrastructures, including agriculture infrastructure, were either damaged or destroyed. Nearly 3.5 million people were considered as vulnerable with immediate food needs, out of which 1.4 million people were considered highly vulnerable requiring immediate food assistance⁴.



Figure 2: Injured livestock being treated
(Source: DoLS Gorkha)

Damages and losses in agriculture sector are significant. The estimated number of small and vulnerable farming households affected in the 24 districts by the earthquake disaster is around 1 million, among them female outnumber male. Most of the small and vulnerable farming households suffered the most, in particular the ones with average land holding of less than 0.7 hectares and 3-5 heads of livestock. Households managed by elderly people and women suffered the most.

Rice and millet grains harvested in November and stored inside the house as food stock were mostly damaged when houses collapsed. Some maize is being recovered however it is hardly suitable for human consumption. Some areas with standing wheat and vegetables have been affected by landslides. Further losses of wheat were caused by hailstorms as household were too busy in managing their family members and the crop was left over-maturing. Productivity of standing maize will be lower as the attention of the farmers for intercultural operations was diverted by the earthquake. Some vegetables crops, including those grown in poly houses were also lost as the land was cleared to place the shelter for the people. In some districts, such as Gorkha and Rasuwa, maize crop has fallen prey to the devastating damages caused by army worms. Together with big quantities of grain stocks, seeds (mainly rice and millet), tools, agriculture machineries and some fertilizer stocks were also damaged. Farm machineries and equipments (e.g., water pumps, generator, tillers, etc.), milk cans, chilling vat, mills, bee hives and equipment for fish production were reported to be damaged by the earthquake. Animals, mainly cattle that were tied close to the house, were killed or injured by the earthquake whereas death or injury of the small ruminants that were left free for grazing was less. Commercial farms, mainly for milk cows and poultry, suffered losses and damages. During the field visits, farmers reported animals subjected to abortion and stress syndromes and many were

⁴ Source: Food Security Cluster, Flash Appeal, April 2015

consuming less feed than usual directly affecting the milk production. Some farmers reported that milk produced per animal is reduced up to 50%. Damage to poultry farms also affected the supply of chicken to the local markets. More numbers of animals were reported to be injured, which if not provided with timely veterinary care, could die in the coming months due to weakness and injuries. Damage to animal shelters was a major concern among the farmers together with human shelter.

Districts, such as Dhading, Rasuwa, Sindhupalchowk, Nuwakot and Dolakha are well known for small-scale rainbow trout farming. Many of the trout farms have suffered with direct damages to the raceways as well as loss of fish and fingerlings. Another important activity of cheese making in few districts has also suffered damages of infrastructure and machineries directly affecting the production and livelihood opportunities.

The farm power in Nepal mainly comes from the human and the animal labours. Loss of labours in agriculture sector is reported due to death and injury of family members, migration and additional demand of work for survival and safety, and fear of life linked to aftershocks. Increase of labour migration is more likely to recover the losses in income and livelihood caused by the earthquake, which could increase the feminization of agriculture. Some of the families under crisis have difficulty keeping their animals due to shelter damages, lack of feed, no time for caring, and too traumatized to resume their usual activities. These factors could not only decrease the food production substantially, but also disrupt the production system if appropriate measures are not adopted. Some farmers, especially in the landslide prone areas are currently living with a fear of further landslide during monsoon. Few are currently displaced, and they may wait until the frequency of aftershocks is reduced. Furthermore, farmers in villages are spending as high as 30% of their time waiting for relief which could continue for a while. With frequent aftershocks, people are mentally stressed. Meanwhile, majority of the staff in public sector have not been able to spend time with their families since the disaster resulting additional mental stress on them affecting delivery of services and mental health.

Disaster Effects and Impact

Areas in some of the most affected districts reported cracks in the field both upland and irrigated. Damages have occurred on around 1000 ha of land that are rendered useless due to landslides and land slips, and these lands will most likely be not recovered.

Internally displaced people from higher land reported huge landslides damaging their maize crop and killing their livestock; and crops and livestock were left behind unattended. Damaged

irrigation systems posed threat to the presently standing crop as well as indicated further risks of losing subsequent crops if not immediately repaired. Rice planted area is likely to go down and millet area may increase. The productivity of rainfed millet is however about three times less than that of rice. This will substantially decrease food production in the affected districts. Given the tremendous needs for managing shelter, food and other most essential items, farmers are unable to spend time in the field or for maintaining livestock. Farmers in some of the most affected districts feared production losses as high as 50%. The earthquake has severely affected the vegetable and mushroom production value chain in Kathmandu, Dhading, Gorkha, Nuwakot and Bhaktapur districts due to damages in poly houses.

Several office buildings and official residences of District Agriculture Development Office (DADO) and District Livestock Service Office (DLSO) are damaged. Damages to agriculture and livestock service centres that



Figure 3: Cracked land (Source: DADO Gorkha)

provide direct services to farmers have seriously disrupted the extension and livestock support service. In addition, damages of a large number of physical facilities, such as training halls, laboratories, garages, boundary walls, toilets, livestock farms, seed stores, water tanks, pump houses, quarantine offices, cooperatives, milk collection centres, and chilling centres belonging to both public and private sectors have seriously jeopardized the crop and livestock production. Damages to access roads in upland areas by landslides have affected the farmers on the sale of their farm produce, particularly perishable vegetables and milk. This loss will discourage the farmers decreasing their efforts in production, which could lead to decreased production. Moreover, already seasonal roads in many of the villages are likely to be blocked during the rainy season aggravating the problem in farm production and marketing.

Effects on Production of Goods and Services and Access to Services

Main drivers are decline in crop production and livestock products. Efforts of farmers to support other farmer families, collection of relief materials, and construction of temporary shelters and excavation of personal belongings have diverted them away from the farm operations, causing delay or absence for intercultural operations of maize particularly weeding, thinning and fertilizer application, and maintaining livestock. Disrupted market system, lack of labour in the villages, lack of food and cash in the families, desperate situation of the farmers due to damaged shelters, their inability to come out of the state of shock exacerbated by the frequent aftershocks and other urgent family priorities have significantly affected the production flows. Time for nursery bed preparation for rice and millet is fast approaching whereas stored seed is buried under the rubble. Farmers may either have no money to buy new seed or the seed may not be available locally. Seeds provided by the external agencies are either not sufficient to cover the overall needs or they might not be supplied in time. These factors may hinder the farmers from accessing required inputs that could pose a risk of having almost 30% land area in hills uncultivated. This would significantly reduce the production affecting overall household food security and income. Meanwhile, a part of the standing spring rice and maize crops can still be harvested; however farmers have no storage facilities. Damages caused by army worm could also lower the production flows.

Damages to livestock shelters, death and injury of livestock, and malnutrition and the risk of animal and zoonotic disease epidemics among the surviving livestock due to insufficient feed, fodder and animal health support could largely affect the productivity of the livestock affecting production of meat and milk products. Loss of forage seed and damages to pasture land could further aggravate the situation.

Due to damages to district and rural service centres, access to crop and livestock extension services is challenging. Already thinly populated extension and animal health workers are diverted to relief operations and their own family care. Access roads to remote villages are damaged, and logistics and transportation facilities with the service centres are limited. Meanwhile, farmers due to their other priorities are unavailable or unwilling to access the services. Such situation is causing decreased access to agricultural extension and veterinary services. This is a particular challenge for women who do most of the agricultural work, but only receive 30% of the extension services and Dalits who are often live in remote areas and far from district headquarters.

Effects on Governance

Agricultural service delivery is affected by death and injury of technicians, damage to office buildings and equipment, and service delivery stations, and deployment of technicians in relief operations. Operating out of tents or temporary sheds was seriously hampering the efficiency and effectiveness of the civil servants.

Lack of basic amenities in their duty stations is further aggravating their physical and mental condition. Meanwhile, the efforts of the government agencies are focussed on crisis management hindering the regular service delivery and governance. Efforts of the veterinary experts are diverted to treatment of injured livestock and agricultural experts are putting efforts in food assistance and seed support in order to meet the fast approaching rice planting season. In addition, the technical staffs are participating in DDRC meetings as well as updating data on damages and losses along with information for immediate needs to resume farm activities and reinstate livelihood of rural farmers. During the meetings the PDNA team realized that both DADO and DLSO are heavily occupied with relief and recovery works. They are over stretched from every corner and a clear need of operational flexibility was realized to cope with the emergency situation.

Effects on Risk and Vulnerabilities

The earthquake increased fragility of food production systems making the poor and marginal farmers, including the elderly and women more vulnerable to other possible future disasters. The earthquake has seriously impacted on the agriculture-based livelihood in the affected districts increasing their vulnerability to hunger and food insecurity. The loss of farmland and other productive assets, and the risk of having land uncultivated in hill slopes of the most affected districts further increases the risks of decreased production and food insecurity in coming months and next couple of years with far reaching negative impacts. Currently provided basic food and nutrition package as humanitarian relief materials is neither enough to feed the family over longer run nor sustainable. Furthermore, some of the vulnerable farmers are indebted and at the current situation, it will be extremely difficult for them to pay back the capital with interest. Moreover, though policy exists, most of the farmers did not have access to insurance services to insure their crop, houses or livestock. Unless these farmers are supported to restore their production capacity with appropriate policy and operational interventions, their vulnerabilities are likely to exacerbate further.



Figure 4: Damaged rural agriculture service centre

With the increasing trend of male-out-migration, the vulnerable percentage of women-headed households may face exclusion from recovery and reconstruction support programmes if not targeted specifically. Furthermore, the likelihood of increase in cost of production due to inflation and price hike may negatively impact the women-headed households and other vulnerable groups.

Effects on risks could be multi-fold. Seeds supplied from outside sources need to fit well to the agro-climatic conditions of the districts to avoid a risk of crop failure and it should be done in close coordination with the DADOs. Recovery assistance should emphasize on protecting local biodiversity. The farmers still face difficulty managing the carcasses appropriately, and microbes from such dead animals can find ways to water sources spreading diseases to surviving animals. Adapted breed of livestock and fingerlings need to be ensured. These risks however may not affect all the farmers in the 24 districts equally. Poor and marginal farmers with injured members; and elderly people are more vulnerable to risks in production loss, food insecurity and decreased livelihood conditions. Further, women and girls are more vulnerable than men to the natural and other hazards and farmers with farmlands in high mountain areas or flood plain are more vulnerable to the earthquake instigated landslides and floods.

Damaged farm lands due to ground cracks and slipping of mountains are further exposed to landslide risks during monsoon by seepage of water. Recent incident of huge landslide and damming of Kaligandaki River is a warning signal for similar situation in some of the most affected areas during monsoon, which could submerge huge swathe of farmlands, seriously affect the environment and lives and livelihoods of thousands of people. Meanwhile, high magnitude earthquakes followed by frequent aftershocks have shaken the ground and altered the geological systems also changing water springs, which can affect water supply in the farm leading to decrease in crop productivity.

Damage and Loss

The estimates of the value of damages and losses are summarised in the table below. The total damages and losses in agriculture sector amount to about **NPR 28,366 million**.

Table 2: Summary of Damages and Loss Estimates (million NPR)

	Particulars	Damages	Losses	Total
A	Crops, fishes and bees			
1	Standing crop loss	-	6,918.82	6,918.82
2	Expected future crop production loss	-	2,263.99	2,263.99
3	Machineries and tools	183.11	-	183.11
4	Infrastructure ⁵	1,253.14	-	1,253.14
5	Fisheries	18.73	30.31	49.04
6	Stored seed stock	775.32	-	775.32
7	Stored food grain stock	6,656.82	-	6,656.82
8	Other stored crops and inputs stock	117.85	-	117.85
	Total	9,004.98	9,213.12	18,218.10
B	Livestock and poultry			
1	Livestock death	2,302.22	-	2,302.22
2	Expected future livestock production loss	-	2,717.51	2,717.51
3	Livestock feed damage	138.24	-	138.24
4	Other livestock inputs	0.63	-	0.63
5	Machinery and tools	8.60	-	8.60
6	Infrastructure	4,949.92	-	4,949.92
	Total	7,399.61	2,717.51	10,117.12
C	Irrigation			
	Production losses due to damage in irrigation systems	-	31.10	31.10
	Total	-	31.10	31.10
	Grand total	16,404.59	11,961.73	28,366.32

Source: Estimated from data reported by MOAD, DOA, DLS, DADO and DLSO

⁵ Including small farmer-managed irrigation system

The earthquake has damaged the crop land, stored food grain, and seed and feed stocks, physical infrastructure, mainly the office buildings, service centres, mills, laboratories, small irrigation system, poly houses, residential premises for the Government installations, livestock shelters, small dairies and cooperatives; and agriculture tools, equipment and machineries. Based on the data compiled from the 24 affected districts the total damages reported to agriculture sector amounts to about **NPR 16,405 million**. Damages to physical infrastructure are estimated by using the current refurbishment / reconstruction costs for the respective types of works and replacement/repair costs for infrastructure and machineries.

The following table represents the summary of damages and losses by districts.

Table 3: Summary of damages and losses by districts (million NPR)

	District	Crop subsector			Livestock sub-sector			Agriculture total				
		Damages	Losses	Total Effect	Damages	Losses	Total Effect	Damages	Losses	Total Effect	Private (%)	Public (%)
1	Rasuwa	207.46	21.55	229.01	239.28	21.61	260.90	446.74	43.17	489.91	81.48	18.52
2	Nuwakot	1298.85	1294.68	2593.53	163.77	144.80	308.57	1462.62	1439.48	2902.10	96.33	3.67
3	Gorkha	498.03	752.79	1250.82	353.84	88.71	442.55	851.87	841.51	1693.37	93.24	6.76
4	Dhading	3623.24	2247.71	5870.95	943.46	139.28	1082.73	4566.69	2386.99	6953.68	97.59	2.41
5	Dolakha	334.99	885.40	1220.40	151.42	59.97	211.39	486.41	945.37	1431.78	95.47	4.53
6	Sindhu palchowk	1075.60	1414.82	2490.41	3382.00	106.50	3488.50	4457.60	1521.31	5978.91	99.07	0.93
7	Kathmandu	441.65	176.05	617.70	117.18	163.55	280.73	558.84	339.60	898.44	98.57	1.43
8	Bhaktapur	176.00	185.71	361.70	84.35	55.55	139.90	260.35	241.26	501.61	88.37	11.63
9	Lalitpur	108.63	113.15	221.78	63.71	110.79	174.51	172.35	223.94	396.29	91.44	8.56
10	Kavre	123.89	80.25	204.14	151.29	258.45	409.74	275.17	338.71	613.88	77.05	22.95
11	Ramechhap	215.45	71.07	286.52	55.61	83.29	138.90	271.06	154.36	425.42	78.05	21.95
12	Sindhuli	300.22	451.93	752.15	160.42	93.66	254.08	460.64	545.59	1006.23	80.31	19.69
13	Okhaldhunga	137.00	158.05	295.05	1198.55	70.54	1269.09	1335.55	228.60	1564.15	95.52	4.48
14	Makwanpur	176.85	128.99	305.84	164.77	137.27	302.04	341.62	266.26	607.88	61.32	38.68
	Total of 14 districts	8717.84	7982.17	16700.01	7229.67	1533.98	8763.64	15947.51	9516.15	25463.65	94.33	5.67
15	Gulmi	22.10	65.79	87.89	0.15	70.49	70.64	22.25	136.27	158.52	82.02	17.98
16	Lamjung	8.54	97.33	105.87	37.10	60.36	97.46	45.64	157.69	203.33	17.83	82.17
17	Solukhumbu	66.25	23.38	89.63	8.38	49.77	58.15	74.63	73.15	147.78	54.26	45.74
18	Tanahun	11.23	116.87	128.10	3.59	143.11	146.70	14.81	259.99	274.80	29.38	70.62
19	Bhojpur	0.90	99.70	100.60	0.68	68.82	69.50	1.58	168.52	170.10	43.04	56.96
20	Kaski	37.25	188.39	225.64	107.68	172.10	279.79	144.93	360.49	505.43	75.84	24.16
21	Palpa	23.25	81.01	104.25	0.23	105.40	105.63	23.47	186.41	209.88	31.84	68.16
22	Khotang	12.30	131.09	143.39	1.07	86.17	87.24	13.37	217.26	230.62	71.64	28.36
23	Chitwan	72.66	260.26	332.92	9.24	248.78	258.02	81.90	509.04	590.94	83.46	16.54
24	Syangja	33.30	167.14	200.44	1.20	178.53	179.73	34.50	345.67	380.17	53.47	46.53
	Total of 24 districts	9005.61	9213.12	18218.73	7398.98	2717.51	10116.49	16404.59	11930.63	28335.22	90.82	9.18

Crop loss due to damage in irrigation system		31.10						31.10	31.10		
Grand total	9005.61	9244.22	18218.73	7398.98	2717.51	10116.49	16404.59	11961.73	28,366.32		

Source: Estimated from data reported by MOAD, DOA, DLS, DADO and DLSO

Production losses occurred especially in the agricultural crop and livestock subsectors. Districts reported loss of production for different crops, animal fodder, potatoes, mushroom and vegetable production, livestock, fish production and fingerlings, and cash crops.. The total lost value of production estimated in the affected districts in agriculture sector amounts to about **NPR 11,962 million**, which also includes value of production of the lost crops, higher production costs and estimated production loss in subsequent seasons. The decline in livestock production in subsequent seasons, such as reduced milk and meat supply, egg production and honey is also included.

According to the report of MDG 2013, Nepal was on track and likely to achieve most of its MDGs including poverty reduction despite the prolonged political instability in the country. However, agriculture is one of the major sectors of Nepalese economy, which was already facing challenges of meeting labour demand due to increasing trend of foreign employment. The sector now is affected severely by the earthquake, and this situation could push the sector to further crisis further resulting low production and abandon farms. Achievement of the MDG goals with sustainable economy and employment growth may therefore remain a challenge. An impact analysis of the earthquake is therefore needed to find out the extent of dislocation of the progress paths of the country to achieve MDG and other development goals such as poverty reduction, food security, economic growth and graduation of the country from the least developed county status to a developing country.

Recovery Needs and strategy

The overall recovery and reconstruction is estimated at **NPR 15,560 million** out of which **NPR 3,579 million** (23%) is required for immediate recovery in short term for the period of next 12 months, and **NPR 11,981 million** (76%) is required for reconstruction of the sector in the medium-term over a period of 36 months. The notion of Building Back Better has been taken into account while estimating the reconstruction needs with the overall aim of enhancing resilience of the small vulnerable farmers. Given the urgency of the situation, activities under both recovery and reconstruction will have to start simultaneously.

Food Security Cluster appealed for USD98.6 million in the revised Flash Appeal, with larger share of the appealed amount for emergency food assistance. Since there are several food security cluster partners providing emergency relief food assistance to the affected vulnerable families in the district, which is expected to continue for some more time, the agriculture sector recovery and reconstruction needs therefore do not cover the humanitarian food assistance needs.

Recovery in agriculture sector focuses on immediate activities aimed at the restoration of production levels in crop, livestock and fisheries. Specifically, recovery needs include:

- (i) Provision of inputs for crop planting;
- (ii) Provision of inputs for fishery restoration, and
- (iii) Provision of inputs and veterinarian assistance for livestock.

Immediate intervention is needed for supply of millet seeds together with fertilizer, and seed of wheat and barley, and potatoes for the October-November planting season; and seasonal vegetable seeds. Grain bags and metal bins need to also be immediately provided to the farmers for storing their currently standing maize and recently harvested wheat crops. Provisions of seedlings will be made for the revitalization of fruit production. Priority needs for immediately recovering livestock production are proper management of carcasses to prevent possible spread of diseases, treatment of injured animals, and supply of feed concentrate and vaccinations. Provision of rainbow trout and other fish mother stock in fish hatcheries, and resumption of fish breeding and fry production is

urgently needed.

Table 4: Recovery and reconstruction needs in the agriculture sector (Million NPR)¹

		Needs (in Million NPR)			Total Needs
		FY 2015-16	FY 2016-17	FY 2017-18	(in Million NPR)
A	Recovery	3,579.19			3,579.19
1	Crop input supply	2754.84			2,754.84
2	Input supply in fisheries	9.09			9.09
3	Input supply for livestock and poultry	815.25			815.25
B	Reconstruction	7188.86	3594.43	1198.14	11981.43
1	Replacement of agriculture inputs, tools and machineries	839.50	419.75	139.92	1,399.17
2	Reconstruction of agricultural infrastructures	977.45	488.73	162.91	1,629.08
3	Reconstruction of fish ponds and race courses	14.61	7.31	2.44	24.35
4	Restocking of livestock and poultry	1381.33	690.67	230.22	2302.22
5	Replacement of livestock inputs, tools and machineries	115.03	57.51	19.17	191.71
6	Reconstruction of livestock infrastructures	3860.93	1930.47	643.49	6,434.89
	Total Needs (A+B)	10,768.05	3,594.43	1,198.14	15,560.62

Reconstruction needs within the next 3 years will include

- (i) Replacement of tools and machineries for crops, livestock and fisheries
- (ii) Restocking of lost animal stock
- (iii) Reconstruction/rehabilitation of agriculture infrastructure, such as animal shelters, office buildings, agriculture and livestock service centres, laboratories, collection centres and markets; chilling vat/centres, poly houses for vegetables and mushroom, poultry farms
- (iv) Reconstruction/rehabilitation of fish ponds and raceways
- (v) Immediate repair and rehabilitation of small farmer-managed irrigation systems

Opportunity will be explored to replace the machineries, equipment, poly houses and other productive assets at subsidized price. Furthermore, multi hazard resilient community grain storage and animal shelter; and community nursery for paddy, millets, herbs and fruit trees will be promoted in the districts. Meanwhile, policy will be developed to encourage commercial livestock farming (dairy, piggery, poultry, and goat farming) in specific locations away from human settlements adopting Good Agriculture Practices (GAP) and Good Veterinary Practices (GVP) to achieve biosecurity and also with a view of export of the livestock products from such farms in longer run.

Overall, the reconstruction needs also include an estimated additional 30% Build Back Better (BBB) costs and associated management support costs. Better technologies will be built on reconstruction of

¹ The budget needed for recovery and reconstruction is in addition to the usual agricultural budget allocated to MoAD, and the annual increment over that budget.

animal shelters, irrigation canals, fish ponds and race courses. Reconstruction of office buildings will incorporate concerns of women, elderly and disabled farmers and employees in additions to structural strengthening. Opportunities will be explored to relocate the office buildings to make them structurally safer and more resilient.

Implementation Arrangements

As the agricultural sector recovery plan spans across different agencies in the government including research and extension departments and other stakeholders such as farmers, private sector, scientific communities, local cooperatives, forest user groups and CBOs/NGOs, the implementation will be done in coordination with all the relevant stakeholders, as appropriate. The executing agency will be MOAD and the implementation will be done by DOA, DLS and NARC with support of development partners, specifically the ones with proven technical expertise and clear comparative advantages in agriculture sector. Given the urgency of the situation, a 'fast track' mechanism with required delegation of authority within the existing institutional framework of the Government of Nepal will be applied. Necessary human resources will be deployed to this institutional set up for the implementation and monitoring of recovery and reconstruction activities along with provisions of equipment and vehicles. Since women headed households may find difficulty to access the services, they will be specially targeted while providing support for recovery and reconstruction. Training of women technicians will be emphasised to better access female farmers.

A robust Monitoring and Evaluation system will be developed to ensure efficacy, efficiency and transparency of implementation that gathers gender disaggregated information. Overall, the sector implementation strategy will align with the Government's overall priorities for the agriculture sector as reflected in Agriculture Development Strategy (ADS) as well as the Immediate Plan of Action for earthquake recovery, specifically:

- Increased technical and financial support to women farmers, small farmers and agri-business with special emphasis on cereals, vegetable and cash crop farming, livestock and poultry farming and aquaculture as per the different agro-ecological zones in the earthquake-affected districts;
- Improved management of farmer-managed irrigation system and water use efficiency;
- Strengthened marketing of agriculture products with value addition; and
- Increased quality and safety of agricultural and agro-processing products.

The sector implementation strategy will have special focus on gender specific targeting ensuring access of women, ethnic minorities, under privileged, elderly and other marginal vulnerable farmers to technology and financial resources, and be based on i) recovery interventions, which would immediately address the urgent needs to maintain and restore the productivity in the sector and income of the affected population with strong linkages to rehabilitation and development within next 12 months. The interventions will have focus on Hyogo Framework for Action and Sendai Framework for DRR with the notion of BBB, and (ii) rehabilitation/reconstruction of building infrastructure, irrigation infrastructures, livestock restocking and repair / replacement of agriculture machineries and equipment coupled with institutional strengthening and capacity building to sustainably improve crop, small irrigation, fisheries and livestock within next 36 months. Cash / voucher transfer will be encouraged for inputs, including fertilizer at subsidized price as per the policy of the Government of Nepal in areas where markets have become functional. Rehabilitation / reconstruction works will be carried out through cash-for-work, also to channel the money to the local economy through self-targeting. Special attention will have to be paid for the structural stability of these structures against earthquakes in future.

Since agriculture in Nepal is highly risk prone due to change in rainfall pattern, floods and landslides, earthquake and other natural and manmade disasters, and considering the imperative of disaster risk reduction, the recovery strategy aims to emphasize on investment on technological backups and agriculture information system to support production and marketing, and improve resilience of vulnerable farmers against most imminent future natural disasters. To that end, research on disaster risk and introduction of new and improved varieties of crops and breeds of livestock and fish will be pursued. Standard Operating Procedures (SOP) for MoAD will be established to get better prepared against similar disasters in future, including early warning system aiming to assist vulnerable farmers for managing risks in agriculture production, and food and nutrition security in the country.

Farmers Welfare Fund foreseen under the ADS will provide assistance to farmers under distress through access to financial resources as safety net to overcome temporary losses of income in similar future disasters. This recovery plan will contribute to establishment and operationalization of such a new concept. The recovery strategy will contribute to bring the newly initiated crop and livestock insurance plan in effect by working with the private sector. Similarly, the recovery plan will look at opportunities for strengthening food reserve system to cope with emergency and covering suffering vulnerable farming households. Building capacity of extension and animal health workers and farmers through training, FFS, and technology transfer will be another important element the strategy will look into over the reconstruction period.

The medium-term recovery interventions should aim at strengthening the value-chains, ensuring the integration of small-holders, mainstreaming crop diversification, good agricultural practices (including Farmers Field Schools and IPM), and climate change adaptation measures, that contribute to disaster risk reduction and management. In addition, it will be essential to promote and strengthen local cooperatives as they can play a key role in the development of the value-chains as well as in water management. Restocking of livestock would strictly target the most vulnerable households for which livestock represent a significant and essential source of income excluding those already covered by an insurance scheme. Recovery and reconstruction interventions will consider special case of gender difference in agriculture. To respond to an increasing role of women in farming, drudgery reduction, labour efficient and cost effective technologies such as hand tractors, zero tillers, and serrated sickles will be introduced. Similarly, to reduce vulnerability of women and children at home, interventions will be made to attract locally available youth labour force as well as returnee migrant workers by providing them job opportunities in agriculture sector. The strategy emphasizes on Government-led implementation with support of development partners in close collaboration with local communities in participatory manner.

Assessment Methodology

Data were collected through a variety of methods and crosschecked. In particular,

- a) Available reports were reviewed, including the draft reports circulated by the Food Security Cluster, namely the NekSAP/WFP household survey report for 11 districts and the rapid agricultural livelihoods assessment report prepared by FAO for 6 most affected districts.
- b) Damages and losses assessment templates were developed, sent to 24 earthquake-affected districts, and the data received from the districts were compiled and analyzed.
- c) Field visits were made to the most affected six districts² in order to meet the authorities and affected population and discuss the effects of earthquake on agricultural livelihoods. Meetings were held with District Disaster Relief Committees (DDRC) and officials from DADO and DLSO.

² Dhading, Gorkha, Rasuwa, Nuwakot, Sindhupalchowk and Dolakha

Focus Group Discussions were carried out with some of the affected farming communities.

- d) Data provided by the districts were crosschecked with official data of the Government³. Cropped surfaces communicated by the districts were compared against data of the 2011 Agriculture Census carried out by CBS and area and production of crops, livestock and fisheries were obtained from 2014 report published by MoAD. Losses and damages reported by the district level offices were triangulated with the baseline data.
- e) Prevalent market unit price was considered for estimating losses and damages. Recovery cost was estimated as 30% of the total losses, and about 30% were added to the damages for estimating reconstruction needs. Total value of damages of livestock was used for estimating the needs for restocking.
- f) The team worked with crosscutting sector teams, in particular with the Environment, Irrigation, Community Infrastructure and Gender.
- g) A stakeholders' consultation meeting was organized on 1 June and the major findings and recovery strategy was presented. Feedback/inputs received from the participants were taken into consideration while finalizing data and the sector report.

District agriculture and livestock offices did their best to collect the data and send to the PDNA team, however, due to their limited capacity and short time frame, the data set received seemed still incomplete. Collection of data on damages and losses in the districts is ongoing, and the situation is expected to become much clearer in few weeks time. A revision would therefore be necessary in due course to get better picture of damages and losses, and recovery and reconstruction needs.

REFERENCES

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³ Data available from the Central Bureau of Statistics, 2014

IRRIGATION

Summary

The objective of this chapter is to provide a preliminary description of the damages and losses caused by the 2015 earthquake to the irrigation infrastructure with a special focus on the reconstruction needs. The report provides an initial assessment of short, medium, and long-term intervention needs adopting “building back better” approach.

The post disaster need assessment in this sector covered 31 districts including the 14 most affected ones. Irrigation in these hilly and mountain districts is provided by an estimated 1877 small- and medium-scale Farmer managed irrigation scheme totalizing about 121,900 ha of irrigated land before the earthquake. The infrastructure and functionality of about 290 of these irrigation schemes was affected to various degrees by the earthquake. Damages to the irrigation infrastructure and sector district offices are estimated to cost about NPR 382.8 million. Losses in agriculture production due to non-availability of irrigation water on 10783 ha are reported for in the agriculture chapter. Direct losses in irrigation fee collection were estimated to cost NPR 0.4 million. Recovery and reconstruction for both office building and irrigation schemes, including building back better approach is estimated to cost about NPR 467.2 million.

Pre-Disaster Context and Baseline⁴

The agriculture sector accounted for 34.1% of GDP in 2013/14 and employed 76% of the labor force. A total 2.5 million hectares (ha) of the country’s land is arable, of which 1.77 million ha is irrigable and 1.35 million ha has access to irrigation water. The irrigation systems are categorized according to their size and operation and management responsibility. In the hills, schemes of less than 10 ha are considered small, schemes between 10 and 500 ha are considered medium, schemes between 500 and 1000 ha are considered large, and schemes above 1000 ha are considered major⁵. Micro irrigation systems using non-conventional technologies are also constructed as independent systems or in conjunction with small and medium irrigation systems to increase water efficiency. Based on the entity-in-charge of the operation and maintenance, the schemes are also classified as agency-managed irrigation schemes (AMIS), farmers-managed irrigation schemes (FMIS) and jointly-managed irrigation schemes (JMIS).

The total area under irrigation surface irrigation AMIS has been reported to be about 749,063 ha out of which large and major irrigation schemes account for 325,919 ha and medium irrigation schemes 424,000 ha. Large and major irrigation schemes are mainly located in Terai plains where large area of productive irrigable land is available. There are about 15,000 small and medium size FMIS covering 227,077 ha. These are mainly located in the hills and mountains. About 3,000 of them have received external support from the government and development agencies in the past. The rest were built by farmers and are made of flexible structures and earthen canals with temporary intake that require frequent repair. The ground water schemes cover about 374, 691 ha of irrigated land in the country and the rest area are covered by other minor/micro irrigation schemes.

⁴ See references in appendix 1

⁵ In Terai area, classification of irrigation schemes by size uses different thresholds. Schemes < 200ha are considered small, schemes 200-2000 ha are considered medium, schemes 2000-5000ha are large and schemes >5000ha are major.

Gender aspects: Right over water that is to use in agricultural purpose is mainly attached with land right. It means those who have land can only enjoy water right. Therefore, right over water is discriminatory in Nepal from gender perspective, as the disparity exists in land distribution, where women only own only 19.17% of the land and housing. Further, there is lack of recognition that women are water stakeholders and actors too and also there exists an undervaluation of the importance of women’s skills, knowledge and labour contributions to water management. Yet women shoulder most of the farm work and make the largest contribution to the agricultural economy.

The government through the Ministry of Irrigation (MOI) and its Department of Irrigation (DOI) develop and manage medium to major scale irrigation systems in the country; whereas, the Ministry of Federal Affairs and Local Development (MFALD) through its Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR) supports farmers in construction and rehabilitation of small irrigation systems. The Ministry of Agriculture Development (MOAD) through its Department of Agriculture (DOA) also supports farmers in construction and management of small to minor irrigation systems in different districts in the country.

The irrigation post disaster needs assessment (PDNA) focuses on 31 earthquake- affected districts totalizing an estimated 121,900 ha that was receiving irrigation prior to the earthquake. Irrigation in these hilly and mountain districts is provided by small and medium-scale FMIS. Only irrigation schemes and buildings which are under the responsibility of DOI and DOLIDAR are accounted for in this chapter. Schemes and offices which are under DOA responsibility are accounted for in the agriculture PDNA report chapter. Table 1 presents the estimated number of schemes and number of hectares under irrigation in each of the 31 districts.

Table 1. The irrigation systems in the earthquake affected districts

S.No.	Districts	Total Number of small and medium irrigation schemes	Total area under irrigation (ha)
1.	Bhaktapur	46	3184
2.	Dhading	123	5523
3.	Dolkha	44	3303
4.	Gorkha	61	3055
5.	Kathmandu	47	2913
6.	Kavrepalanchowk	78	4346
7.	Lalitpur	46	3805
8.	Makwanpur	54	3813
9.	Nuwakot	69	5602
10.	Okhaldhunga	43	2449
11.	Ramechhap	63	3399
12.	Rasuwa	21	1163
13.	Sindhuli	47	4492
14.	Sindhupalchowk	97	5803
15.	Arghakhanchi	51	2143
16.	Baglung	54	1912
17.	Bhojpur	32	2646
18.	Chitwan	152	16499
19.	Dhankuta	60	3313

S.No.	Districts	Total Number of small and medium irrigation schemes	Total area under irrigation (ha)
20.	Gulmi	53	2438
21.	Kaski	47	3329
22.	Khotang	39	3416
23.	Lamjung	95	4527
24.	Myagdi	44	1834
25.	Nawalparasi	65	8849
26.	Palpa	74	3163
27.	Parbat	62	3193
28.	Sankhuwasabha	45	2609
29.	Syangja	79	4492
30.	Solukhumbu	22	1491
31.	Tanahun	64	3205
Total		1,877	121,909

Damage and Loss

The PDNA damage assessment in irrigation sector has considered the damages in irrigation infrastructure and office buildings. Losses in this sector only include reduction in irrigation service fee (ISF) collection from damaged irrigation schemes. Losses in agriculture production due to non-availability of irrigation water are accounted for under the agriculture sector.

Infrastructure damages. The field visit revealed that damages are due both to ground shaking and landslides. Typical damages include (i) small and major cracks on RCC canals, falls or other structures due to ground shaking, (ii) displacement of canal with loss of gradient, (iii) RCC canal section degraded or washed away due to landslides and rock fall, and (iv) damaged retaining walls. In many instances, sections of RCC canals have cracked due to faulty construction. Despite of the major scale of the disaster, important structures of the systems such as intake, super-passages and aqueducts have generally well resisted and remain in operation. Many landslides have occurred. Some with new spring water are very vulnerable and may further deteriorate. Even firm rocky areas have started to show wedge failure or serious cracks of a couple of inches wide. Many landslides prone area have been weakened by the earthquake. It is expected that monsoon rain will cause many of these weak area to fail. These hidden damages were accounted for by adding 30% to the immediate post-earthquake visual damage estimates. Finally, many DOI and DOLIDAR district offices were damaged. District offices in Dhading, Dolkha and Nuwakot have to be rebuilt.

Losses in production, fiscal revenue and services. Losses from damaged irrigation infrastructures include (i) loss in agriculture production due to reduced irrigated area; and (ii) reduction in ISF collection. As discussed in the recovery strategy section, it estimated that damaged irrigation schemes will remain completely or partially out of function in average for a period of 1 year. Some will be fixed much earlier and other may be fixed after a maximum period of 2 years. Losses in production and irrigation fee will occur for a period of 1 year. The fee is collected by the irrigation department on an annual average at the rate of NPR 200/ha. However the average collection rate does not exceed 20%. This low collection rate was factored in while calculating the losses in ISF collection. Losses in production were calculated for 10783 ha which include the 8295 ha reported without of irrigation plus 30% for unreported damaged schemes. For most systems, one year out of production corresponds to

losses of three crops including (i) one rice crop, (ii) one wheat crop, and (iii) one maize crop. Losses of production were estimated at NPR 4,042.5 million and accounted for in the agriculture PDNA chapter. Table 2 present estimated damages and losses in the 31 affected earthquake affected districts. Damaged office building will affect DOI and DOLIDAR district staff ability to provide the services that are required to support fast reconstruction and recovery. Fast reconstruction/ retrofitting of the offices will be critical including possibly provision of temporary offices.

Table 2. The irrigation systems in the earthquake affected districts along with the cost of damages and losses

S.No.	Districts	Number of affected Schemes	Total cost of damage on irrigation scheme in Million NPR	Cost of damage to office building in Million NPR	Total Cost of Damages (offices +irrigation schemes) in Million NPR	Total Loss in CA (ha)	Total loss in ISF collection in Million NPR @ 20% collection rate
1.	Bhaktapur	0	0.0	0.0	0.0	0	0.0
2.	Dhading	26	50.6	9.5	60.1	944	0.05
3.	Dolkha	38	9.2	15	24.2	874	0.05
4.	Gorkha	111	70.9	0.9	71.8	2,848	0.107
5.	Kathmandu	0	0.0	0.5	0.5	0.0	0.0
6.	Kavrepalanchowk	8	17.8	1.5	19.2	202	0.01
7.	Lalitpur	1	0.5	0.0	0.5	25	0.001
8.	Makwanpur	19	25.8	3.3	29.2	497	0.03
9.	Nuwakot	13	41.6	0.9	42.5	870	0.05
10.	Okhaldhunga	14	12.8	1.5	14.3	271	0.01
11.	Ramechhap	0	0.0	0.0	0.0	0	0.0
12.	Rasuwa	5	16.2	10	26.2	196	0.01
13.	Sindhuli	1	1.0	2.4	3.4	45	0.002
14.	Sindhupalchowk	7	12.6	0.0	12.6	272	0.01
15.	Arghakhanchi	0	0.0	0.0	0.0	0	0.0
16.	Baglung	1	0.3	4.5	4.8	10	0.001
17.	Bhojpur	3	2.2	0.7	2.9	53	0.003
18.	Chitwan	0	0.0	9.2	9.2	0	0.0
19.	Dhankuta	12	11.9	2.0	14	267	0.02
20.	Gulmi	1	0.3	0.5	0.8	20	0.001
21.	Kaski	2	2.5	1.4	3.9	50	0.003
22.	Khotang	1	2.0	5.0	7.0	20	0.001
23.	Lamjung	6	6.4	6.0	12.4	445	0.02
24.	Myagdi	1	0.3	0.0	0.3	10	0.001
25.	Nawalparasi	0	0.0	1.0	1.0	0	0
26.	Palpa	0	0.0	0.5	0.5	0	0

27.	Parbat	5	4.6	0.0	4.6	135	0.007
28.	Sankhuwasabha	0	0.0	0.0	0.0	0	0
29.	Syangja	7	8.0	0.0	8.0	126	0.007
30.	Solukhumbu	6	5.4	2.5	7.9	75	0.004
31.	Tanahun	2	1.1	0.0	1.0	40	0.002
	Total	290	304.0	78.8	382.8	8,295	0.4

Recovery Needs and strategy

Recovery and Reconstruction Strategy based on Building Back Better Approach

The general approach and strategy for recovery and reconstruction is to restore the performance of irrigation sector as quickly as possible with an objective of minimizing economic losses in agriculture sector. Given the limited international experience in designing and building earthquake resilient small-scale irrigation scheme and the absence of local experience and capacity on this subject, it is not realistic to wait for new design/retrofitting guidelines to be prepared before starting rebuilding/repairing the damaged schemes. Developing new design guidelines or retrofitting guidelines for irrigation scheme will require action research consisting of pilot testing the feasibility of various options in the Nepalese context. However, improvement can be brought in building better by enhancing the quality of the construction. As already noted earlier, many damages observed during the field visits, were due to faulty construction particularly the installation of the rubber seals. This can be improved by enhancing DOI/DOLIDAR and water users' associations (WUAs) capacity in construction supervision. Cost for piloting and preparing retrofitting/new design guidelines as well as capacity building in construction supervision was estimated at 10% of the cost to repair/rebuild the damaged irrigation schemes.

Gender aspects: As irrigation is an integral part of agriculture, it is imperative that women become more involved in irrigation and related activities. The post-disaster recovery frameworks should pursue interventions that involve more women. The long term reconstruction activities proposed under irrigation should take into account women needs and priorities by involving them in planning and designing phase of reconstruction activities. Further, consideration of women's WUA's is necessary whose inputs are useful and their capacity also need to be enhanced for management of such irrigation scheme.

There is enough regional and national experience on retrofitting or constructing earthquake resilient administrative building. Based on available guidelines and bibliography, the cost of building earthquake resilient new offices and retrofitting damaged ones was estimated at 20% of the estimated repair/reconstruction cost. Table 3 provides a breakdown of reconstruction and recovery costs.

The strategy for reconstruction and recovery will follow a three-stage approach including:

- (i) Short term recovery activities 2015-16 and before. It is believed that some level of functionality can be restored and maintained during the monsoon in many irrigation schemes through provision of emergency assistance to WUAs. With DOI technical guidance and provision of tools and materials, farmers will be able to clean obstructed canals, repair small and medium cracks, consolidate landslide prone area or even install temporary pipes in most damaged areas. Material may include, PVC pipes, cement bags, high grade plastic sheet, plastic piping, etc. This would allow saving part of the monsoon paddy crop. Precise inventory of the damages must wait after the monsoon as more damages are expected to emerge during that season. Such inventory should be completed in 4 months. Preparation of detailed design and costing should start immediately after and be completed in 5 months. The cost undertaking the

detailed damages inventory and preparing detail design was estimated at 1% of the cost of reconstruction.

- (ii) Medium term reconstruction activities- FY 2016-18. Physical reconstructions should not take more than 1 to 1.3 years as it is planned to contract these directly to WUAs. Reconstruction and retrofitting of office buildings will take up to 2.5 years including 6 months for survey and detailed designs, 8 months for tendering and contract award, and 12 months for construction.
- (iii) Long term reconstruction activities up to - FY 2018-19. These will consist of identifying possible options for building/retrofitting more earthquake resilient small- and medium- scale irrigation schemes from the international literature and particularly from the Indian Himalayan region as the geologic and economic setting might be similar. The experience of the international water management institute with post-earth-quake canal restoration in Pakistan may be a good example. The most promising options will then be tested through pilots in earthquake prone affected hill districts. Based on the results of the pilot irrigation schemes, design guidelines will be updated and retrofitting guidelines will be produced. It is estimated that completion of these tasks should take at least 4 years.

Table 3 Estimated cost of Recovery and Reconstruction

Items	Recovery and Reconstruction cost in Million NPR				Total
	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	
Recovery : inventory and detail design of irrigation schemes and building	38.2				38.2
Reconstruction/Repair Irrigation Schemes	40.0	132.0	132.0		304.0
Reconstruction/Retrofit earthquake Resilient Office Buildings		47.3	47.3		94.6
Piloting/preparing irrigation scheme new Design/retrofitting Guidelines	10	10.0		10.4	30.4
TOTAL	88.2	189.3	179.3	10.4	467.2

Implementation Arrangements

In view of the limited budget required for reconstruction and recovery, it is proposed to absorb the cost of reconstruction through donor funded and government projects currently under implementation including (i) ADB-funded Community Managed Irrigated Agriculture Sector Project (CMIASP) and Water Resource Project Preparation Facility (WRPPF), (ii) World Bank-financed Irrigation and Water Resource Management Project (IWRMP), or (iii) government-financed Medium Irrigation Project (MIP). If required, the geographical scope of these projects may be extended to cover all 31 districts.

Before and during monsoon season, stocks of materials and tools will be purchased and dispatched to needy districts for supporting WUAs-led emergency repairs. Irrigation and DOLIDAR district engineers are to assess the needs and provide technical support to the WUAs. The project management units (PMUs) of IWRMP and CMIASP will procure materials and tools using shopping procurement mode to ensure fast delivery.

PMUs of IWRMP, CMIASP and WRPPF, may recruit individual consultants to undertake necessary detailed damages inventory in all 31 districts and produce detailed designs of severely damaged schemes and office buildings. Under Nepal government procurement rules, works up to a NPR 6,000,000 can be directly contracted to WUAs. Most if not all repair/reconstruction works are not expected to exceed that threshold. In most cases WUAs will be contracted to undertake repair/reconstruction with technical support and guidance of DOI and DOLIDAR engineers. In doing so, substantial amount of time and efforts required for preparing tender document and procuring works through national competitive bidding (NCB) will be saved. Quality control and overall supervision must be ensured by experts employed under the mentioned above projects. Office building repair and reconstruction works will be procured through NCB by CMIASP and IWRMP PMUs.

Similarly, PMU of WRPPF will recruit an individual consultant to (i) explore possible options for retrofitting and enhancing earthquake resilience in DOI design guidelines, (ii) identify and design pilots and (iii) assess suitability and update design guidelines. Most suitable options will be pilot tested in FMIS to be constructed or reconstructed under CMIASP, IWRMP or MIP.

Assessment Methodology

The PDNA irrigation sector assessment was conducted following the terms of reference for the Nepal earthquake: post-disaster needs assessment, May 2015 of the Nepal PDNA Secretariat led by the National Planning Commission, and the guidelines for PDNA prepared jointly by the European Commission, the United Nations Development Group, and the World Bank in 2013. The approach focused on (i) identifying the damages and losses of the 25 April 2015 earthquake and subsequent aftershocks, and (ii) defining and costing a recovery strategy including the cost for rehabilitation and reconstruction of the irrigation infrastructure and office buildings while ensuring resilient recovery based on the “Build Back Better” principle.

The baseline information was collected from secondary sources including the Central Bureau of Statistics supported census survey 2011, and the past reports and records of DOI, DOA and DOLIDAR (Annex 2- reference). The report on the development of database in irrigation development in Nepal—a report prepared by DOI in 2007, and information from district profiles prepared by district development committees (DDC). Field level post-disaster information was collected from the irrigation division offices (IDDs) of DOI and district technical offices (DTO) of DOLIDAR. A standardized checklist was developed for this purpose. It included questions on (i) the scale of damage in the irrigation systems and buildings, (ii) the command area loss due to the unavailability of irrigation water due to the damage, and (iii) the level of functionality of the scheme. Most of the post disaster information was collected on the phone from WUAs members. Based on these descriptions, IDDs engineers prepared cost estimates using the district schedule of rates. It is estimated that this count covers about 70% of the irrigation schemes of the affected districts. About 30% of the irrigated area, including the entire irrigated area of Ramechhap district for which no data could be obtained is not accounted. This gap was taken in consideration when accounting for damages and losses in command area and ISF.

In order to check the reliability of the information, field validation of a few irrigation systems in the highly earthquake-affected district was carried out by ADB, JICA and the World Bank along with the staff of IDD/DOI. The farmers were consulted on the status of the system and their cultivation plan for the next agriculture season. A walkthrough of the system was conducted with detailed observation, measurement of damages, and photographic recording. The operational status of the systems was recorded in terms of being fully or partially operational or completely non-operational. Also, probable cost of repair and rehabilitation in the post-monsoon condition of the already vulnerable and fragile hills was estimated. Based on the field observation and consultation with the farmers, the cost per ha

required for immediate measure to make the system operational, short-term repair and medium- to long-term rehabilitation was estimated.

Results of the field verification surveys were compared with IDD/DTOs data. It was concluded that damages descriptions were usually accurate but costs were over-estimated by an average of 40%. IDD cost estimates were reduced by 40%. However these were also increased twice by 30% to account for (i) the non-reported schemes, and (ii) hidden damages that would lead to further damages during the monsoon.

Reference:

1. Government of Nepal, Central Bureau of Statistics. 2008. Kathmandu.
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COMMERCE AND INDUSTRIES

Summary

The commerce and industry sectors play a key role in the economy, contributing substantially to employment and ensuring access to services and goods. Numerically, the largest share of enterprises in these sectors are microenterprises of which majority are informal and which create a substantial number of jobs, while medium and large scale enterprises provide access to formal sector employment opportunities.

In the affected 14 districts, prior to the earthquake, there were:

- A total of 174,823 microenterprises as assessed through the Household Survey, of which 23,180 are classified under industry and 151,643 under commerce;
- 57,308 cottage and small industries (32,949 in commerce and 24,359 in industry), out of 229,309 cottage and small industries registered with Department of Cottage and Small Industries in the entire country;
- 3919 medium and large industries, or 66 % of the total of 5973 medium and large industries registered in Department of Industry in Nepal;
- 2495 FDI-enterprises, or 78% of total 3200 FDI enterprises registered the entire country. 1775 FDI-enterprise or 55.4% of total are established in Kathmandu district alone;
- An additional further 122,026 commerce firms registered with the Ministry of Commerce and Supplies.

The commerce and industry sectors have been affected by physical damage to premises, equipment, raw materials, and stocks of finished goods; a lack of labour; reduced demand; as well as disruptions in trade flows due to damage to trade-related infrastructure.

Based on the outcomes of the PDNA-research, damages resulting from the earthquake amount to NRP 15,613 million in the 14 affected districts (and NRP 17,408 million in the country overall), while losses are estimated to amount to NRP 16,874 million (and NRP 18,815 million in the country overall).

Beyond immediate effects in terms of damage and losses, the earthquake is likely to generate negative impacts in the sectors overall in terms of business survival and performance, with the exception of the construction subsector, which is likely to be strengthened. Among other impacts, the lower business performance in these sectors is likely to translate into decreased government revenue as well as employment losses, and, as a result thereof, increased individual and household poverty.

Table 1:

	Earthquake Effects		Recovery and Reconstruction Needs	
	Damages (NRP, millions)	Losses (NRP, millions)	Recovery Needs (NRP, millions)	Reconstruction Needs (NRP, millions)
14 Districts	15,613	16,874	6,624	17,955
31 Districts*	17,408	18,815	7,386	20,019

*11.5% is used as a basis for extrapolation from 14 to 31 districts

To mitigate these negative impacts and allow for the sectors to recover and contribute to overall reconstruction efforts, a two-pronged recovery strategy is therefore proposed, comprising, firstly, the immediate assistance for rubble removal and the restoration of the working capital of the affected enterprises, and secondly, assessing their need for and securing their access to supplementary financial

and non-financial services to ensure that the businesses – especially those headed by women and youth - are built back better in terms of management capacity, sustainability and resilience. The estimated cost of implementing the recovery component of the strategy is NRP 6,624 million for 17 districts and NRP 7,386 million for 31 districts, while reconstruction needs amount to NRP 17,955 million for 17 districts and NRP 20,019 million for 31 districts.

Pre-Disaster Context and Baseline

Nepal is a landlocked country situated between China and India, and has been ranked as one of the least developed countries in the world. The Central Bureau of Statistics preliminary result of the National Population Census 2011 indicates that Nepal’s population has grown at 1.4% annually, reaching 26.6 million in the year 2011. The present population is estimated at over 28 million.ⁱ The Nepalese economy is mainly agriculture-based, involving 76.3 percent households as per Nepal Living Standard Survey (NLSS 2011). However, despite the high percentage of people involved, its contribution in Gross Domestic Product (GDP) is only 33 percent. Services make up over half of GDP, with wholesale and retail trade contributing 14.95% to GDP in 2013/14, while the contribution of industry to GDP is declining and stood at 14.4% in 2012/13 as compared to 17.5 in 2001/2.

This section outlines the pre-earthquake situation of the industry and commerce sectors. For the purposes of this report:

- **Industry** refers to manufacturing, construction, minerals and agro-and forest enterprises
- **Commerce** refers to services, businesses and traders.

Prior to the earthquake, the commerce and industries sectors played a key role in providing employment opportunities, as outlined below. A large share of the enterprises – especially micro- and small scale enterprises including household based enterprises - operating in these sectors are informal; it is estimated that only one fifth of all enterprises are formally registered. Location determines the types of activity that enterprises are involved in, with trade being dominant in urban areas and manufacturing in rural areas. While sex-disaggregated data is scant, indications are that women are most heavily represented among micro-entrepreneurs (including as heads of households); their representation among managers and workers of the industries is significantly more limited than among men (in the industrial estates surveyed for this report, women accounted on average for between 10-15% of the workforce).

Box 1: Manufacturing: a key subsector in decline

Manufacturing industries are the backbone of Nepalese industrial sectors and dominate in numbers and generate more employment opportunities than other categories of enterprises in the industry sector. The results of the recent National Census of Manufacturing Establishments survey conducted in 2011/12 by the Central Bureau of Statistics are summarised in Table 2:

Table 2: Summary of Principal Indicators of Manufacturing Industries (all Nepal)

Principal indicators	2011/12
Total number of establishments	4076
Total number of persons engaged	204,360
Total number of employees	194,989
Average number of employee per establishment	48

Source: National Census of Manufacturing Industries 2011/12, Central Bureau of Statistics, June 2014.

Employment promotion is one of the key objectives of promoting industrial enterprises in Nepal. However, as exhibited in the table, employment creation in manufacturing industries is not encouraging. This could be due to different reasons such as focus on capital intensive technologies or practices of hiring employees on a temporary basis.

The contribution of manufacturing industrial sector to GDP has diminished from 9.03 percent of FY 2000/01 to 6.08 in 2013/14.

The pre-earthquake baseline data on the commerce and industries sectors is provided below by size and type of enterprise. It should be noted that both the baseline as well as the assessment of post-disaster effects could not fully capture the situation of informal enterprises, on which data is scant.

Micro-enterprises in both the commerce and industry sectors represent a significant share of the Nepali economy. In terms of employment creation, they employ on average four persons per enterprise. In the 14 affected districts, the number of micro-enterprises surveyed through Household Survey 2011 totals 174,823, of which 23,180 are classified under industry (cottage industries), and 151,643 under commerce (including business, service, and other subsectors such as beauty parlours, computer cafes, or photo studios. PDNA Housing Sector-data (based on Ministry of Home Affairs data) indicates that over 90% of the households with microenterprises may have been destroyed in Sindhupalchok, Gorkha, Dolakha, Nuwakot, and Rasuwa.

Table 3:

District	Industry	Commerce			
	Cottage industry	Businesses	Service	Other	Total Commerce
Bhaktapur	3066	6735	5089	1495	13319
Dhading	2189	4543	4282	439	9264
Dolakha	717	2327	3616	114	6057
Gorkha	464	3055	4236	221	7512
Kathmandu	4062	30428	15230	3684	49342
Kavrepalanchowk	1922	5875	5642	534	12051
Lalitpur	3569	8199	5498	1064	14761
Makawanpur	1332	5485	4213	349	10047
Nuwakot	969	2576	3238	594	6408
Okhaldhunga	858	1217	2206	77	3500
Ramechhap	950	1908	2580	184	4672
Rasuwa	405	535	400	87	1022
Sindhuli	453	1840	2783	237	4860
Sindhupalchowk	2224	4097	4421	310	8828
Total	23180	78820	63434	9389	151643

*Other includes trades such as beauty parlours, rural grocery stores, photo studios, cyber cafes, etc.
Source: Household Survey 2011, CBS

Cottage and Small Industries play pivotal role in income generation and employment promotion in Nepal. Recognizing their contribution to job creation, the government has established cottage and small industry development offices in each district. Based on information provided by Department of Cottage and Small Industries, 229,309 cottage and small industries are registered in different districts

as of FY 2013/14. 57,308 small and cottage industries (32,949 in commerce and 24,359 in industry) are registered in districts classified as highly-affected, which is almost 25% of the total registered enterprises in 75 districts. The types of businesses registered in both the commerce and industries sectors in the 14 affected districts are as follows:

Table 4:

Districts	Manu- facturin g	Constr -uction	Agr i& Forest	Miner al	Service	Only Industry	Comm -erce	Total
Bhaktapur	1615	78	208	0	1208	1901	1208	3109
Dhading	316	163	353	7	1463	839	1463	2302
Dolakha	169	25	196	3	648	393	648	1041
Gorkha	210	22	137	7	751	376	751	1127
Kathmandu	9634	86	523	0	17405	10243	17405	27648
Kavre	633	0	741	0	1643	1374	1643	3017
Lalitpur	5106	43	292	0	4374	5441	4374	9815
Makwanpur	1080	0	283	0	2028	1363	2028	3391
Nuwakot	460	2	430	7	776	899	776	1675
Okhaldhunga	59	0	64	0	346	123	346	469
Ramechhap	187	1	167	9	508	364	508	872
Rasuwa	63	15	116	1	213	195	213	408
Sindhuli	170	2	127	4	599	303	599	902
Sindhupalch ok	157	154	202	32	987	545	987	1532
Total	19859	591	3839	70	32949	24359	32949	57308

Source: Department of Cottage and Small Industries

In terms of numbers, **medium and large industries** are less numerous as compared to cottage and small industries. However, these industries generate more employment in the formal sector. The Department of Industry, which administers medium and large industries, has registered 5973 (4836 excluding tourism) industries up to May 2015, with commerce enterprises (as represented by services) accounting for 1,640 enterprises. It is estimated that 496,730 (448,707 excluding tourism) employment opportunities are created from these industries, with commerce (as represented by services) accounting for 102,775 employment opportunities.

Table 5:

CATEGORY	NO. OF INDUSTRY	TOTAL CAPITAL (NRP, millions)	FIXED CAPITAL (NRP, millions)	WORKING CAPITAL (NRP, millions)	NO. OF EMPLOYEES
AGRO AND FORESTRY	354	16,259	13703.39	2,673	32,115
CONSTRUCTION	46	42,332	41476.76	855	3,062
ENERGY BASED	252	553,073	538336.46	14,737	25,439
MANUFACTURING	2,483	213,225	157753.79	55,942	278,917
MINERAL	61	4,367	3846.99	522	6,399
SERVICE	1,640	111,014	75869.31	35,190	102,775
TOURISM	1,137	70,447	62481.36	7,958	48,023

TOTAL	5,973	1,010,717	893468.06	117,877	496,730
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Source: Ministry of Industry

Out of 5973 total industries registered in Nepal, 3919 (66%) are registered in the 14 affected districts. 91% of the medium to large industries are registered in Kathmandu, Bhaktapur, Lalitpur and Makwanpur.

Table 6:

DISTRICT	NO. OF INDUSTRY	TOTAL CAPITAL (NRP, millions)	FIXED CAPITAL (NRP, millions)	WORKING CAPITAL (NRP, millions)	NO. OF EMPLOYEES
Bhaktapur	144	9,036.89	7,519.46	1,517.42	14,168
Dhading	42	17,915.24	16,854.70	1,060.54	2,992
Dolakha	28	83,751.80	83,238.14	513.66	5,931
Gorkha	22	3,857.05	3,744.09	112.96	1,563
Kathmandu	2,734	158,901.09	122,595.71	36,350.08	210,554
Kavre	129	6,672.58	5,314.71	1,357.86	10,890
Lalitpur	625	31,393.96	21,503.66	9,998.30	37,167
Makwanpur	92	17,119.41	13,969.34	3,150.08	8,892
Nuwakot	34	11,225.20	10,871.07	355.13	1,648
Okhaldhunga	1	1,214.00	1,200.00	14	50
Ramechhap	10	21,002.92	20,156.74	846.19	683
Rasuwa	17	39,709.81	37,289.39	2,420.43	2,258
Sindhuli	2	203.84	194.85	8.99	195
Sindhupalchok	39	48,462.45	47,148.43	1,314.03	3,354
TOTAL	3,919	450,466	391,600	59,020	300,345

Source: Ministry of Industry

Foreign Direct Investment (FDI) enterprises can be found in both the industry and commerce sector across all size groups (small, medium and large) with the exception of microenterprises. Altogether 3200 FDI-enterprises are currently (as of April 2015) registered with the Department of Industry, generating 202,670 jobs, out of which 2495 or 78% of total FDI are established in the 14 quake-affected districts. Of these, 1775 industries are registered in Kathmandu district only.

In addition to the commerce sector establishments registered with the Department of Industries, above, in terms of **commerce enterprises registered with the Ministry of Commerce and Supplies**, there are a further 122,026 commerce firms in the 14 quake-affected districts, representing an investment of NRP 56,096,350,000.

Table 7:

Firms Registered with the Ministry of Commerce and Supplies (2013/14)			
SN	District	Registered commercial firms	Investment (NRP)
1	Gorkha	1266	365,730,000
2	Dhading	2450	380,000,000
3	Nuwakot	2011	355,500,000
4	Rasuwa	298	118,200,000

5,6,7	Kathamdu, Lalitpur, Bhaktapur	102142	51,000,000,000
8	Makwanpur	5063	1,500,000,000
9	Dolakha	1788	1,470,000,000
10	Kavre	3026	
11	Sindupalchok	1841	262,320,000
12	Sindhuli	235	173,100,000
13	Ramechhap	843	261,500,000
14	Okhaldhunga	1063	210,000,000
Total		122026	56,096,350,000

Source: Ministry of Commerce and Supplies

Post-Disaster Context

In the affected districts, the earthquake has disrupted the functioning of enterprises in a variety of ways, including:

- **Damage to premises, equipment and stocks of raw materials and finished goods:** In the case of a large share of household based micro-enterprises, premises have suffered significant damage or have collapsed completely. In the case of medium and large industries, damage to property is less extensive, but in many cases even where buildings are intact, cracks following the quake and aftershocks mean that parts or all of the building must be reconstructed. Damage to property is a cause of disruptions or stoppages of production. In addition to damage to premises, damage to stocks of raw materials or finished goods has caused further disruption in production and sales losses.
- **Lack of labour:** Generally enterprises are facing a lack of labour due to the earthquake. A large share of the migrant workers from India returned to India after the quake, and, within Nepal, the same phenomenon occurred: workers from other districts left the quake-affected districts after the earthquake out of fear, while a reverse trend of workers leaving their workplaces in non-affected areas to help their families in quake-affected areas is also taking place. In addition to this phenomenon of temporary out-migration, the absence of workers who are originally from the quake-affected districts and who have not left the district itself, but have not returned to their workplaces due to fear of working in buildings which they consider unsafe, has led to decreases in production capacity. For instance, the Garment Association of Nepal estimates that to date, 90% of workers have not returned to work after the earthquake.ⁱⁱ ⁶ The lack of demand for labour translates into increases in workers' rates: in the construction sector, for example, the daily rate of workers has gone up by 100%, from RS 500 before the quake to Rs 1000 at present.ⁱⁱⁱ
- **Reduced demand:** Demand in general has fallen for a number of reasons, including lower domestic consumption due to lower purchasing power of consumers (due to property damage and other losses), a phenomenon of guilt leading to a reduced desire to purchase non-essential goods and services, and a drastic reduction in tourist arrivals (affecting enterprises beyond the tourism sector. It should be noted, however, that it is expected that demand for certain products, such as those related to construction, will increase due to the earthquake.

⁶ It should be noted, however, that there is also an inverse trend occurring at the same time, albeit on a more restricted scale: in some cases where production has been interrupted because of infrastructure damage or reduced demand, workers who would be willing to work have in been either given leave (with 50-100% of pay, in the case of hired staff), or asked not to come to work (in the case of day labourers).

- **Damage to trade-related infrastructure:** roads, bridges, customs points have been severely affected, with significant implications for both merchandise and services trade.

Box 2: Field visit findings – Examples of effects in Makwanpur, Chitwan and Dhading districts*

In Makwanpur district:

- Enterprises and industries were generally closed for 20 days after the quake. Now some small enterprises have started producing their goods in tents;
- In the industrial estate of Makwanpur, a company involved in manhole cover production, for instance, was fully closed for two weeks and is currently operating at 30% capacity. A tent has been set up as the main production building is cracked and needs to be demolished and reconstructed.

In Chitwan district:

- Tourist arrivals have dropped to less than 50 per day as compared to 1000-1500 per day before earthquake. While there are no damages in tourist related businesses, this reduced demand has a large negative impact nevertheless, affecting some 150 hotels, 50 restaurants, and 3500 workers (many of whom are receiving 50% of their salaries and are on leave);
- Poultry Firms have did not experience physical damages but losses due to low demand and decreased prices of chicks, eggs and meat (e.g. 4 RS decrease per egg);
- In brick industries, there are physical damages of chimneys and raw materials. More than 10,000 workers in the district were involved on daily wage basis; now production has been reduced by 50% and a large share of workers have returned to their homes.

In Dhading district:

- The district is heavily affected and in particular many micro- and small enterprises have suffered significant damage and losses;
- As an example, one of the furniture makers interviewed had lost glass worth 4 lakh and formica worth 2 lakh. The 20 workers employed by the business had left and not returned to work since the quake.
- Public and private business support organizations and agencies such as the District Cottage and Small Industries Office have also been damaged and are operating out of tents, with limited capacity to serve enterprises in the district.

**The above highlights of findings are based on statements by key informants. As such, they cannot be considered to be accurate or comprehensive reflections of effects and trends in the districts; they are meant to serve as example testimonies only.*

Damages and losses suffered by the commerce and industry sectors overall are described in Section 4. Because of the above factors, it is estimated (based on assessments by private sector stakeholders) that all enterprises in the industry and commerce sectors in all districts will on average lose 100% of their normal revenue for two months, 75% for the third month, 50% for the fourth month and 25 % for the fifth month, with revenue being restored to normal levels after 6 months, if support is provided for responding to damage.

While financial losses are larger for larger industries, the almost complete destruction of the premises of smaller businesses (especially household-based microbusinesses) combined with their lower capacity to deal with such shocks (lower reserve capital availability, lack of insurance, etc.) means that that MSMEs are disproportionately affected and require special attention in recovery efforts (see strategy section).

It should be noted that while the above effects are most significant in the affected districts, and while non-affected districts do not face the challenge of physical damage, limitations in the availability of labour and reduced demand has negative effects even in the non-affected districts.

Damage and Loss

Based on PDNA research data, the damage for industries and commerce sectors in 14 districts amount to NPR 15,611 million (US\$156.11 million), while losses amount to NPR 16,873 million as detailed in the tables below:

	Damage (NPR million)	Loss (NPR million)	Total Effects (NPR million)
Industries	7,527	9,754	17,281
Commerce	8,084	7,119	15,203
Total	15,611	16,873	32,484

Commerce	Micro		Cottage/Small		Medium & Large		District wise total (NPR)	
	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss
Bhaktapur	414,450,960	321,636,000	8,743,360	2,122,571	6,700,947	36,128,050	429,895,267	359,886,621
Dhading	590,602,320	266,325,000	173,327,933	899,697	3,520,902	29,576,042	767,451,155	296,800,738
Dolakha	459,690,000	146,265,000	45,932,934	149,703	70,950	218,750	505,693,884	146,633,453
Gorkha	495,993,960	168,441,000	74,945,516	319,117	351,087	3,385,417	571,290,563	172,145,534
Kathmandu	748,730,400	2,098,714,000	1,302,913,742	24,637,266	122,619,222	1,920,690,042	2,174,263,364	4,044,041,307
Kavrepalanchowk	832,311,480	277,160,000	88,459,558	321,846	3,352,635	14,887,500	924,123,673	292,369,346
Lalitpur	224,070,000	439,652,500	62,128,438	1,625,778	42,800,670	476,770,592	328,999,108	918,048,870
Makawanpur	282,148,680	271,519,000	7,259,204	1,677,948	1,559,316	18,102,050	290,967,200	291,298,998
Nuwakot	486,354,000	143,695,500	95,803,973	129,648	633,600	2,620,583	582,791,573	146,445,731
Okhaldhunga	106,260,000	78,487,500	29,615,692	1,310,269	-	-	135,875,692	79,797,769
Ramechhap	322,642,320	104,754,000	58,699,510	128,319	-	-	381,341,830	104,882,319
Rasuwa	74,448,000	22,912,500	18,191,785	98,863	-	-	92,639,785	23,011,363
Sindhuli	180,748,260	108,985,500	29,471,929	283,540	-	-	210,220,189	109,269,040
Sindhupalchowk	603,028,800	121,824,169	78,203,362	365,738	8,019,000	12,500,000	689,251,162	134,689,907
Total Nepalese Rupees	5,821,479,180	4,570,371,669	2,073,696,935	34,070,305	189,628,329	2,514,879,025	8,084,804,444	7,119,320,999

Industry	Micro		Cottage/Small		Medium & Large		District wise total (NPR)	
	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss
Bhaktapur	144,525,000	308,437,500	41,694,387	16,772,062	71,160,500	425,950,000	257,379,887	751,159,562
Dhading	211,428,000	209,750,000	301,203,527	2,575,563	70,191,500	285,989,583	582,823,027	498,315,147
Dolakha	82,400,000	72,100,000	84,417,237	456,430	4,285,000	34,416,667	171,102,237	106,973,097
Gorkha	46,371,000	43,306,250	113,704,489	791,166	3,300,000	17,191,146	163,375,489	61,288,562
Kathmandu	93,420,000	1,080,168,750	2,323,566,083	72,484,770	1,292,632,000	2,262,461,354	3,709,618,083	3,415,114,874
Kavrepalanchowk	201,110,000	460,416,667	224,161,983	1,346,057	63,912,250	479,276,042	489,184,233	941,038,766
Lalitpur	82,080,000	506,160,000	234,195,521	10,130,542	156,831,500	1,260,065,833	473,107,021	1,776,356,376
Makawanpur	56,647,000	89,946,250	14,784,137	5,642,626	285,267,000	1,309,356,354	356,698,137	1,404,945,230
Nuwakot	111,400,000	90,512,500	336,327,015	750,112	6,638,250	27,489,583	454,365,265	118,752,196
Okhaldhunga	39,440,000	80,112,500	31,903,333	2,328,188	-	-	71,343,333	82,440,688
Ramechhap	99,372,000	88,725,000	127,453,583	460,473	432,500	186,502,604	227,258,083	275,688,077
Rasuwa	44,640,000	37,781,250	50,467,733	450,372	30,790,000	89,645,833	125,897,733	127,877,456
Sindhuli	30,576,000	50,700,000	45,175,991	722,963	192,500	880,208	75,944,491	52,303,172
Sindhupalchowk	230,130,000	127,850,213	130,854,813	1,015,746	8,727,500	13,843,750	369,712,313	142,709,709
Total Nepalese Rupees	1,473,539,000	3,245,966,880	4,059,909,833	115,927,073	1,994,360,500	6,393,068,958	7,527,809,333	9,754,962,911

Extrapolating with a multiplier of 11.5%, the total damage for both sectors combined for the country overall amount to NRP 17,408 million, while damages amount to NRP 18,815 million.

Disaster Effects and Impacts

While an accurate estimate of impact is difficult to obtain given limitations in the baseline and post-earthquake data that could be obtained and in the absence of a detailed survey, this section outlines impacts that have a relatively high likelihood of occurring, calling for a recovery strategy that mitigates negative impacts and supports the sector in its recovery.

It is expected that the damages and losses experienced by enterprises in the commerce and industry sectors will lead to a number of changes within the sectors themselves, including:

- The possible collapse of a share of the most hard hit micro-enterprises;

- Reduced levels of business activity, performance and profit in a number of sub-sectors, including agribusiness and commerce and trade ; given the strong backward and forward linkages in agro-processing, the impact on the supply of intermediate as well as final goods and opportunities for SMEs will be negative;
- The strengthening of a limited number of sub-sectors linked to reconstruction, such as construction materials.

As most goods are produced (and consumed) in Terai and Kathmandu Valley, the reduced demand for goods and services in Kathmandu Valley and affected districts has led to slowdown in production as well as shortage of labour in Terai; unless fast recovery activities in Kathmandu Valley and major district towns are undertaken, overall industrial demand will continue to be subdued till the medium-term.

While the disaster has created a short-term lack of labour (meaning demand for labour is currently high), and while the disaster will boost of the construction sector, leading to new employment opportunities, overall, the net impact on employment in the medium and long term is likely to be negative due to the challenges that enterprises - especially small scale enterprises and those run by women and youth who have more limited assets and lower disaster resilience - in these sectors are facing and will continue to face for some time. The possible employment losses, in turn, could translate into reductions in individual and household income levels and increases in poverty and vulnerability levels.

The negative impact that the disaster will have on the survival and performance of enterprises in these sectors is also likely to lead to a reduction of government revenue due to a shrinkage in corporate tax contributions. This, in turn, will negatively affect the Governments capacity to provide much-needed social services.

In terms of access to goods, the earthquake and its negative impact on enterprises will most likely also lead to a reduction in supplies, thus increase in imports, as well as increased prices for consumers. Depending on the extent to which imports exceed exports, balance of payments challenges could also emerge.

A short- and medium term liquidity crunch is likely to occur in the financial sector, as requests for loans from affected enterprises will increase. Investment overall is likely to decrease, and the stock exchange may be negatively affected as a result.

	Short-term (FY2015 /16)	Medium-term (FY2016/17 -2017-18)	Long-term (FY2018/19-2019/20)
Sector restructuring with a collapse of a share of micro-enterprises and emergence of new ones in growing sub-sectors (e.g. construction)		X	X
Growth of investment in infrastructure and reconstruction, leading to increased demand for construction materials and increased demand for labour in these sectors	X	X	X
Negative impact on agribusiness due to reduced agricultural production	X	X	
Short-to-medium term shrinkage of commerce and trade in the severely affected districts	X	X	

Employment opportunity losses, corresponding household income reductions and increases in household poverty levels	X	X	X
Increased vulnerability of already vulnerable groups (women, youth, minorities)	X	X	X
Decreases in government revenue from commerce and industry-sector tax contributing enterprises	X	X	
Reduction in supplies	X	X	
Price rises for consumers	X	X	
Increased imports	X	X	
Balance of payments challenges		X	
Liquidity crunch in banks due to requests for loans from enterprises	X	X	
Decrease in investment overall	X	X	X
Negative impact on stock exchange	X	X	X

To mitigate the risks in terms of impact outlined above, it is critical that needs-based support is channeled to the sectors and enterprises within them in both the immediate future as well as medium- and long term.

Recovery Needs and Strategy

Recovery and Reconstruction Initiatives and Costs

Policy Measures:

Part of the response to the impacts of the earthquake and needs of the enterprises that make up the sector relates to national policy-level issues.

During the PDNA consultation process, stakeholders from the Commerce, Industry and Supplies sector recommended the following policy measures, some of which could be integrated into the sector strategy following discussion and validation by Government and other stakeholders:

- Increased government budget to the sector for recovery and revival, in order to cover direct losses and to channel additional practical assistance to MSMEs, in particular in high-priority sectors such as construction and for target groups with specific needs, such as returning migrant workers, youth and women (see section below)
- Development of an overall industrial vision addressing import-substitution and export growth
- Downward adjustment of interest rates to avoid depression and of cash reserve ratio rates for ensuring sufficient liquidity
- Temporary relaxation of rules regarding provisioning by the Central Bank to allow for rescheduling of loans
- Reductions in corporate tax and VAT
- Subsidies and reductions in customs duties on materials that are key for reconstruction
- Implementation of the national employment policy to address the lack of availability of skilled labour and weak links between the supply and demand of labour; possible temporary measures (e.g. wage subsidies) for securing labour; and enactment of the revised draft Labour Act for securing harmonious and enabling industrial relations and to stimulate the attraction of workers to the domestic industrial sector
- Infrastructure-related measures (e.g. road construction for linkages to neighboring countries) and trade financing mechanisms to boost trade.

Practical assistance to affected MSMEs:

Larger industries will most likely be able to cope with the effects of the disaster thanks to the policy measures mentioned above, in particular loan rescheduling provisions and subsidies for imports to replace damaged equipment and raw materials.

In addition to the policy-level measures outlined above, MSMEs – more affected by the earthquake and with a lower capacity to respond as compared to the larger industries – in the sector will require targeted practical assistance both in the immediate and longer term to enable them to cope with losses and rebound; contribute to overall recovery and reconstruction efforts; and improve their performance and long-term resilience.

As detailed in the post-disaster situational assessment, MSMEs are facing a range of challenges following the earthquake, including:

- Damage to premises, stock and equipment, resulting in interruptions or reductions of production;
- A short-term lack of labour due to worker absenteeism due to fear after the quakes and given property damage, and long-term limitations on the availability of skilled workers;
- Reduced demand, due to lower domestic spending and reductions in flows of tourists, resulting in reduced sales and income.

These challenges are compounded by pre-existing limitations such as the quality of human capital, both in terms of managers and workers.

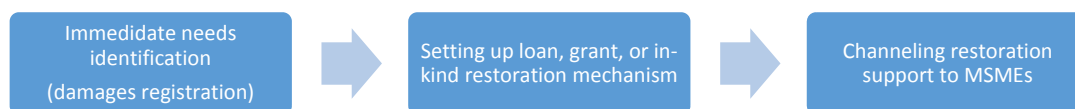
The practical assistance component of the proposed strategy comprises 1) immediate support for demolition/rubble removal and restoration of the affected MSMEs' working capital and 2) the provision of additional needs-based support for accessing finance and markets, upgrading the technical and business management skills of entrepreneurs and their employees, and other measures as required.

While the nature and extent of damages and losses can be roughly estimated for the sector overall as well as for specific geographical areas and sub-groups of enterprises within it, there is a need for more detailed information on the structure of specific sub-sectors and value chains, business development service markets and the supply and demand of labour. The strategy will thus be based on preliminary analyses on these factors, which in turn will inform intervention design.

The strategy component will be built on the following pillars:

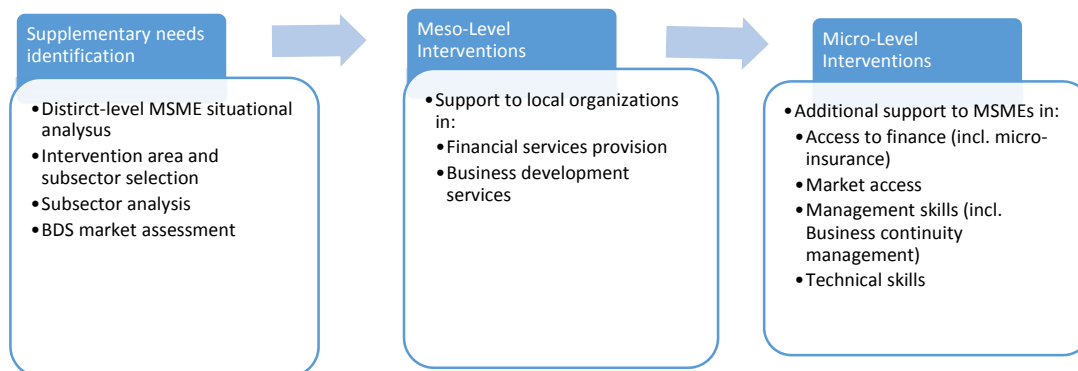
- Immediate support for responding to challenges arising from the earthquake for earthquake-affected MSMEs, including demolition and rubble removal from premises and restoration of working capital
- Identification of additional needs (e.g. through area-based district-level MSME studies, subsector or value chain analyses) for building back better enterprises in terms of sustainability and resilience, management capacity, working conditions practices and productivity and contributions to green and socially inclusive growth;
- Capacity building of service providers, such as micro-finance organizations or business development service providers, to provide the required services;
- Additional service delivery by service providers to earthquake-affected MSMEs in areas such as skills upgrading (e.g. technical or managerial training, including in business continuity management), market access (e.g. business linkages services), and financial services (e.g. micro-insurance).

Immediate support for demolition/rubble removal and restoration of working capital:



+

Additional support for building back better enterprises:



While districts themselves should identify their own priorities, it is recommended that districts select a limited number of subsectors or value chains to work with, based on potential impact, and focus on these. Such sectors may include building construction, for instance. The potential of MSMEs in building construction has been harnessed in other contexts, such as Haiti where MSMEs were supported to play a key role in post-earthquake reconstruction efforts while providing much needed employment opportunities.

Special attention should be given to women, youth and returning migrant workers in the MSME sector both for the assessment of needs and and the channeling financial and technical assistance. For the latter, it is proposed that at least 65% of the proposed budget of the strategy be allocated to activities targeting these groups.

7. Recovery and Reconstruction Initiatives and Costs

Overall, recovery needs for 31 districts for both sectors are estimated to amount to NRP 7,386 million, while the same estimate for reconstruction needs is NRP 20,019 million.

	Recovery Needs (NRP, millions)	Reconstruction Needs (NRP, millions)
14 Districts	6,624	17,955
31 Districts*	7,386	20,019

*11.5% is used as a basis for extrapolation from 14 to 31 districts

The individual recovery and reconstruction activities proposed in the strategy, their costs, and proposed implementation timing are detailed for the 14 districts in the tables below for both the commerce and industry sectors separately.

INDUSTRY	Fiscal years (NPR in million)					Total
	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20	
Recovery needs (14 districts)						
Demolition and rubble removal costs	181	45	0	0	0	226
Working capital	1582	852	0	0	0	2433
Additional services needs assessment (value chain analysis)	2	5	1	0	0	7

Capacity building for providers of non-financial (e.g. training in management, including business continuity management) and financial services (e.g. microinsurance schemes)	10	18	12	0	0	39.2
Delivery of additional non-financial and financial services to final beneficiaries	43	86	86	43	29	288.2
Establishment of institutional mechanisms for channelling support	7	2	1	1	1	11.2
Reconstruction needs (14 districts)						
Reconstruction of premises and replacement of assets (31 districts)	2155	1436	0	0	0	3591

	Fiscal years (NPR in million)					
	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20	Total
COMMERCE						
Recovery needs (14 districts)						
Demolition and rubble removal costs	194	49	0	0	0	243
Working capital	1296	698	0	0	0	1994
Additional services needs assessment (value chain analysis)	7	18	3	0	0	28
Capacity building for providers of non-financial (e.g. training in management, including business continuity management) and financial services (e.g. microinsurance schemes)	39	71	47	0	0	157
Delivery of additional non-financial and financial services to final beneficiaries	173	346	346	173	115	1,153
Establishment of institutional mechanisms for channelling support	29	7	4	3	2	45
Reconstruction needs (14 districts)						
Reconstruction of premises and replacement of assets	8618	5745				14364

Implementation Arrangements

It is proposed that the recovery and reconstruction strategy will be implemented through the following implementation strategy:

- The **Ministry of Commerce and Supplies** and **Ministry of Industry** will be responsible for overall coordination and monitoring.
- At district level, **“Business Recovery Centres” (BRC)** composed of public and private stakeholders will be set up. The BRCs will identify district-level needs and priorities, channel direct recovery assistance to earthquake-affected MSMEs through a loan, grant, or in-kind restoration mechanism, coordinate capacity building of local business development service providers and connect MSMEs to service providers.
- Local **business service providers** (organizations such as district chambers of commerce, financial institutions, NGOs or others) will be capacitated to provide additional services to



earthquake-affected MSMEs based on their needs, in areas such as access to finance, market access or technical or managerial skills development.

The practical assistance component of the strategy will target the 14 affected districts as a priority, but may gradually be expanded to cover all districts.

Recovery assistance (working capital restoration)

Assessment Methodology

The methodology used for assessing the impact of the earthquake on the sector and developing recommendations included:

- The establishment of a baseline based on documentation and secondary data obtained from the Ministry of Industry (MoI), and Ministry of Commerce and Supplies (MoCS) and the private sector stakeholders (CNI, FNCCI, FNCSI, local Chambers of Commerce and Industries and local officials).
- The calculation of post-earthquake damage and loss data based on the baselines provide from different sources, including MoI, MoCS, various Departments, Central Bureau of Statistics, NPC, and others.
- A survey of four industrial estates located at Balaju, Patan, Bhaktapur and Hetauda were carried out to assess damage to structures and plants.
- Field visits to selected districts to validate quantitative data provided by sector stakeholders and to gather additional qualitative data: field visits were conducted in Makwanpur, Chitwan and Dhading districts and consisted of interactions with district level Chamber of Commerce and Industries, District Cottage and Small Industries Office, Industrial Area Development Management Office, District Administration Office, producer associations and other stakeholders.
- Stakeholder meetings in Kathmandu with the relevant ministries and departments and industry associations (e.g. CNI, FNCCI and FNCSI) to obtain their qualitative overall assessments of damage and loss and of their recommendations for recovery.

Annex 1: Definitions of Enterprises by size

Definitions extracted from: Government of Nepal, Ministry of Industry: *Industrial Policy 2010*.

- **Microenterprises:** a micro enterprise means the enterprise having met the following conditions: Where investment is up to two hundred thousand rupees as fixed capital except the house or land; where the entrepreneur himself/herself engaged in management; where there are up to nine workers including the entrepreneur; where the annual financial transaction is less than two million rupees; and if an instrument with engine is used, the electric motor or other oil engine capacity has to be less than ten kilowatt
- **Traditional and other cottage industries:** An industrial enterprise that uses traditional skills and technology, the instruments and machinery based on local raw materials and associated with art and culture of the country and that uses electric power up to 10 kilowatts as referred to in schedule-6
- **Small scale industries:** An industrial enterprise other than those of micro enterprises and traditional and other cottage industries having the fixed assets of up to 50 million rupees
- **Medium scale industries:** An industrial enterprise having the fixed assets more than fifty million to one hundred fifty million rupees.
- **Large scale industries:** An industrial enterprise having the fixed assets of more than one hundred fifty million rupees.

TOURISM

Summary

The tourism sector has sustained significant physical damages in the affected districts but more importantly is expected to suffer major economic losses over the next 2-3 years as a result of the earthquake. It is important to note that the overall impact of the earthquake on the tourism sector goes beyond the 14 affected districts and affected well-known tourism destinations like Chitwan and Pokhara in terms of sharp fall in tourists. The negative repercussions of the disaster are likely to mean a reduced number of tourist arrivals over the next 2-3 years, reduction in tourist spend per day from \$43 to \$35 as per industry sources which will significantly affect the tourism revenue. When comparing to other nations which have experienced a similar disaster they have generally taken several years to recover fully with regards to tourist arrivals.

It is estimated that the overall impact to the Nepali tourism industry will be a reduction of about 40 per cent on average over the next 12 months, and a 20 per cent reduction in following 12 – 24 months.

Despite the overall estimated damages and losses, the tourism sector and the industry remains resilient and optimistic to turn-around in the medium to long terms. With concerted efforts from all relevant stakeholders and support from the government, the sector is poised to 'Build Back Better'. However, these efforts needs to target the global tourism market and convince (potential) visitors to come to Nepal as well as provide assistance to the affected rural and urban tourism entrepreneurs. The recovery strategy should be carried out in a phased manner with actionable items as mentioned in this report.

Pre-Disaster Context and Baseline

Impact of tourism on the Gross Domestic Product

The exact contribution of tourism to the GDP is not available due to absence of tourism satellite account. Hotels and Restaurants⁷ may contribute about 75% to 80% of the tourism sector's revenue to GDP (including domestic tourism). Since 'Hotels and Restaurants' contributed about 1.9% to GDP in 2012 (WTTC 2015 mentions direct contribution to GDP of 4.3% in 2014), international tourism has contributed 2.0 % to GDP. This is more or less similar to estimates of other developing countries like Nepal. However, domestic tourism is not yet accounted for and no national survey to understand its contribution had been carried out so far. Adding the contribution of the domestic tourism and that of other sub-sectors to the tourism sector, which are not accounted for and aggregated to 'Hotels and Restaurants', tourism's total contribution to GDP according to WTTC 2015 report in 2014 is 8.9% of GDP. The tourism sector constitutes an important component of the Nepali economy with a steadily increasing number of visitors. In 2013 Nepal received nearly 800,000 tourists.

Employment generation

Tourism Employment Survey, 2014 indicates that approximately 138,148 persons were engaged in the tourism sector (MoCTCA, 2014)⁸. Based on the NLSS 2011, more women than men are engaged in the tourism sector. Analysis of the hotel and restaurant survey indicates that 52% of the people employed

⁷ Central Bureau of Statistics (CBS) estimates

⁸ There is a caveat that the survey was only based on 10 districts and some 193 enterprises and therefore the estimate is associated with some uncertainty.

in this sector are women. The WTTC 2015 report, based on pre-earthquake data, indicated that in 2014 Travel & Tourism in Nepal directly supported 487,500 jobs (3.5% of total employment). This was expected to rise by 4.0% in 2015 and rise by 3.0% pa to 681,000 jobs (3.9% of total employment) in 2025. Following the earthquake, these numbers will need to be revisited.

Foreign exchange earnings from tourism compared to the national economy and revenue elasticity

At the macro-economic level, the tourism is the third largest economic sector of foreign exchange earnings after remittances and the export of goods and services. Currently, revenue from tourism accounts for about 38% of the contribution of merchandise export, 20% of the total value of the goods and non-factor services, 5% of total foreign exchange earnings and about 1.8 % of the GDP. Please refer to Table 5 under Annex for yearly data on foreign exchange earnings from tourism.

Fiscal aspects of tourism

In 2012, the directly visible government revenue from the sector was NRs 8,832 million (Table 6 under Annex), and represented about 3.6% of the total government revenue. This however excludes direct corporate and various other taxes, which the tourism sector pays through industries.

Tourism establishments in Nepal

The majority of registered hotels are located in the two main tourist hubs of the country Kathmandu and Pokhara. Hotels range from tourist standard to 5-star standard in these locations. Please refer to Table 4 under Annex for more details. There are 160 registered homestays around Nepal but a significant number of homestays around the country are not yet registered with the Government. The total number of non-MoCTCA registered properties was 2,604 that provided 35,789 tourist rooms and 69,040 tourist beds in the 15 major and five minor tourism sites of Nepal⁹. Most of these additional lodgings are homestays, teahouse lodges and monastery accommodations.

The tourism statistics 2013 shows 2,336 registered travel agencies and tour operators, 1,665 trekking agencies and 56 rafting agencies. Other tourism related firms and services providers are listed under Annex.

Tourism Trend

Nepal's annual arrivals have had a typical seasonality influence with arrivals peaking during summer season (March-May) and winter (Sep-Nov), ranging from around 80,000-90,000 in March, October and November to around 50,000 during May, June and July. The growth of Chinese market however was closing the trend of off-seasonality in Nepal with arrivals filling in during the lean seasons for long-haul (North American and Western European) markets and short-haul market (India).

The two main volume markets India and China have shown encouraging trend in arrivals to Nepal. In the past 5 years, the average annual growth rate of Chinese and Indian visitors have been 26% and 14% respectively. The growth from the rest of the world has been about 8% a year. As visitors' share from India and China accounts to about 36%, the overall growth of arrivals has been pulled up to 10% a year over the past 5 years.

⁹ Tourist Accommodation Facilities in the major Tourist Areas of Nepal, 2011, NTB

Global comparison

With total tourism receipts of NRs. 42,900 million in 2013, Nepal ranks at 23rd position among Asia and Pacific tourism economies¹⁰. Nepal's tourism yield appears low in comparison with most global and Asian destinations. When comparing Nepal with other regions and countries in Asia:

- Nepal attracts 0.1% of global international visitors' arrival and 5.7% of arrivals to South Asia.
- International visitors' receipts per arrival of NRs. 53,800 in 2013 which is less than half of the global average, a third of Bhutan and Thailand and around a quarter of receipts per arrival in India. A total of 10.42 million tourist days were spent resulting to the average length of stay of 12.51 nights per tourist, (MoCTCA, 2013). This leads to a daily spend per visitor of only NRs. 4,280.

Damage and Loss

The 7.9 Richter scale earthquake that rattled Nepal has made a major impact on dynamics of various economic sector of the country, let alone tourism. The immediate impact in the sector is as follows:

- Tourist numbers are down by about 90% between May-July 2015
- About 16 billion NRs worth of hotel properties are fully or partially damaged in the affected areas
- Domestic airline operators reported total monthly income losses of about 400 million NRs for the month following the earthquake.
- Tourist accommodations of different types were either fully or partially damaged in the Langtang, Gorkha-Manaslu, Khumbu, Charikot, Kalinchok, Jiri, Rolwaling areas and Dhading district and few hotels in the Kathmandu valley (including Nagarkot) were damaged completely with majority having minor cracks.
- A portion of key tourism monuments and heritage attractions have turned into rubbles
- Portion of tourism infrastructure are destroyed, e.g., 150 kilometres of trekking trails have significant damages and 200 kilometres requires maintenance and repair which also impedes access to rural areas
- A further implication is on the jobs and the revenue loss that the sector has provided to the country over the years
- The sheer amount of recovery and rebuilding destination and visitor's confidence stands at billions of Nepali Rupees.

Infrastructure & assets:

Tourism sector has sustained a damage of approximately NRs. 18,862.8 million, majority of which (86%) comes from hotel accommodations and home stays (9%). Trails in the current form have sustained a damage of about NRs. 426.1 million.

Particulars	NRs. (in millions)
Hotels, other accommodations (source: DoT/HAN/TAAN)	16,294.5
Homestays (report under Housing sector report)	1,720.0

¹⁰ UNWTO, 2013: *World Tourism Barometer, Volume 12 April 2013*, Annexure

Eco-Lodges in Conservation Areas (source: NTNC)	415.3
Trekking Trails (source: TAAN)	426.1
Tour Operators (Source: NATO)	6.9
Total	18,862.81

Effects on production of goods and services and access to services

The decreased tourism arrivals will affect the tourist spending and subsequently lead to a revenue loss of NRs. 21,300 million for May to December period of 2015. This is estimated to decrease by about half to NRs. 12,800 million in the next six months period. Similarly there are losses to series of revenues streams like permit fees (National Parks), tourist service fees (NTB), taxation revenue (government) etc.

The following table indicates what this means to the specific operations in the country.

Impact on tourism sub-sector revenues	May - Dec 2015 NRs. (in millions)	Jan - Jun 2016 NRs. (in millions)	Jul 2016 - Jun 2017 NRs. (in millions)
Domestic airlines loss of revenue (source: AOAN)	2,000.0	1,280.0	1,440.0
Revenue loss - Tour Operators	1,851.7	1,228.9	1,843.4
Income loss – Trekking	5,711.3	0.0	0.0
Income loss - Restaurants in Kathmandu only	11.1	0.0	0.0

Effects on sector governance functions and systems

The decline in public sector revenue flows from tourism will affect the promotion, maintenance and upkeep of the tourism sector. There will be increased costs to respond to market slackness both to NTB and for the industry as a whole. The NRs. 400 million annual marketing spend of NTB in normal situations and approximate marketing and promotion spend of private sector NRs. 1,800 million (aggregated total) may have to be increased multiple fold to recover and revive the market.

The information provision function at the regional and district level will require strengthening through well-managed information centres which will provide up to date information to tourists related to weather or information on trekking trails. Some of these functions can be carried out jointly with the private sector

Increased risks and vulnerabilities

After the earthquake, Nepal must now be prepared for secondary disasters like rock fall, slope failures, glacial lake outburst floods and avalanches, particularly during the upcoming monsoon season. Safety has now surfaced as critical issues on destination image. This may also be applicable for safety hazards arising from visiting monuments/ buildings at heritage sites.

There is an increased need for invest in early warning system and safe tourist experiences for all market segment which will have ideational costs over and above the reconstruction costs calculated.

Demand side

The arrivals numbers to Nepal have drastically declined by 90% compared to May of last year. It is expected that this downturn will remain the trend for next couple of months. Industry expects visitor numbers will stay at 40% compared to last year in the coming autumn (peak) season of September - November. Whilst new travel insurance products are widely available, the majority exclude claims made where a government had advised against travel to Nepal and / or claims directly or indirectly relating to the reason the government advised against travel to that country i.e. claims related to the earthquake(s).

The FCO advice “If you have no pressing need to remain and can leave Nepal safely then you should do so” is the major constraint for adventure travel insurance provider. It is unlikely that this will change during the Monsoon season which influences the ‘booking’ season severally.

Summary table of estimates of Damage and Loss

	Value of Damage (NRs million)	Value of Total Flow changes (NRs million)	Time distribution of revenue losses	
			2015 – 2016 (NRs million)	2016 – 2017 (NRs million)
Damage	18,862.77			
Hotels and others	16,294.5			
Homestays	1,720.0			
Eco-lodges	415.3			
Trekking trails	426.1			
Tour operators	6.9			
Changes in flows		62,379.32	40,477.69	16,179.36
Tourism revenues		47,013.0	34,117.1	12,896.0
Air transport revenues		4,720.0	3,280.0	1,440.0
Homestay		495.3		
Tour operator revenues		4,924.0	3,080.6	1,843.4
Trekking revenues		5,711.3	Not estimated	Not estimated
Restaurant revenues		11.1	Not estimated	Not estimated
Promotion campaign costs		5,250	2,730.0	2,520
Cost of demolition and rubble removal		3,772.56	3,018.1	754.5

The sector has sustained destruction of NRs 5,053.5 million of full damage and NRs. 13,809.3 of partial damage of assets that includes hotel and restaurant facilities and furniture, homestays, eco-lodges, trails, etc. to the tune of 18.8 billion Rupees. Homestay physical damage is reported under Housing report to avoid double counting, however it is worth noting that 57% of all homestays are owned by women, and as such any damaged incurred in this sub-sector is likely to have affected women more adversely.

For hotel sector, the physical damages are reported by districts and data is not available on damages for rooms and beds.

An estimated total of 62.4 billion Rupees will be lost in terms of revenues that will not occur due to the combination of the destruction and non-availability of tourism facilities and of the drastic decline in foreign tourist arrivals after the disaster. The revenue loss results from tourism revenues, air transport revenues, tour operator revenues, trekking revenues and restaurant revenues. The losses in revenues will comprise several years starting from May 2015 till Jun 2017 and would continue until all destroyed assets have been rebuilt and when the number of foreign tourists has recovered to normal levels.

Disaster Effects and Impact

It is important to note that the overall impact of the earthquake on the tourism sector goes beyond the 14 districts listed below. The negative repercussions of the disaster are likely to mean a reduced number of tourist arrivals over the next 2-3 years, reduction in spend per day to about NRs. 3,500 from NRs. 4,300 (source: NATO). When comparing to other nations which have experienced a similar disaster they have generally taken several years to recover fully with regards to tourist arrivals.

It is estimated that the overall impact to the Nepali tourism industry will be a reduction of about 40 per cent on average over the next 12 months, and a 20 per cent reduction in following 12 – 24 months.

However, the impact on the tourist arrivals is not expected to be uniform across the three market segments. The high end cultural/leisure tourism is likely to suffer relatively more than the other segments. It is expected that at least a 55 – 60 per cent reduction in number of groups over the next 12 months. As only minor damage has been reported from Chitwan and the tourism infrastructure in Lumbini has not been affected by the earthquake it is expected that religious tourism to Lumbini will recover in twelve months. For trekking, the higher end segments are more likely to cancel and the impact of the earthquake on this group is expected to be 70 per cent reduction over a 12 month period. However, the number of the lower end trekking groups is expected to recover quicker with an estimated reduction of 20 per cent over a 12 month period.

Trekking Association of Nepal reported that 40,000 employees (guides, porters, cooks etc.) engaged in the trekking sector combining all the major trekking destinations have no jobs between May to July 2015 and were sent home. Similarly Tour Guides Association has reported that 228 tour guides are no longer employed as a result of the earth-quake as there are hardly any tourists to take around the Durbar Squares in Kathmandu, Bhaktapur and Patan. Restaurants in Kathmandu reported a total of 335 contractual workers who lost their jobs. Taking into account that the tourism sector employs more women than men, it can also be assumed that more women have lost jobs than men, particularly when one considers that women occupy less skilled jobs such as house-keeping, which can be easily replaced.

A sustained absence of visitors from highly affected areas (destroyed infrastructure, enterprises and geophysical dangers) is likely to lead to a (permanent) relocation of residents to other areas and disconnecting their livelihood from their place of origin.

Recovery Needs and strategy

Disaster Risk Reduction into recovery process in tourism sector is modelled below:

General observation on Risks Context of TOURISM	
<p>Mountain tourism is in general more vulnerable to calamities due to the geophysical challenges, weather conditions, climate change and inappropriate human behaviour. Mitigating measures to date have been based on enterprise and industry practises and guided by the experience and skills of the trekking & tourism industry.</p> <ul style="list-style-type: none"> • No inventory/assessment/classification of trekking routes exists to date. Trail sections are known to be insecure based on assessment by trekking companies and individual companies make their own assessment of use. • The protected area system in Nepal (national parks and conservation areas) do not have an inventory system in place that assesses the safety of their areas in respect of natural disasters • Mountain communities and residents relying on tourism are particularly at risk. As residents they are exposed to the general increased risk of landslides, rock-fall, floods, etc. associated with mountain settings. As employees & entrepreneurs they are exposed to the dangers of trekking and mountaineering and as families they are highly vulnerable to changes in visitor numbers and travel patterns that directly affect their income. If no alternative income source is available to the household, their position is likely to become severe in the near future. • The clear and present risk is the sustained loss of income due to the absence of visitors in the aftermath of the earthquake. This risk is NOT limited to actual earthquake affected areas but to the whole of Nepal. • The capital value of tourism in Nepal is found in the accommodation & transport sectors. Physical damage to hotels, lodges & resorts incurs high financial costs compounded by the loss of income due to the absence of guests. Loan repayment is in danger of defaulting in the absence of sufficient income making (re)financing of repairs and retrofitting difficult. Staff lay-off is expected combined with increased labour migration to other Asian countries and the Gulf states. More women than men, however, are likely to be laid off first but have limited options for alternative livelihoods such as migration. 	

PDNA Sector	Questions	Indicators	Indicative recommendations to address DRR in recovery of the sector.
	What safety is requested & required by visitors?	<ul style="list-style-type: none"> • Travel insurance cover for Nepal • Liability insurance cover for tour companies in/to Nepal • Foreign travel advice to Nepal by source market • # visitors asking for safety schemes 	<ul style="list-style-type: none"> • Travel insurance and liability insurance underwriter's guidelines for Nepal • Travel advice criteria for Nepal in source countries
	How can safety for tourists against natural disasters be provided?	<ul style="list-style-type: none"> • Certified Enterprises (accommodation, museum, shops, information centres) • Certified infrastructure (pathways, bridges, signage, drinking water station, shelters, 	<p>Creation of the Nepal Safe Trekking System comprising standards and regulations at two levels:</p> <p>[1] Product Level</p> <ul style="list-style-type: none"> • Communication • Monitoring • Rescue

		<p>viewpoints, high-pass crossing)</p> <ul style="list-style-type: none"> • Communication system covering the complete destination area/ trekking route • Visitor monitoring system in place for the destination areas • Rescue services operational in the destination area • # of appropriate- and location of shelters • Classification of the geophysical attributes of a destination area/trail in terms of its safety (high, medium, low risk) with seasonal adaptation 	<ul style="list-style-type: none"> • Shelter • Enterprise • Infrastructure & Resource <p>[2] Management Level</p> <ul style="list-style-type: none"> • Grading • Promotion • Revenue collection • Maintenance of trails • Investment in infrastructure • Staff skills and roles <p>Formulation of appropriate criteria and regulation for each of the Safe Trekking System categories</p>
	Do tourist facilities consider appropriate building codes and by-laws and policies and are there plans in place by the government for safe construction?	<p># Enterprises that are build and operate according to appropriate codes.</p> <p># appropriate building guidelines that are usage and location specific</p> <p>% tourist facilities for which measures have been taken to enable them to withstand expected hazards</p> <p>% enforcing existing policies, standards, and guidelines regarding safe construction, including risk assessment during site selection, and hazard-resistant building designs</p>	<p>Formulation of tourism safety standards per type of enterprise and location, incorporating climate adaptation/resilience guidelines for mountain areas.</p> <p>Management capacity and mandate at district or protected area level to inspect and assess building regulation</p> <p>Grading system to be created for enterprises to incorporate safety aspects</p> <p>Implementation of the Safe Trekking System</p>
	Do tourists and tourism staff have access to forecasts and warnings to common hazards (floods, landslides, avalanches etc.)?	<p>% of tourism areas where forecasts/ warning information are made available to tourists</p> <p>% of communication coverage across destination areas</p>	<p>Creation of an early warning system and communication system</p> <p>Implementation of the Safe Trekking System</p>
	Are there disaster preparedness systems and other protective and safety measures for tourism? Are there	<p>% sites and areas with facilities for emergency communication of warnings/ forecasts and arrival tracking/ monitoring</p>	<p>Formulation of business plans and visitor management plans</p> <p>Creation of certified training course on</p>

	appropriate policies and plans in place by the government for responding to emergencies, preparedness and long term resilience of the sector?	#appropriate operational plans for national parks & conservation areas. # appropriate operational visitor management plans for heritage sites #staff trained and certified in appropriate behaviour in mountain environments % of hotels/ tourist facilities with disaster preparedness plans in place based on risk assessments including business continuity plan	appropriate mountain tourism behaviour and conducting of training. Creation of a template for a disaster preparedness plan and business continuity plan Assessment of insurance appropriateness and possible enhancement measures. Implementation of the Safe Trekking System
	What is tourism doing in terms of worker safety and insurance?	% of workers insured Employment standard available # enterprises following employment standards	Assessment and adaptation of insurance scheme Formulation of employment standards

In order for the tourism sector to recover, the following needs have been identified:

- Cost of demolition and rubble removal
- Cost of promotion campaign abroad to re-attract tourists
- Rescheduling of previous loans of hotel and restaurant owners
- Temporary tax holidays, perhaps over one year

As for reconstruction needs, the total amount required for reconstruction is 22.6 billion rupees.

Particulars	Figures in million NRs	Total	2015 - 2016	2016 - 2017
Recovery Needs		20,775.87	14,277.38	6,498.50
	Demolition and rubble removal	3,772.6	3,018.1	754.5
	Promotion campaign costs	5,250.0	2,730.0	2,520.0
	Loan rescheduling ¹¹	11,753.3	8,529.3	3,224.0
Reconstruction Needs		22,635.37	18,571.29	4,064.08
	Hotels	19,553.4	15,642.7	3,910.7
	Homestays	2,064.0	2,064.0	0.0
	Eco-Lodges in Conservation Areas	498.4	498.4	0.0
	Trekking trails	511.3	357.9	153.4
	Tour Operators Office	8.2	8.20	0.0

[All figures in Millions NPRs]

The total promotion costs includes two elements: (i) the estimated regular annual budget for promotion allocated by the Government of Nepal through Nepal Tourism Board which is assumed to remain the same as last year and (ii) the total cost of promotion by the tourism industry as a whole through sales call, web marketing, print marketing, e-newsletter, sales mission, roadshow/ trade shows

¹¹ Rescheduling of previous loans of hotel and restaurant owners, which are roughly estimated as 25 per cent of revenue losses (on the basis of informal consultations with selected tourism industry representatives). This is a crude measure and will need to be verified with Nepal Rastra Bank and Nepal Bankers Association.

and other media which is roughly at least five times higher than the government annual budget using historical data.

Implementation Arrangements

The impact of the earthquake are likely to have a sustained negative impact on the tourism sector in Nepal and the wider economy and mountain livelihoods, unless a number of mitigating initiatives are pursued. These efforts needs to target the global tourism market and convince (potential) visitors to come to Nepal as well as provide assistance to the affected rural and urban tourism entrepreneurs. The recovery strategy has four distinct phases: [1] identify and assess unaffected and safe destinations and enterprises where tourism can happen already; [2] create a 'safe trekking system' for mountain tourism in Nepal and [3] rebuild and redeveloped damaged areas and enterprises following improved guidelines and regulations of the 'safe trekking system' and [4] identify and develop new tourist products and services. Some of these phases can be sequential or run in parallel depending on the needs.

Phase 1: Short term

Conduct a rapid post-earthquake assessment of Annapurna and Khumbu (Everest) regions through a specialized ATC-20 audit (earthquake damage assessment) to proof the safety of these areas and enable Nepal to be visited again (for selected areas). Accommodation establishments in rural and urban areas should obtain a similar assessment certificate enabling them to be utilized by visitors and package tours to unaffected areas to be offered. An appropriate marketing and promotion plan for the upcoming peak season (October-December 2015) should be created together with all stakeholders. A special effort should be made to attract visitors from India which is close and forms a resilient market driven by pilgrimage and religious objectives. The cultural heritage sites should be open for visitors in Kathmandu valley for those which are assessed as safe.

Financial sector immediate relief through soft loans and loan restructuring is a need for industry recovery (hotels and restaurants) and should be reported in more details under Financial Sector report.

Activity	Cost	Coverage	Duration
Safety assessment			
ATC-20 audit for Annapurna and Khumbu	TBD	Samarth-NMDP & WBG	July 2015
Safety audit for enterprises	TBD	TBD/Industry associations	
Communication			
Travel advisory adjustment	TBD	Samarth-NMDP	September 2015
Tour operator buy-in from source markets	TBD	NATO	July & August 2015
Special Indian market promotion	TBD	NTB	July & August 2015

Phase 2: Safe Trekking System Creation

Standards are to be formulated for all elements of a safe trekking product including communication coverage throughout the areas/trail, monitoring system that captures movement of visitors and staff along a trail, rescue procedure and management, shelter provision at each daily section of a trail, enterprises build and operating according to safety standards and infrastructure & Resource build and operated according to safety standards. These improved products should be supported by an appropriate management system that provides, a grading system for trails and climbs, promotes trails and climbs, incorporates a revenue collection system able to cover the costs of safety monitoring and management, maintenance of trails as per management plan, investment in infrastructure upkeep and expansion and staff skills and training.

Activity	Cost	Coverage	Duration
Creation of a Nepal Safe Trekking System			
Design of standards and criteria for product	TBD	Samarth-NMDP	October 2015

Phase 3 -Rebuild and Redeveloped damaged areas and enterprises

Assess and design financial and technical relief packages (e.g. credit lines and ‘soft loans’ through local commercial banks) for hotel, restaurants and other tourism enterprises for re-construction and re-building with earthquake resistant technologies and according to safe trekking system guidelines (where applicable) to enable accommodation facilities to sustain a basic operational level. Please refer to Financial Sector report for more details. This requires more detailed discussion with Nepal Rastra Bank and Nepal Bankers Association. In order to assist tourism enterprises to revive their businesses, the government could come up with training schemes/interventions for newly recruited workforce, as many of the old workers have left for their home districts. Attention should also be paid to women who own hospitality establishment, especially homestays, who may find it difficult to recover quickly due to limited access to financial resources.

Selected trekking areas are to be rehabilitation and the option to open areas for trekking which have earlier been restricted, such as upper mustang should be assessed as this would both generate attention and also entice trekkers to return. Together with communities and local operators a selection of small scale repair/recovery projects that can be developed quickly and donations can be channelled. All reconstruction will follow a labour intensive approach and work guarantee scheme. In close cooperation and collaboration with the relevant organizations like UNESCO, repair and rebuilding of priority heritage sites of cultural importance is to be undertaken to allow (income generating) tourism usage.

The recently completed National Tourism Strategy Plan (NTSP) with a 10 year horizon and a detailed 5 year action plan is to be re-examined in the light of the earthquakes and their aftermath to identify new challenges and re-prioritize important tasks so that the tourism industry recover quickly, as part of the national rebuilding effort. Finally, there is a need to re-build and re-brand the image of tourism in Nepal including announcement of 2017 or 2018 as ‘VISIT NEPAL YEAR’ assuming that re-construction and re-building will be completed by then. Hence, significant effort and resources are required and well-coordinated among the key stakeholders to ensure that foreign tourists perceive Nepal as a safe destination.

Activity	Cost	Coverage	Duration
Financial Support to Enterprises			
Soft loans - hotel reconstruction			
Loan rescheduling			
Trekking Trails			
Trekking route reconstruction		4 districts	10 months
Trekking route development		2 districts	10 – 22 months
Work guarantee scheme		11 districts	10 months
Cultural Heritage Tourism			
Priority site selection			
Visitor management			
Strategy Adaptation			
Adapt the tourism strategy post-earthquake		MoCTCA & Samarth-NMDP	
Advertising Campaign/ rebranded Nepal			
My GHT marketing campaign	GBP 350,000	Samarth-NMDP	

Assessment Methodology

To assess the damage to infrastructure and physical assets the team consulted the government counterparts led by the Ministry of Culture, Tourism and Civil Aviation and active support from the Department of Tourism and the Nepal Tourism Board. Other agencies who supported with information includes Department of National Parks and Wildlife Conservation (DNPWC) and Nepal Trust for Nature and Conservation (NTNC). The key source of information on damages and losses were the private sector business associations such as the Hotel Association of Nepal (HAN), Trekking Agencies' Association of Nepal (TAAN), Nepal Mountaineering Association (NMA), Nepal Association of Tour Operators (NATO), Nepal Association of Tour and Travel Agents (NATTA), Tour Guide Association of Nepal (TURGAN) and others. Based on the number of physical assets damage and the estimates provided by them, the assessment has been conducted.

In order to estimate the impact on overall tourism sector revenues the team calculated the normal or pre-disaster revenue forecast and the post-disaster revenue forecast; the difference of the two gave the estimated post-disaster losses. The following calculations was used to arrive at the figures:

Revenue forecast= Arrival of tourists*Average tourist expenditure/visit

The normal arrival of tourists for May – Dec 2015, Jan – Jun 2016 and Jul 2016 – Jun 2017 have be calculated assuming a 1% increase on the 2014 arrival data, which was made available by the Department of Tourism. The normal average tourist expenditure/ visit was calculated as follows = Average length stay (days)*Average spend per day, where the estimates were based on NTSP, 2015-2024 report.

For homestay, it is assumed that total revenue losses will be around NRs 495 m, assuming 1,000 Rs per night loss for a total of 6 months of income losses.

The post-disaster arrival of tourists for May-Jul 2015 has been estimated at 10% of normal arrivals; for Aug-Dec 2015 at 40% of normal arrivals; Jan-Jun 2016 at 60% and Jul 2016-Jun 2017 at 80%. From July 2017 onwards it is assumed that the numbers will reach pre-earthquake arrivals. Similarly average length stay is estimated at 67%, 75%, 92%of normal average for May – Dec 2015, Jan – Jun 2016 and Jul 2016 – Jun 2017 respectively. Similarly the post-disaster average spend per day is estimated at 82%, 89% and 93% of normal average spend for May – Dec 2015, Jan – Jun 2016 and Jul 2016 – Jun 2017 respectively.

The Recovery Needs Estimation includes the total annual expenditure of promotion campaigns (comprising of both the government and private sector contributions) and the working capital (line of credit) requirement. Rescheduling of previous loans of hotel and restaurant owners, which are roughly estimated as 25 per cent of revenue losses. Cost of demolition and rubble removal has been calculated as a 20% of the cost of destroyed buildings.

The Reconstruction Needs Estimation includes the needs for tourist accommodations including hotels, homestays, lodges in conservation areas, trekking trails and physical assets of tour operators reconstruction, rebuilding and retrofitting. These have been estimated at 1.2 times of the damage estimation under the Build Back Better concept.

Recovery needs assumptions:

- Cost of demolition and rubble removal (20% of the cost of destroyed buildings is used based on similar cases elsewhere in the world)

- Rescheduling of previous loans of hotel and restaurant owners, which are roughly estimated as 25 per cent of revenue losses (on the basis of informal consultations with selected tourism sector representatives)
 - Temporary tax holidays, perhaps over one year are requirements expressed by hotel and restaurant owners interviewed
- Reconstruction assumption: Cost of reconstruction using disaster-resilient standards (i.e. 20% above value of damage)

ANNEX

Table 1: Tourist numbers and growth in tourism arrivals from neighbouring countries and the rest of the world (2007 to 2013)

Source: Nepal Tourism Statistics, 2013, MoCTCA

Nationality and number of tourists (000)	2008	2009	2010	2011	2012	2013	Growth rate over the last five years
China	35.2	32.3	46.4	61.9	71.9	113.2	26.3
% share	7.0	6.3	7.7	8.4	8.9	12.4	
India	91.2	93.9	120.9	149.5	165.8	181	14.7
% share	18.2	18.4	20.1	20.3	20.6	23.2	
Rest of the World	336.1	347.4	390.1	464.9	495.9	503	8.4
% share	67.2	68.1	64.7	63.1	61.8	63	
Total	500.3	510.0	602.9	736.2	803.1	797	9.76
% share	100	100	100	100	100	100	

Table 2: Other tourism related firms and service providers

Source: MoCTCA, CAAN, 2013

Sector	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tourist guides	1,900	2,001	2,071	2,149	2,202	2,271	2,343	2,458	2,548	2,661	2,835	2,935	3102
Trekking guides	2,745	3,094	3,457	3,930	4,395	4,663	5,098	5,356	5,987	6,747	7,303	8,163	9076
River guides										24	44	58	115
Tourist police								52	52	50	53	60	227
Paragliding company											16	21	21
Ultra light company											1	3	3
Skydiving											2	2	2
Domestic airlines											17	15	15
International airlines											29	28	29

Domestic Airport												54	54	54
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Table 3: Some economic indicators for Hotels and Restaurants (NSIC Category) by FY 2005/06 to 2012/13

NSIC= Nepal Standard Industrial Classification R = Revised; P = Preliminary

Source: Central Bureau of Statistics (2013), Nepal

Economic Indicators	2005	2006	2007	2008	2009	2010	2011	2012
Annual Growth Rate at constant price, 2001 (in %)	6.33	3.46	6.92	2.31	6.52	7.39	5.96	5.49
Gross Output at current price (NRs million)	29,477	32,422	37,536	45,311	56,041	71,193	79,118	95,080
Gross Value Added at current price (NRs million)	9,398	10,043	11,503	13,943	17,347	21,866	24,521	29,886
Proportion of Gross Domestic Product at current price (%)	1.49	1.44	1.48	1.49	1.55	1.7	1.7	1.89

Table 4: Registered hotel accommodation in Nepal by category and capacity, 2013

Source: GoN, MoCTCA, Tourism Industry Division, 2070 B.S.

Hotel standard	Number	No of rooms	No of beds
Five star	10	1,818	3,461
Four star	2	190	362
Three star	27	796	1,707
Two star	35	1,513	3,096
One star	31	964	2,374
Tourist standard	625	9,985	23,382
Total	730	15,266	34,382

Table 5: Foreign exchange earnings from tourism, 2000/01 - 2012/13

Source: Nepal Rastra Bank, 2013

Year	Total Foreign Exchange Earning from Tourism (NRs. in million)	As % of Total Value of Merchandise Exports	As % of Total Value of Exports of Goods and Non Factor Services	As % of Total Foreign Exchange Earnings	As % of GDP
2000/01	11,717	16.8	11.8	5.7	2.7
2001/02	8,654	14.9	10.6	4.8	1.9
2002/03	11,748	23.1	15.2	6.1	2.4
2003/04	18,147	32.9	20.3	8.0	3.4
2004/05	10,464	17.5	12.2	4.7	1.8
2005/06	9,556	15.5	10.9	3.6	1.5
2006/07	10,125	16.5	10.8	3.7	1.4
2007/08	18,653	30.1	17.9	5.5	2.3

2008/09	27,960	40.0	22.8	6.5	2.8
2009/10	28,139	44.5	24.6	8.1	2.4
2010/11	24,611	35.8	20.2	5.0	1.8
2011/12	30,704	37.7	20.0	4.8	2.0
2012/13	34,211	39.8	18.9	4.7	2.0

Table 6: Some indicators on the tourism sector's contribution to the Government's fiscal revenue

Source: Data extracted from Financial Comptroller's Annual Report of the respective years.

Year	2010	2011	2012
Indirect tax (NRs million)			
Internal commodity tax revenue collection (million)	2,221.4	2,551.9	
VAT (tourism services)			1,057.4
Administrative fee (immigration and tourism)			5,481.9
No-Tax revenue	1,928.5	2,059.2	
Visa Fee	1,221.9	1,268.8	1,781.9
Mountain trekking fee	343.5	366.9	508.8
Pollution control fee	363.1	423.5	
Other tourism fee			2.1
Corporate and other	NA	NA	NA
Total Excluding (corporate and other taxes)	4,149.9	4,651.1	8,832.1

In Nepal, tax contribution to fiscal revenue of the Government from tourism consists of the following:

- Airport taxes, fees and levies.
- Hotel, restaurant, tour and travel agency, car rental and nightclub registration/ licensing fees.
- Corporate and personal income taxes.
- Import duties on imported items used in tourism.
- Taxes on local inputs to the tourism sector.
- Entertainment tax (tourist expenditure taxes in hotels, restaurants, etc.).
- Entry fees to tourist attractions –parks and reserves, cultural and heritage sites.
- Trekking, expedition and climbing peaks levies.
- Municipal, local level taxes including property taxes and copyright fees.

FINANCIAL SECTOR

Summary

The earthquake exacerbates Nepal's already complex financial sector challenges. In the years prior to the earthquake, important successes have been made in expanding the reach of the financial system, in restructuring of state-controlled financial institutions and improving legal frameworks. Nonetheless, a significant proportion of the population lacks access to financial services, and the banking sector remains exposed to several vulnerabilities, including concerns over asset quality. The framework for financial crisis management is still in the development stages and the depositor safety net is still in the early stages of implementation. Work to reform the insurance sector is now underway but will not be completed for some time, and the frameworks for supervision of the largely unregulated microfinance sector are very weak.

Thanks to a decisive policy response, operational disturbances in financial infrastructure caused by the earthquake were short-lived outside the affected areas and the overall financial sector remains sound aftermath the earthquake. This is a remarkable achievement, given the serious physical damage to the NRB' premises, and the absence of a Disaster Recovery Site (DRS) and Business Continuity Plans (BCPs). Although retail electronic banking holds considerable promise for expanding access and enhancing efficiency and speed in the delivery of financial services, it has not yet reached a stage where it can substitute for damaged bank branches.

Non-banking financial sector is more affected than the banking sector. Particularly the microfinance and cooperatives are heavily impacted by the earthquake. Preliminary impact assessments point to a very large number of affected members. Most of the affected borrowers will see their income flow severely affected and lack alternative income generating activity. This could translate into liquidity and solvency pressures on the microfinance sector, impacting their capacity to assist their communities in times of need.

From the preliminary estimates, it is suggested that the total damage and potential losses (suffered by the banking and insurance sectors), are expected to be NPR 4.4 billion and NPR 26.2 billion respectively. However, it must be strongly emphasized that these estimates are based on the currently available information which is largely anecdotal and unsupported by the data needed for precision. It will take many months for the true extent of damage to the sector to become fully apparent. There are specific concerns that if the damage to financial institutions is greater than initial estimates there is potential for deleveraging across the sector (a "credit crunch"), with the impact concentrated in the lower – and most important for access to finance of poor and rural people – tiers of the system. The quantification

of losses also does not recognize the inherent risks posed by post-earthquake relaxation of prudential rules to the gains made over recent years in reforming the banking sector, or the potential delays to the implementation of further reforms as a result of the need to address post-earthquake problems first.

PRE DISASTER SITUATION INCLUDING CONTEXT ANALYSIS

Overview of the Financial System

Nepal's financial system is bank-dominated, with decreasing but significant state-ownership (Table 1). There are four classes of NRB-regulated banks and financial institutions (BFIs) differentiated by their capital requirements and the range of permissible activities. Non-bank financial institutions and capital markets are in their initial stages of development, but with a very rapid growth in both the number and share of system assets and deposits held in financial and multi-purpose co-operatives (FINCOs) which, together with microfinance institutions (MFIs) and financial intermediary NGOs (FINGOs), are the primary source of financial services for poor and rural people.

Despite tangible advances in expanding outreach of the banking sector, important gaps in the provision of financial services remain. The financial sector has been growing rapidly (driven in part by the increasing volume of remittances), with deposits, credit and number of branches and ATMs (heavily concentrated in the Kathmandu valley and urban areas) increasing over the past few years. Deposit mobilization and credit to the private sector exceeds the South Asian average. Accessibility in general has improved: the number of BFI branches has doubled in eight years. Nonetheless, a persistent urban-rural and gender gap persists, only partially remedied by the growth of MFIs, FINGOs and FINCOs.

Table II: Structure of Nepal's Financial Sector

Financial Institution	Number	Total Deposits (NPR millions)	% of Total	Total Loans (NPR Million)	% of Total	Total Assets (NPR Million)	% of Total
Commercial A ¹²	30	1,291,660	72.79	1,013,724	68.91	1,599,295	72
Development B ¹	81	202,679	11.42	168,676	11.47	261,271	11.76
Finance C ¹	51	74,893	4.22	65,694	4.47	112,488	5.06
Microfinance D ¹	35	13,093	0.74	44,077	3	58,433	2.63
Cooperatives - NRB ¹³	15	15,046	0.85	14,027	0.95	21,083	0.95
Micro Credit NGO ²	27	4,744	0.27	10,356	0.7	14,000	0.63
Subtotal Regulated by NRB	239	1,602,115	90.28	1,316,554	89.5	2,066,570	93.04
Cooperatives Savings & Credit ¹⁴	13,368	129,000	7.27	117,147	7.96	117,200	5.28

¹² As of Mid-January 2015

¹³ As of Mid-May 2015

¹⁴ As of Mid-July 2015

Cooperatives Multipurpose ³	4,114	31,400	1.77	27,041	1.84	27,100	1.22
Subtotal	17,482	160,400	9.04	144,188	9.8	144,300	6.5
Other Cooperatives ³	13,695	12,100	0.68	10,305	0.7	10,331	0.47
Total Cooperatives	31,177	172,500	9.72	154,493	10.5	154,631	6.96
Grand Total	31,416	1,774,615	100	1,471,047	100	2,221,201	100

Key Pre-Earthquake Financial Sector Challenges and Strengths

- **Access to Finance**

Several FINCOs have become problematic in the absence of adequate supervisory and regulatory frameworks. This adversely affects the reputation of the sector and its capacity to function as a reliable first point of entry for poorer people into the financial system. Work to address the risks in non-bank financial sector has begun, but wholesale reform of the regulatory and supervisory frameworks for FINCOs, and building the capacity of the FINCO regulator and FINCOs themselves remains to be done.

Similarly, access to finance is a major constraint for firms, especially for small and medium-sized enterprises (SMEs). Administrative measures have been taken to channel funds to deprived sectors via MFIs (now representing about 5 percent of total BFI loans), promote the flow of credit to productive sectors, lower the intermediation cost and to address what is perceived as excessive profitability in the banking sector. Comparatively little progress has however been made in strengthening the enabling environment with important gaps in credit reporting systems; secured transactions; creditor rights and insolvency frameworks; retail payment system development; and consumer protection and financial literacy.

At the micro-level, access to formal finance is also a major challenge to rural communities, especially women. Their lack of collateral forces them to rely on informal micro-credit structures that charge exorbitant interest rates, thereby constraining their ability to grow their micro-enterprises.

Progress in payment systems modernization has been slow and consequently the use of electronic payments remains limited, reducing the efficiency, safety and reach of the payment infrastructure. A comprehensive National Payments Systems Development strategy has been developed and action plans are now being prepared, but (per UNCDF) out of 541 VDCs in the ten most impacted districts (excluding Kathmandu, Lalitpur, Bhaktapur and Kavre), there are only 86 VDCs with some form of financial services touch points.

- **Excessive number of BFIs with low capital base and sub-optimal financial intermediation**

At face value, the Nepali banking sector appears highly profitable, reasonably well capitalized and asset quality appears good, but reported financial ratios do not however necessarily reflect the true financial condition of BFIs. There are too many small BFIs with limited capital bases, weak risk management systems and governance. Given all these weaknesses the financial system is vulnerable to shocks and does not adequately fulfill its purpose of intermediating resources to finance Nepal's infrastructure investment and development needs. In response, the NRB has imposed a moratorium on new licenses for BFIs, promoted mergers, and in 2014 started in depth special inspections of 54 banks. As a result, the NRB has successfully identified and taken action against weaker institutions and seen improvements in the overall quality of financial reporting, while the number of BFIs has also fallen rapidly. Intermediation cost (net spread) has decreased to more acceptable levels. In parallel, the NRB is working to build up and modernize its supervisory capacity; while the Government is working to reform the legal framework for bank supervision and regulation, and strengthen the deposit guarantee

system to bolster depositor confidence and reduce liquidity risks.

- **Banking sector profits are sound**

Profits of the banking sector is considered sound with commercial banks registering profits in the second quarter of FY 2014/15 to a record high – a total of NPR 14.4 billion in six months compared to NPR 9.4 billion in corresponding period last year. Average ROE is estimated to be above 20 percent.

- **Low rate of reported non-performing loans (NPL)**

The level of NPL reported for the banking sector stood at around 2.7 percent of the total loan portfolio as of Q2FY15 compared to 3.1 percent reported a year ago. NPL levels have been hovering between 2.5 percent and 3.5 per cent since FY10. Average NPL for all class banks (A,B,C) is reported to be 3.9 per cent in Q1FY15 compared 4.1 percent Q1/FY14. While NPLs are adequately covered by loan loss provisions, the Special Inspection report indicate under-reporting of impaired assets.

- **Ample liquidity in the banking system**

The banking sector continues to have surplus liquidity despite significant growth in loan disbursement in the first two quarters of FY15. Excess liquidity is being mopped up by NRB through deposit auction and reverse repos on a periodic basis. The weighted average 91-days T-bill as of Q2FY15 was 0.1151 percent compared to 0.47 percent a year ago. Similarly, inter-bank rate was 0.15 percent compared to 0.21 percent a year ago. However, inter-bank rates amongst other financial institutions (other than commercial banks) declined only slightly to 2.51 percent from 2.62 percent a year ago.

DISASTER EFFECTS WITH ESTIMATES OF DAMAGES AND LOSSES

Financial Infrastructure

Operational disturbances in financial infrastructure caused by the earthquake were short-lived outside the affected areas, minimizing disruptions in the availability of payment services. However, damage to the physical infrastructure of banks in the affected areas has been high, with 408 branches and 652 ATMs owned by Class A, B and C BFIs damaged, with the cost of damage estimated at about NPR 864 million. Despite this, most depositors have regained access to their accounts, which has been key in maintaining public confidence in the banking system. Outside the most heavily affected areas, payment systems were quickly resumed, remittances could again be received (and are reported to have increased significantly), and domestic and international trade flows were restored. NRB has also moved quickly to relax restrictions on the ability of BFIs to open new service points and to reduce documentation requirements for earthquake victims.

The restoration of services has been a remarkable achievement, given the serious physical damage to the NRB's headquarters (including its main cash distribution facilities) and the lack of an NRB Disaster Recovery Site (DRS) which means that its core banking systems – which lie at the center of the domestic payments and settlement system and management of monetary and liquidity facilities – remain vulnerable to destruction by a new disaster. The cost of replacing the two damaged NRB buildings with a well-equipped modern central bank is estimated at NRP 5 billion.

Banks and Financial Institutions

Deterioration in the quality of BFIs' loan portfolios resulting from the earthquake could occur as a result of earthquake damage and disruption in three main ways: (a) as a result of damage or disruption to otherwise viable businesses (e.g. hydropower and tourism) which may need to restructure their debts and will need additional finance to repair damage; (b) damage to uninsured real estate collateral; and, (c) losses on deprived sector lending in the affected areas where borrowers are unlikely to be able to

repay their loans. If the impact of these factors is significant, it would lead to deleveraging, constricting the flow of credit needed to support reconstruction and development of the economy.

Microfinance Sector and Access to Finance

The livelihood of very large numbers of low income people - who rely on microfinance services as only source of finance for income generating activities – has been severely damaged by the earthquake with the 14 most impacted districts accounting for 13.6 percent of the total number of people living below the poverty line. The preliminary impact assessment of damage to Class D MFIs and FINGOs estimates that 132,000 members (approximately 10 percent) of licensed MFIs have been affected, 72,064 households directly affected and 53,457 livestock lost. Similarly, it is estimated that about 31 percent of FINGO members (about 155,000 people) have been impacted. Out of the total 1,049 branches of the MFIs across the country, 156 branches (14.9 percent) have been damaged (partly and fully) by the earthquake. Most affected MFIs have also lost all or some of their records. The cost of reconstruction and data recovery is expected to hamper the sustainability of the MFIs and, in addition, they will be unable to operate for months.

As most of the affected borrowers do not have alternative income generating activity and source of repayment, the MFIs will face both liquidity and solvency issues, impacting their capacity to assist their communities in a time of need. The sector is especially vulnerable due to the lack of diversification of its funding, weak or nonexistent IT systems, and low connectivity. Some MFIs may be susceptible to rapid loss of liquidity as members withdraw their funds to pay for immediate expenses and there are no central liquidity facilities available to supply additional funds. Little is known about the condition and portfolio composition of the 17,000 or so FINCOs, which are particularly susceptible to rapid loss of liquidity as members withdraw their funds to pay for immediate expenses and there are no central liquidity facilities available to supply additional funds. The major probable financial problems which will be faced by the sector are:

- *Deterioration of asset quality:* MFIs' portfolio will most probably be the most damaged among the financial institutions as the low income people in the affected districts in rural areas lost their lives and livelihoods. The level of NPLs will steeply increase and the PAR could reach unacceptable magnitude for future sustainability of already fragile balance sheets/operations; and,
- *Falling liquidity leading to a contraction or cessation of lending and inability to repay deposits:* MFIs and FINGOs receive credit mostly through mandatory deprived sector lending from Class A, B and C BFIs and this borrowing is the most critical component of funding, representing about 70 percent of total resource mobilization. As MFIs and FINGOs in the affected areas are likely to default on existing loans, this source of funding is likely to also dry up. This loss of liquidity is likely to be reinforced by falling deposits as people withdraw deposits to fund emergency costs. FINCOs are thought to be particularly vulnerable to liquidity risks because they lack any central funding back-up or access to borrowed funds.

The Savings and Cooperatives (SACCOs) are also hard hit by the earthquake in the most affected 14 districts. . The 3rd lifestyle measurement survey reveals that 54% of the population have access to cooperatives and 34 % have access to banks in the rural community. Women, who depend the most on the SACCOS will therefore be hardest hit. The following table illustrates the impact to SACCOS:

Table III: SACCOs Affected by Earthquake

Particulars	Damages
Number of affected SACCOs	502
Amount of affected loans	NPR 4.9 billion
Physical damage to the assets	NPR 622 million
Number of affected members	221,370
Number of affected households	45,178
Number of human casualties associated with SACCOs	280

Damage and Loss Calculation to the Financial Sector

Summary

Table 3 provides an estimate of the total damage and potential losses suffered by the banking and insurance sectors. The sources of information and assumptions used in the calculation of the estimates of losses in this Section are in Appendix 1 and Appendix 2.

Table IV: Damage & Loss Summary (NPR million)

Loss		Public	Private
Cost of Potential Loan Loss/ Restructuring	16,542	2,812	13,730
Technical Assistance Required for MFIs	340	40	300
Concessions for Housing Reconstruction	6,808	4,539	2,269
Cost of potential liability of Insurance Companies	3,200	128	3,072
Total Loss	26,891	7,519	19,372
Damage		Public	Private
Damage to Central Bank Infrastructure	3,530	3,530	0
Damage to BFI and SAACOs infrastructure	1,486	253	1,233
Total Damage	5,016	3,783	1,233
Total Loss and Damage	31,907	11,302	20,605

Sources of Damages (from Infrastructure Damage)

BFIs and the microfinance sector have also suffered significant losses due to damage to their physical infrastructure and ATM networks in the affected areas. In addition, the NRB has suffered about NPR 2 billion of damage to the two buildings.

Sources of Potential Losses

Losses from Deterioration in Asset Quality

Deterioration in the quality of BFIs' loan portfolios resulting from the earthquake could occur as a result of earthquake damage and economic disruption in three main ways: (a) as a result of damage or

disruption to otherwise viable businesses (e.g. hydropower and tourism) which may need to restructure their debts and will need additional finance to repair damage. Some of these losses may be mitigated by regulatory forbearance, but this also carries considerable risk of simply storing up problems – by restructuring unviable debts – for later; (b) damage to uninsured real estate collateral. All real estate used for collateral by BFIs is required to be insured against earthquake damage – which would pass through any BFI losses due to damaged collateral to the insurance sector – but under-insurance is considered widespread, and weaknesses in credit administration at some BFIs may mean that insurance policies may not have been perfected (for example, due to failure to secure building completion certificates) or renewed, allowing claims to be denied. A lax approach by some BFIs to requiring borrowers to renew their insurance on time has been specifically identified by insurers as a potential source of disputed claims, meaning that some coverage could be invalidated for BFIs with poor loan administration.; and, (c) losses on deprived sector lending in the affected areas where borrowers are unlikely to be able to repay their loans (see discussion below). Diagnostics are urgently needed to determine the extent of damage to BFIs’ asset quality and identify where these losses will be incurred.

In the microfinance sector (particularly for FINGOs and FINCOs) there is less reliance on real estate - and according to the Insurance Association no insurance of real estate collateral required - with the main threat to loan performance coming from the loss of borrowers’ income as a result of earthquake damage. In specific sectors (such as manufacturing and tourism), post-earthquake labor shortages forcing factories to stay closed, and the severe decline of the tourist market, also reduce the ability of borrowers to repay and, at least in the short term, the value of the collateral underlying the loans.

Losses Due to the Cost of Recapitalization of Institutions

Losses incurred by BFIs as a result of the earthquake will result in a significant loss of capital system-wide specifically and are also likely to be unevenly distributed, with losses concentrated in smaller institutions which are either most exposed to the affected areas or which have the weakest loan administration practices and thus will see higher levels of uninsured losses. The deposit guarantee fund only contains sufficient resources to cover the liquidation of two small BFIs, and thus the Government will have to step in to either cover the guaranteed deposits or, in the case of any larger BFIs, recapitalize the institution.

Cost of Interest Rate Subsidy Programs

The Government has announced subsidized interest rate refinancing programs (zero interest refinancing by the NRB of loans to be made at 2 percent interest per annum) for rebuilding houses. Providing this refinancing at a zero interest rate entails a subsidy. However, given the unattractiveness of the terms offered, uptake of this program is envisaged only if BFIs are adequately incentivized with an interest subsidy over the tenor of the loan.

Insurance Sector Losses

For the insurance sector the impact of losses is largely mitigated by the fact that around 80 percent of their liability are covered under re-insurance treaties. While the sector as a whole is thinly capitalized, the number of claims is low given the scale of the disaster (estimated by the Insurance Association at 15 thousand potential claims (13 thousand already claimed) representing a maximum of NPR 16 billion of covered losses). The Insurance Association estimates that its total losses (i.e. net of reinsurance provided by foreign reinsurers) from the earthquake will not be more than NPR 2 billion, but the distribution of losses between the 16 insurance companies may be uneven, particularly if reinsurers

find a basis to deny claims. Diagnostics are needed to determine if this is in fact the total amount of un-reinsured losses and the distribution of losses between insurance companies (which would determine if any companies face solvency problems).

An important question is whether insurance companies have the financial capacity to honor their commitments to reimbursed (net of reinsured commitments). In an adverse scenario where the amount of the claims exceeds insurance companies' financial capacities, the banking sector would be exposed to absorb the loss of the collateral. These losses could significantly affect banks' capital, and would put additional pressure on banks' balance sheet.

Microfinance and Cooperatives

Portfolio NPL/PAR - MFIs' portfolio will most probably be the most damaged among the financial institutions as the low income people in the affected districts in rural areas lost their lives and livelihoods. The level of NPLs will steeply increase and the PAR would reach unacceptable magnitude for future sustainability of already fragile balance sheets/operations.

Lack of diversified source of funds - MFDBs and FINGOs receive credit mostly through the mandatory "deprived sector lending" requirements for banks established by the central bank. As of mid-March 2015, the banks had an exposure to the microfinance sector of NPR 34.5 billion under "deprived sector lending" and MFIs received 60 percent of their funds through the "deprived sector lending". From the financing mix of MFDBs, borrowing is the most critical component of financing. It covers about 70 percent of total resource mobilization. The members' savings comes next followed by equity. If funds are reduced or no longer available due to the liquidity crisis in the financial sector the MFIs will suffer. If the recovery process for MFIs is slow and not supported, the crisis might further impact the banking sector given around 4.5 percent exposure to the microfinance sectors.

Clients withdrawing their savings – though in the MFIs balance sheets savings are not the most important source of funding, some of them heavily rely on them. People are withdrawing the money from the accounts to face the emergency and they will continue withdrawing with the risk of increasing the liquidity crisis. Particularly the cooperative system could be adversely affected.

A significant number of borrowers may face a catch 22 situation. Many borrowers have seen their income streams disrupted due to the earthquake, and many will require a loan to rebuild their livelihoods. However, the lack of a stable source of income may be a ground for credit providers not to extend loans. As a consequence, such borrowers face a catch 22 situation – their income stream is disrupted due to earthquake, but loans needed to recover livelihood are denied precisely because of the interruption in income streams. Borrowers that do not have spare, unencumbered real estate that can be pledged to take out a new loan and whose source of income has dried up as a consequence of the earthquake are particularly vulnerable. This is for instance the case for MSMEs that have pledged their only property (often serving as place of business) as collateral for a loan.

Contagion of BFIs by Losses in the Microfinance Sector

Deprived sector lending by BFIs to MFIs (4.97 percent of total loans) will result in substantial losses for Class A, B and C BFIs which have lent to MFIs within the affected areas: contagion could spread from an expected high rate of default by borrowers from MFIs who have lost their livelihoods to the MFIs which will then be unable to repay the loans they have received from BFIs.

Capital Markets

Other than the loss of fees from no trading to the SEBON, Nepal Stock Exchange and brokerage houses,

NEPSE has experienced limited impact since it began operations after the earthquake. Two weeks on after NEPSE resumed trading, market capitalization was reaching pre earthquake levels. Immediately before the earthquake on 23rd April market capitalization stood at NRs. 963.53 million. As of 3rd June market capitalization was NRs. 951.18 million. The market remains bullish and Nepal Stock Broker's Association is confident the market will reach pre-earthquake levels in the coming weeks.

Remittance Networks

There remains challenges in the availability of connectivity (telecommunication), transportation and cash (as unsafe buildings enhances the risk of hold significant amounts of cash). While some remittance agents have begun operations, several are still non-operational and may relocate or cease operations altogether.

Infrastructure damages have also disrupted remittance networks. Roads and telecommunication connectivity are basic infrastructure required by an agent to operate. With many roads damaged, optic fiber connectivity may be down in parts of affected districts and telecom data services intermittent reestablishing remittance agents and networks will be challenging.

Recovery and Reconstruction Strategy based on Building Back Better Approach

Recovery and Reconstruction Strategy will be based on three pronged approach: Financial sector stability, access to finance and economic recovery.

Recovery Strategy

1. Financial Sector Stability

1.1 Diagnostic of the impact of damage to real estate in affected areas on BFIs and insurance companies.

Diagnostics are needed to allow accurate assessment of the impact of the earthquake on the solvency of BFIs and insurance companies and will facilitate the design of recapitalization and restructuring programs for the sector.

1.2 Diagnostic of the financial condition of MFIs, FINGOs and FINCOs in affected areas.

Diagnostics are needed to: (a) get an accurate assessment of the recapitalization and liquidity needs of the non-bank financial sector in the affected areas to allow the resumption of credit flows to poor and rural communities; and, (b) to assess the impact of losses from deprived sector lending on BFIs.

1.3 Loan restructuring

As a consequence of the earthquake there may be broader impact economy wide. If economic activities slow down it will affect many borrowers' ability to service their debt. Previously creditworthy borrowers may need to have their existing loans restructured to allow them to revive their livelihoods.

1.4 Recapitalization fund.

This fund would provide financial resources with which to recapitalize BFIs and non-bank financial institutions in affected areas, based on the results of diagnostics. The need for the fund reflects: (a)

the need to prevent deleveraging by the financial system as a result of reduced solvency and the inability of BFIs to provide deprived sector loans to insolvent MFIs and FINGOs; and, (b) the low balance of the deposit guarantee fund and the fact that deposits in non-bank financial institutions are not guaranteed, exposing small depositors to heavy losses if the institutions are not restored to solvency.

1.4 Capital increase for the Deposit and Credit Guarantee Fund (DCGF).

The DCGF presently has only about NPR 2 billion with which to insure about NPR 300 billion of deposits, well below the recommended level of NPR 15 billion (5 percent of insured). While the Government is contributing NPR 500 million of additional capital each year, the capital of the Fund needs to be increased very rapidly to increase depositor confidence and allow insolvent banks to be liquidated rather than recapitalized by the Government.

2. Access to Finance

2.1 Special cash transfer account scheme

The financial system can play a key role in channeling support to earthquake victims through a special cash transfer account scheme, using banks that meet certain eligibility criteria. Contrary to traditional bank accounts, such cash transfer accounts do not serve transactional or savings purposes. It is merely a scheme for the government to transfer funds to victims. It therefore represents minimal risks for abuse. The scheme would amongst others require establishing sound eligibility criteria for participating banks, and a robust enrolment process. It would also require a simplification of Know Your Customer (KYC) and Customer Due Diligence (CDD) norms. As a matter of urgency, this requires TA aimed at establishing the KYC/CDD tier thresholds; issuing an amendment to the current regulations and issuance of a guidance circular to the financial industry; and developing the full technical and operational framework for the account opening and payment processes. Please refer to appendix 5 for tiering of KYC/CDD requirements.

2.2 MFI liquidity facility

This facility would provide concessional loans to MFIs in affected areas to quickly restore their liquidity and respond to the increased demand for credit from FINGOs and FINCOs to finance reconstruction and recovery.

2.2 Technical Assistance to MFI

Given the extent of damages caused by the earthquake in the MFI sector, the sector would require a range of technical assistance for two reasons- 1) to ensure that the MFI sector, that has greater outreach in rural parts of Nepal but are also vulnerable to shocks, is back on track providing the basic financial services to the people in the lowest income groups and 2) to ensure that rural livelihoods that have been mostly impacted by the earthquake is restored quickly to make sure that households do not slip back to poverty. For the same, the following recovery technical assistance is warranted for:

2.3 Rebuilding livelihoods in affected communities:

Compared to other larger financial institutions, MFIs have better outreach, community based linkages, long and trusted presence in the rural affected areas and could be effective delivery mechanism and channels. There is need for specific support schemes for rebuilding livelihoods in affected communities, to be channeled through eligible MFIs and coops, targeted specifically at micro entrepreneurs. In addition, MFIs could play a supplementary role to support houses reconstruction and repairing as delivery channels with outreach in the affected rural communities.

2.4 Rebuilding infrastructural assets, recovering data and enhancing MIS/IT structure:

MFIs need technical assistance to rebuild physical infrastructure and recover data (short term) and to enhance/introduce MIS systems (long term). Assistance would be required so that appropriate parameters/conditions are set (e.g. assessment of physical damages, management structure in place, basic business plan). In the long term, financial support and technical assistance are needed to enhance/introduce IT infrastructure and MIS systems to instill best practices and to equip the microfinance institutions for post-emergency action and sustainability.

2.5 Capacity building at sectoral and institutional level:

Strengthening the sector and providing support in the areas identified as major constraints before the shock is imperative to enhance the resilience and equip the sector in the long-term. A lot of capacity building of the sector would be required to cope with the changed circumstances after the earthquake. Similarly, regulatory support would also be required to make short-term regulatory adjustments to provide flexibility for MFIs to be back in business and medium to long-term regulatory changes to enhance resilience of the sector. In order to support the microfinance sector on recovery strategy, a program would be required to identify key areas such as risk management, loan recovery, loan origination and approval processes and accordingly, technical assistance would be required at targeted MFIs and FINGOs to guide them instill best practices, based on the country context, and to equip them for post-emergency action. In addition, a program would also be required to develop, test, and promote micro-risk management products post calamity such as insurance and pension. On this, technical assistance to develop and launch household level micro-risk management products would also be helpful. These activities would have to be complimented by financial awareness raising and customer protection programs to ensure that these complex products are offered responsibly and in a transparent manner.

2.6 Insurance product development and education technical assistance.

The earthquake has highlighted the lack of insurance providing protection from the devastating impact of natural disasters for the vast majority of people – only about 15 thousand of the 500 thousand homes damaged by the earthquake are insured, and most of those insured are under-insured (meaning insurance will only cover debt not the cost of rebuilding). Technical assistance is needed to support the development of insurance products which provide protection from natural disaster and provide financial education to promote their use.

2.7 Recapitalization fund for MFIs, FINGOs and FINCOs.

This fund would provide financial resources with which to recapitalize non-bank financial institutions in affected areas, based on the results of diagnostics. The need for the fund reflects the inability of BFIs to provide deprived sector loans to MFIs and FINGOs while they are insolvent (cutting them off from 70 percent of their funding for loans) and the fact that deposits in non-bank financial institutions are not guaranteed, exposing poor and rural depositors to heavy losses if the institutions are not restored to solvency.

2.8 Effective Regulation and Supervision of SACCOs

There are thousands of SACCOs operating in the country; most of them are registered with the government through the department of cooperatives. Unlike banks and other financial institutions including licensed MFDBs and FINGOs, SACCOs not licensed by NRB are not regulated or supervised by NRB. However, the outreach of these SACCOs is widespread and they have been providing financial

services to a large number of members across Nepal. Given the volume of financial services business being managed by SACCOs, there is a need for a strong regulator, and a major upgrade of the regulatory and supervisory regime, with a view to raising safety and soundness in the sector, to the direct benefit of its users. Regulating the SACCOs on the one hand, would ensure the financial services they are carrying out are fully accounted for in the overall financial sector portfolio and national payment transmission mechanism, on the other hand, it would ensure level playing field for similar smaller financial institutions including the licensed MFDBs and FINGOs that are currently subject to NRB regulation and supervision.

3. Economic Recovery and Finance

3.1 Refinancing facility funding to support recovery of households.

This facility would provide concessional refinancing for on-lending by BFIs to allow for the funding of repairs/reconstruction of damaged homes. Funds would be provided through an NRB refinancing window at a concessional rate. The following financing would be provided:

- *Housing reconstruction.* Funding for rebuilding destroyed uninsured homes at concessional rate for 10 years.

4. Insurance

4.1 Capacity building to expand coverage

- Building capacity to streamline and accelerate the claim settlement process can send positive signals for expanding insurance coverage.

4.2 Enhancing legal and regulatory framework

- There is also a need to strengthen insurance regulation and supervision to ensure effective enforcement.

Reconstruction Strategy

1.1 Rebuilding the Nepal Rastra Bank

The NRB must replace two of its main buildings, including its cash management facility and install a new real time gross settlement system. Both buildings need to be replaced by earthquake resistant facilities built to purpose. In addition, the NRB needs to replace workstations damaged in the earthquake and adapt to the use of temporary quarters by providing staff with computers and/or laptops.

1.2 Disaster Recovery Center for the NRB's Core IT Systems.

The NRB's core IT systems are operating without a disaster recovery facility which exposes the financial system to catastrophic disruption of the domestic payments and settlements system and to the NRB's ability to provide liquidity and conduct monetary operations in the event of another natural disaster.

The following table summarizes the Needs Assessment in terms of recovery and reconstruction over a three year period. Please refer to Appendix 1 and Appendix 3 for assumptions used in the computation

of needs.

Table V: Summary of Needs & Reconstruction

Needs				
Recovery (NRs. millions)		Year 1	Year 2	Year 3
Cost of Potential Loan Loss/ Restructuring	16,542	12,407	4,136	0
Technical Assistance Required for MFIs	340	150	100	90
Concessions for Housing Reconstruction	6,808	371	829	1,114
Cost of potential liability of Insurance Companies	3,200	2,000	0	0
Total Recovery Cost	26,891	14,928	5,065	1,204
Reconstruction (NRs. Millions)		Year 1	Year 2	Year 3
Cost of Re-building NRB with Modern Infrastructure and workstations	4,972	1,492	1,492	1,989
Cost of Re-building infrastructure of BFIs/SACCOs	1,709	993	0	0
Total Reconstruction Cost	6,681	2,485	1,492	1,989
Total Recovery and Reconstruction Cost	33,572	17,413	6,557	3,193

Implementation Strategy for Recovery

The Government will continue to carry out reform measures designed to assess and then mitigate risks to the financial sector which have been amplified by the impact of the earthquakes. These include the strengthening of the financial crisis management architecture, establishment of disaster recovery centers by the NRB and BFIs, and expanded diagnostic work to assess the impact of the earthquake on bank and insurance company solvency.

The recovery strategy will encompass:

- Physically reconstructing the NRB with built-to-purpose facilities, establishing a disaster recovery center, re-equipping staff, and providing adequate information systems to support supervision;
- Financial support for reforms provided by the Development partners. These provides support for putting in place a legal framework for financial crisis management, strengthening risk based supervision of BFIs, reforms to the legal and regulatory frameworks for insurance companies and FINCOs, further steps to strengthen the payments system, and in-depth diagnostics of insurance companies and FINCOs. These actions will also be supported by capacity building grants from DFID and FIRST Initiative of the World Bank;
- The use of carefully-designed regulatory forbearance to allow BFIs to restructure the debts of viable borrowers; this could include, among others, deferring of loan loss provisioning requirement by one notch on the incremental NPA. However, the BFIs should disclose such “gains” and dividend payout restricted to the extent of forbearance exercised;
- Providing concessionary financing and expanded use of credit lines to facilitate the

restructuring of viable corporates and SMES, and to support housing reconstruction. The emergency facilities established by the NRB will be complemented by on-budget facilities and the distribution channels will be designed to ensure transparency and accountability;

- It may be important to impose a moratorium on the increase in lending rates by BFIs at pre – earthquake levels at least for a quarter;
- Allow full deduction of financial contributions made by all incorporated BFIs to Prime Minister’s Relief Fund;
- Investments in financial education/awareness and new product design to encourage and enable the more widespread use of insurance as a disaster mitigation mechanism, especially by the poor and rural population; and
- Establish a Bailout Fund for concessions and recapitalization with appropriate mechanism in consultation with relevant stakeholders and development partners.

Assessment Methodology

This financial sector needs assessment is based on a wide range of inputs and data, from diverse sources. The Sector assessment was led by the NRB in collaboration with the following agencies conducting the assessment: WB, ADB, UNCDF, ILO, USAID, IOM and DFID. However, as explained above, it will take time for the full impact of the earthquake to become apparent. The team also carried out a field visit to Nuwakot and met affected BFIs and MFIs, consulted various associations of BFIs, MFIs and Insurance sector, the Department of Cooperative, the Insurance Board, and used expert opinions and secondary data where possible.

Appendix 1: Assumptions and Sources of Information Used for Estimates

	Class A, B & C	Class D	SACCOs	Total
Total Portfolio (NPR millions)	1,256,580	55,000	154,493	1,466,073
Average NPA Rate before EQ (%)	2.7%			
Volume of NPA before EQ (based on average NPA) (NPR millions)	33,676	1,474	4,140	39,290
Portfolio at Risk (%)	1.12%	7%	7%	
Volume of Portfolio Affected/Volume of Additional NPA (NPR millions)	14,024	3,850	10,814	28,689
Estimated NPL Post Earthquake (NPR millions)	47,700	5,324	14,955	67,979

1. In computing the level of NPAs of Class A,B and C, the net loan portfolio does not include Deprived Sector lending of NPR 55 billion.
2. Portfolio at risk of A, B and C is based on the data received from 6 banks banks in affected areas and extrapolated to the entire banking portfolio.
3. SACCOs data is provided by Nepal Federation of Saving and Credit Union which includes institutions not regulated by NRB.
4. Current NPA level of the financial institutions is taken at 2.7 percent as of Q2FY15.
5. Estimated portfolio at risk of the Class D FIs & SACCOs is assumed at 7 percent of their total portfolio where based on the discussions with the respective associations.

POSSIBLE LOSSES DUE TO BUSINESS DISRUPTION OF BORROWERS		NPR million
Portfolio to be restructured (SME)	5%	62,829
Additional provisioning after restructuring	12.50%	7,854

6. It is estimated 5 percent of the BFI's total loan portfolio, mostly MSMEs could potentially be affected due to business disruptions/slowdown as a consequence of the earthquake. These loans would require restructuring and therefor loan loss provisioning of banks would increase by 12.5 percent (prevailing regulation) of the impaired loans.

Total Loan Loss Provisioning financial sector Post-Earthquake (NPR millions)	75,833
Post-Earthquake NPL ratio (%) after 90 days	5.17%

Cost of Potential Loan Losses/Restructuring	Amount
Incremental Loan Loss Provisioning without Deprived Sector Lending (NPR millions)	32,692
Incremental Loan Loss Provisioning in Deprived Sector Lending (NPR millions)	3,850
Net Incremental NPA (NPR millions)	36,542
Estimated Profits of the financial sector this FY (NPR millions)	20,000
Potential Cost of Loan Loss/Restructuring (NPR millions)	16,542

7. Access To Finance

Technical Assistance Required for MFIs (NPR millions)	340
Rebuilding Livelihoods in Affected Areas (NPR millions)	90
Rebuilding Infrastructure Assets, Recovering Data and Enhancing MIS/IT Structure (NPR millions)	160
Capacity Building at Sectoral and Institutional Level (NPR millions)	90

8. Concessional Housing Loan Program

Concessions for Housing Reconstruction (NPR millions)	6,808
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The 0 percent refinancing facility being proposed by NRB requires financial institutions to on-lend at 2 percent interest rate. This would mean financial institutions would forgo their gains (in the form of opportunity cost vis-à-vis interest spread in normal circumstances) while NRB would also forgo some of their returns. It is envisaged that the opportunity cost, in terms of interest spread should be at least 4 percent to incentivize banks to lend; Total fiscal cost over 10 years of the loan's tenure is calculated on a declining balance, with loan uptake of 30 percent, 40 percent and 30 percent in year 1, year 2 and year 3 respectively.

It is also assumed that the loan processing fees (Credit Information Centre fee, Property Valuation fee and Insurance Premium) will be transferred to the borrower. For the loans that are likely to be disbursed as per above, the total loan processing fees would cost NPR 491.1 million over the tenure of the loan.

9. Potential Loss in Insurance Sector

Insurance	NPR millions
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Expected Insurance Claims	16,000
Covered by Re-insurance treaty	80%
Amount covered by re-insurance	12,800
Liability of local insurance companies	3,200

As per discussions with insurance sector professionals, the total insurance claims made amounts to around NPR 16 billion. It has been suggested that approximately 80 percent to 90 percent of this are re-insured. Therefore, around 10 – 20 percent of the total claims are assumed to be borne as local liability of domestic insurance companies.

10. Reconstructing Nepal Rastra Bank Infrastructure

Nepal Rastra Bank	NPR millions
Cost of Damage	3,500
Estimated Budget for re-building NRB with modern infrastructure	5,000

The estimate for the damage to the two NRB offices at Baluwatar and Thapathali is NRs. 3.5 billion. This is based on calculating the rental cost for 15 years of relocating the entire staff to similar alternative premises. The estimate for constructing new central bank offices at the two locations with modern facilities and security features based on international best practices would total NRs. 5 billion.

11. Damage to BFI branches

Item	Class A	Class B	Class C	SACCOs	Total
Total Branches	1,508	787	246		2,541
Total Bank Buildings Damaged	75	203	130	502	408
a. Within KTM Valley	36	97	62		196
b. Outside KTM Valley	39	105	68		212
<i>Total Cost of Damage to Bank Branches(NPR Million)</i>	<i>149</i>	<i>401</i>	<i>257</i>		<i>807</i>
Number of ATMs Damaged	120	324	208		652
<i>Total Cost of ATM Damage (NPR Million)</i>	<i>84</i>	<i>227</i>	<i>146</i>		<i>456</i>
Total Cost of Infrastructure Damage (NPR Million)	233	628	403	622	1,486

Approximately 2.5 branches per bank are assumed to have been affected by the earthquake by extrapolating data gathered from 13 commercial banks. Further, 48 percent of the affected branches are considered within valley and 52 percent branches are considered outside of valley based on.

12. It is estimated that the renovation/refurbishing of a bank's branch within valley will cost around NPR 2.5 million and NPR 1.5 million outside the valley based on the discussion with class A bankers.

13. It is estimated that 4 ATMs per bank are considered as being damaged/non-operational and replacement cost of each ATM is estimated at NPR 700K based on the discussion with Class A bankers.

Appendix 2 & 3

Appendix 2: Assumptions for damage and loss summary calculations.

- The three state owned banks account for 17 percent of the loans market share. As such the 17 percent of the total loss from restructuring is assumed to be on the books of the 3 state owned banks while the remainder on private banks.
- The public sector portion of the cost of interest subsidy on housing loans is calculated by assuming the NRB incurs opportunity loss of 4 percent interest rate spread in providing 0 percent refinancing. The private sector portion is calculated by assuming private banks forego 2 percent interest rate spread in providing housing loans at 2 percent.
- Loan Processing charges are borne by the borrowers.
- Interest rate subsidy costs of loans for schools and hydro power for public and private sectors are calculated on similar assumption as the calculations for housing loan public-private costs and are to be covered by the Bailout Fund.
- It is assumed the one state owned insurance company with a market share of 4 percent will also account for 4 percent of the total liabilities of the local insurance companies.

Appendix 3: Assumptions used for Needs Assessments

- Almost 75 percent of the potential loan loss is likely to be incurred in year 1 while 25 percent carried over to year 2.
- The BFIs may be granted deferment of loan loss provisioning for incremental NPA owing to restructuring of loans to MSMEs from business disruption. This loan portfolio may constitute 5 percent of total loan portfolio and incremental provisioning of 12.5 percent which amounts to NPR 7,854 million may need to be relaxed allowing the BFIs to extend credit in favorable terms. However, direct concessional rate to the borrowers have not been recommended due to challenges in selection process.
- Housing loans are provided for 10 years. It is assumed that of the total housing loans disbursed, 30 percent is disbursed in year 1, 40 percent in year 2 and 30 percent in year 3.
- Loan Processing charges are borne by the borrowers.
- It is assumed that rebuilding the Nepal Rastra Bank with earthquake resilient infrastructure will cost 40 percent more than the damages and it will take 3 years for completion. A substantial proportion of the rebuilding costs are assumed to be state of the art technologies including real time gross settlement system and disaster recovery site. As these will be installed last after the buildings are complete 40% of the total expenditure is expected to be used in the year 3.

Appendix 4 & 5

Appendix 4: Nepal Rastra Bank BBB and RTGS Cost Estimates

Real Time Gross Settlement (RTGS); Central Securities Depository (CSD) for the T-Bills, etc; a robust data center with disaster recovery arrangements; and, associated inter-bank network. Rough cost estimates based on other countries in South Asia:

- RTGS + CSD (hardware + software + implementation): \$2.5 million
- Data center (strengthening main datacenter and creating a DR center - without including civil works): \$5-10 million.
- Consulting support, capacity building etc: \$0.5 million
- Enhancements to core banking etc to support new systems: \$0.5 million

In total: **NPR 850 to 1,350 million**; additional cost for Operating and Maintenance would be required.

Appendix 5: Revising KYC tiers

The following tiers with agreed thresholds can be considered by the authorities:

Tier 1 – Minimum level identification for cash transfers: Leveraging on information of the beneficiary households that will be screened and identified through the Household Survey for Earthquake Damages. This should focus on identification of the member of the household that is the account holder or under whose name a “cash transfer account” is opened. A “cash transfer account” could be limited in functionality – i.e. it is only meant for the recipient to make withdrawals (not deposits or transfers to other accounts). This tier should not focus on getting information on the physical address of the recipient (which could change), but instead on something unlikely to change like the individual’s name. This could be as simple as the individual saying “I am X”, and the bank ensuring that X’s name exists as a cash transfer recipient based on the Household Survey for Earthquake Damages findings. Indeed, the international standards do not require obtaining the residential address in the case of individuals to be part of the CDD/KYC process.

Tier 2 – Simplified verification measures above a determined threshold: Where amounts above an agreed threshold of cash transfer are involved (to be determined by the team and the authorities), simplified measures such as verification of the identity of the recipient may be required. The verification can be in the form of any available photo ID and in the current disaster environment, flexibility is necessary as to what photo ID is acceptable. This is to recognize that a lot of earthquake victims most likely have lost their photo IDs. This verification may be postponed to after the establishment of the relationship¹⁵.

Tier 3 – Simplified measures where potential of criminal abuse is possible: Where amounts are being disbursed for construction of houses and therefore likely a higher threshold than in the case of cash transfers, there is potential for fraud or misuse of the money. Some recipients could potentially use the money received for other purposes than construction of a house. In mitigating this risk, additional information may be required beyond a photo ID. For example, knowing the area and possible location of the prospective house could be information that the bank may require as part of its due diligence process.

Section C: Infrastructure Sectors

ELECTRICITY

Summary

The Post Disaster Need Assessment (PDNA) for the electricity sector covers generation, transmission and distribution facilities in on-grid and off-grid system. It covers the generation, transmission and distribution systems owned by the public utility company Nepal Electricity Authority (NEA) and the hydropower generation facilities owned by Independent Power Producers (IPPs). The distribution system above also includes community managed and operated rural electrification entities. It also covers community based micro hydropower projects (MHP), solar home system (SHS), small solar home system (SSHS) and institutional solar PV system (ISPS) owned by local communities and individual households and promoted by Alternative Energy Promotion Center (AEPC). The assessment covers the entire country, with a focus on the 14 districts that have been severely affected by the earthquake.

The PDNA was carried out based on the data collected and verified by NEA, representative of the Power Grid Corporation of India Ltd (PGCIL), IPPAN for on-grid facilities and AEPC for off-grid facilities under the leadership of the Ministry of Energy (MOE) and Ministry of Science, Technology and Environment (MOEST). The World Bank, as the leading agency for PDNA for the electricity sector, has provided support to MOE and MOEST in the data processing, damage assessment and preparation of recovery and reconstruction strategy and plan with active participations and contributions from JICA, ADB, Norwegian Embassy and UNDP.

Major damages were found in electricity generation facilities, both on-grid and off-grid, and distribution networks. For **generation under operation**, about 115 MW hydropower facilities out of the 787 MW total installed capacity in the country (grid and off-grid) have been severely damaged, 60 MW partially damaged. For **generation under construction**, about 1,000 MW of hydropower projects owned both IPPs and NEA, have been partially damaged. For transmission system under operation, there were damages to seven substations. Boundary wall of 8 substations, cracks in control room building of 9 substations and staff quarters & office building damaged at 14 locations were observed. Damages have also been noticed in 5 transmission lines. All the affected transmission substations were restored within a short period of time with the assistance of officials from Power Grid Corporation of India. As on date all 42 substations and 57 transmission lines are in operation, however risks of tower foundation damage, vulnerable towers due to landslide/soil erosion and structure damages are yet to be confirmed through a walk through check for all towers in the transmission lines in the earthquake affected areas. For **distribution**, about 800 km of distribution lines at different voltage levels (33 kV, 11 kV and 400 V) and 365 transformers at different capacity (from 15 to 300 kVA) have been damaged and are out of services. For the **off-grid electricity** services, about 262 MHP facilities and 115,438 SHS or small SHS, and 156 ISPS have been damaged and are out of services.

The total **cost of physical damage** is about NPR 17,807 million, including NPR 5,575 million on the public side and NPR 12,231 million on the private side. Out of services of operational facilities, for estimated duration of recovery and reconstruction since April 25, 2015, would make **loss of revenues**, as reported, of NPR 3,338 million for IPPs in power sales revenues and about NPR 97 million for the Government in royalty payments by NEA and IPPs, and no loss of revenue for NEA since cost of purchase of electricity is higher than retail tariff. **Cost of recovery and build back better** is estimated to be NPR 18,586 with NPR 5,693 million and NPR 12,893 for public and private assets.

Loss of electricity services is one of the factors that affect many people's life in Nepal. About 603,000 **households affected** have lost access to electricity, including 91,200 households for grid electricity and the rest for off-grid electricity, due to either damage of the electricity supply facilities or collapse of

their houses. Assuming that new houses will be built up on time, it will take **12 to 24 months to recover electricity services** to the affected households, depending types of physical electricity facility damage.

Pre-Disaster Context and Baseline

Access to electricity services. According to the national census published in 2013, about 75 percent of the total population in Nepal (27.5 million), is estimated to have connections to grid (about 50 percent) and off-grid (about 25 percent) electricity. Although off-grid connections provide relatively reliable electricity supply in the rural areas, access to the grid in rural and urban areas does not necessarily mean access to electricity due to continuing load shedding, up to 14 hours per day in grid-covered areas in the dry season. Lack of access to reliable grid-supplied electricity is one of the key obstacles to lifting the remaining people below the poverty line out of poverty. While Nepal has achieved remarkable progress in off-grid electrification, coordination with grid extension needs to be enhanced through planning future rural electrification to avoid stranded off-grid assets when the grid is extended to the off-grid areas.

Electricity service in Nepal is provided mostly through grid system and some part by isolated off-grid system. Grid system consists of vertically integrated Generation, Transmission and Distribution System. Nepal Electricity Authority (NEA) is fully government owned power utility responsible for operation and management of the grid. NEA as well as private power companies owned the generation assets, whereas Transmission and Distribution assets are fully owned and managed by NEA. A brief status of Generation, Transmission and distribution system is described below.

On-grid Generation. Total existing installed generation capacity pre-disaster period is reported to be 787 MW of which 782.5 MW is in grid system. Of the total capacity in the grid, 729.1 MW is provided from hydropower plants whereas 53.4 MW consists of thermal generation. Independent Power Producers (IPPs) own 255.6 MW of generation capacity and rest (473.4MW) belongs to NEA. Summary of generation capacity is illustrated below in Table 1.

Table1: On-grid Generation Capacity of Nepal

Source of Generation	Installed Capacity (MW)
Total Hydro (NEA)	477.9
Total Small Hydro Isolated (NEA)	4.5
Total Hydro, in Grid System (NEA)	473.4
Total Hydro (IPP)	255.7
Total Hydro (Nepal)	729.0
Total Thermal (NEA)	53.4
Total Installed Capacity in Nepal	782.4

Transmission Network. Existing Transmission System consists of 66 kV and 132 kV transmission lines and associated grid substation as well as a Load Dispatch Center. NEA is having transmission system with 42 substations (28 at 132 kV level and 14 at 66 kV level) with total transformation capacity of 2,159.6 MVA (1722 MVA at 132 kV and 438 MVA at 66 kV). There are total 57 lines under transmission segment, out of which 36 lines are at 132 kV level and 21 lines at 66 kV level. It is reported that there is 2,129.7 circuit km of 132 kV transmission lines and 511.16 circuit km of 66 kV transmission line. Route length of the transmission lines is 1948 with 6093 number of towers.

Distribution. Electricity services to end consumer is provided through distribution system of 33 kV, 11 kV and 400 V distribution lines and associated distribution substations. NEA is providing electricity services to more than 2.7 million consumers through its 90 distribution centers spread over the whole country. Total number of consumer in the 14 earthquake affected districts is accounted for 23 % of

total NEA customer. Whereas, these affected districts contributes 72 % of total sales and 73 % percentage of sales revenue of the NEA. Base line information of Physical Infrastructure is given in Table 2.

Table 2: Distribution System Baseline Information

S.N.	Description	33 kV
1	33 kV distribution line (km)	3,823
2	11 kV distribution line (km)	32,393
3	400 V distribution line (km)	87,318
4	33/11 kV distribution Transformer-set	800
5	11/0.4 kV distribution transformer-set	21,877
6	33/11 kV Substation(Nos.)	100
7	Installed Capacity of 33/11 kV S/S (MVA)	843
8	Installed Capacity of distribution Transformers (MVA)	2030
9	Meters-set	3,172,424
10	Distribution Poles-(Nos.)	2,347,146

Off-grid Electricity Services. As of July 2013 there 1152 community owned micro-hydro plants (MHP) with totaled installed capacity of 22,830 kW. Similarly there are about 600,000 (July 2014), Solar Home System (SHS) / Small Solar home System(SSHS), with total capacity of about 10 MW, that have been installed by individual households for lighting purposes.

Damage and Loss

The major earthquake of April 25, 2015 and May 12 2015 and continuing aftershocks has significantly damaged the hydropower plants, transmission system (substation and lines), and distribution lines. The damage to complete transmission lines and grid substations are being assessed through walkover survey. The following section presents the damage assessment of the on-grid and off-grid system.

Existing Hydropower Plant. Three NEA own power plants (48 MW) and 15 IPPs owned power plants (123 MW) are damaged resulting in an outage of 171 MW. See list of power plants affected by the earthquake in Table 3. Other hydropower plants are still in operation but status of damages is not yet known. The magnitude of the damage to power plant of NEA and IPP is to be known only after the detail assessment of damaged power plants. Only preliminary assessment of physical damage is being made as of now. It is reported that in Kulekhani Storage Hydropower Plant (92 MW), the deep crack is developed in the dam, going 0.8 m deep to clay-core and the cracks are observed in the shaft bearing block also. It is also reported that some cracks are observed in power house of Upper Marsyangdi Hydropower plant (75 MW). In Kaligandaki A hydropower plant (144 MW), cracks are developed in the left bank of the reservoir which was damaged by the heavy rain two years back. Similarly, there are damage in waterway of cascade plants-Trisuli (24 MW) and Devighat (14.1). However, all the power plants of NEA are currently in operation except for Sunkoshi (10 MW), infrastructure of which is reported to be seriously damage. Although, there seems no visible damage to other hydropower plants, it needs thorough assessment. Out of 15 IPP power plants, Chilime Hydropower plant- under NEA subsidiary Company is already in operation. Other power plants requiring major reconstruction work for a time period ranging from 4 to 12 months. These power plants have suffered destruction in head works, waterways, substations, transmission lines, power houses, office buildings and staff quarters, etc. List of Hydropower plant affected by the disaster is presented in Table 3.

Table 3: List of Affected Hydropower Plants in Operation

Hydropower Plant	Installed Capacity (MW)	District
NEA Owned		
Trishuli	24.0	Nuwakot
Devighat	14.1	Nuwakot
Sunkoshi	10.0	Sindhupalchowk
Sub-Total:	48.1	
Private Power Producer		
Chilime	22.0	Rasuwa
Bhotekoshi	45.0	Sindhupalchowk
Baramchi	4.2	Sindhupalchowk
SipringKhola	10.0	Dolakha
BhairavKunda	3.0	Sindhupalchowk
Chaku	3.0	Sindhupalchowk
MadheChaku	1.8	Sindhupalchowk
Lower Chaku	1.8	Sindhupalchowk
Sunkoshi	2.6	Sindhupalchowk
AnkhuKhola	8.4	Dhading
MailungKhola	5.0	Rasuwa
RadhiKhola	4.4	Lamjung
Jiri	2.2	Dolakha
TadiKhola	5.0	Nuwakot
SiuriKhola	5.0	Lamjung
Sub-Total:	123.4	
Total Affected:	171.5	

Hydropower Plants under construction. There are reports of damages to the hydropower projects under construction, both NEA and IPP owned. Construction work in major hydropower projects such as Upper Tamakoshi (456 MW), Upper Trishuli 3A (60MW), Rasuwagadhi (111 MW), Madhya Bhotekoshi (102 MW), Sanjen (45 MW) and Upper Sanjen (14 MW) and UT1 (216 MW) stopped due to earthquake and subsequent landslides in these areas. Among these projects only Upper Trishuli 3A is being developed by NEA. However, the details of damages are yet to be assessed. Similarly, other small IPP projects under construction (Upper Chaku, 22 MW; Lower Modi, 20MW; and Lower Khare, 11MW) totaling 43 MW capacity are also reported to be severely damaged.

NEA/GON has requested Japanese government to assess the damage of the Kulekhani Storage hydropower plant. This plant was designed and construction supervision was carried by the Japanese consulting firm. GON has also requested German government through KFW to assess the damage of the Middle Marsyangdi Hydropower plant (70 MW), Lower Marsyangdi Hydro Power Plant (69 MW) Kaligandaki A Hydropower Plant (144 MW) and the Load Dispatch Center. The assessment reports no major problem and thus no need to stop the generation from these plants. GON has not yet decided on policy of providing relief to the affected private hydropower plants under construction.

Transmission System. The list of substations where damages of equipment reported is presented in Table 4 and the damages noticed in transmission lines passing through the most earthquake affected area are given in Table 5. List of substations where damages of boundary wall and cracks in building are given in Table 6. A partial damage in Load Dispatch Center is reported and load management in the system is being carried out through a back-up system.

Table 4: List of substations where equipment damaged during earthquake

Name of Substations		Voltage level
1	Balaju	66 kV
2	Lainchour	66 kV
3	Teku	66 kV
4	Panchkhal	66 kV
5	Suichatar	66 kV
6	New Chabahil	66 kV
7	Lamosangu	132 kV

Table 5: List of Transmission lines where damages noticed in tower / tower foundation during preliminary survey.

Name of transmission lines		
1	Khimti-Lamusanghu Transmission Line	132 kV
2	Lamusangu-Bhaktapur line	132 kV
3	Suichatar-Marshyangdi line	132 kV
4	Chilime-Trisuli Transmission Line	66 kV
5	Devighat-New chabel	66 kV

Table 6: List of locations where control room building / residential building / boundary walls damaged during earthquake

S. No.	Name of Substations / location	Type of damage		
		Cracks in control room building	Boundary wall damaged	Damage of residential / staff quarters / office building
1.0	Chabahil Substation	Yes	Yes	Yes
2.0	BhaktapurSubsation	Yes		
3.0	Teku Substation	Yes	Yes	
4.0	Suichatar Substation	Yes	Yes	
5.0	Lainchour Substation		Yes	
6.0	Balaju Substation	Yes		
7.0	Patan Substation	Yes	Yes	
8.0	Baneshwor Substation			Yes
9.0	Lalpur Substation		Yes	
10.0	Lekhnath S/S			Yes
11.0	Damauli S/S	Yes		Yes
12.0	Pokhara S/S	Yes		Yes
13.0	Butwal			Yes
14.0	Bardghat			Yes
15.0	Kawasoti			Yes
16.0	Chandrauta			Yes
17.0	Lamahi			Yes
18.0	Hetauda	Yes		Yes
19.0	Parwanipur		Yes	Yes
20.0	Chanranigahpur		Yes	
21.0	Piluwa			Yes
22.0	Anarmani			Yes

The substations were out of service for some time due to either loss of power or there was some problem in the substations due to damage of equipment. As reported all substations were restored in few days with the help of officials from PGCIL and the material & machineries received from India.

In most of the substations, transformers with roller were placed on rail. Due to high intensity of shaking during the earthquake, these transformers moved along the rail from its position as there was no locking arrangement to keep the transformers in a particular position or it jumped out of the rail. Due to this, damages took place in accessories of the transformer. As reported there is no damage in the main tank of the transformer. Some of the transformers started leaking heavily through various joints during earthquake and oil got drained from the transformers. Around 20,500 liters of oil has been refilled in these transformers after rectification of the cause of leakage. Most of the transformers were put into service after rectification of damages / replacement of damaged equipment by NEA with the assistance of a team from PGCIL except one transformer at Teku substation and one at Lainchaur substation. One transformer received from India is under installation at Teku Substation. Action has already been taken for procurement of the damaged equipment required for restoration of Transformer at Lainchaur S/S.

Similarly one transformer at Lamosangu S/S presently is in service but jumped out of the rail and the same needs to be put back on rail at the earliest possible otherwise the foundation is getting damaged in every aftershocks. Few substation bay equipment also got damaged, the same were replaced either from inventory, material received from India, cannibalizing from bays already installed in new transmission system or bay charged bypassing the equipment due to non-availability of the same in inventory. Cracks developed in control room building wall, column as well as in beams in some substations. Some of the damaged walls of control room building are load bearing walls. Crack also developed in control room floor and foundation settlement also observed but no control room buildings collapsed. Boundary wall of 8 substations damaged / collapsed.

It may be noted that majority of transmission lines passes through difficult hilly terrain and deep forest. During earthquake there is every possibility that tower foundation of some locations might have damaged or stress might have developed on the tower members due to disproportionate shifting of its base as a result of movement of earth. This might have weakened the tower structure. There is 1948 km (route length) of transmission lines having 6093 towers. Actual quantity of damage in transmission lines can be assessed only after thorough checking of all these 6093 towers having total route length of 1948 km but this will take considerable time. Walkover survey of transmission lines is in progress and as per preliminary report received from NEA transmission team on May 31 2015, tower damage reported in 3 number 132 kV lines and 2 no. 66 kV lines. Foundation damaged in around 20 loc. Due to soil erosion and protection wall needs to be erected. However all transmission lines are in service as it was prior to earthquake.

Distribution. It is reported that four major substations in Kathmandu valley and one substation outside the valley were damaged. However, supply to consumer is being restored. Distribution networks are significantly damage in the 14 districts including three districts of Kathmandu. As per preliminary estimates of NEA Distribution and Consumer Services Director the total damage is shown in the following Table.

S.No.	Description	Unit	Base Line Data	Works to be Carried Out	
				Immediate Restoration*	Reconstruction**
1	33 kV Transmission Line	km	3,823	63	191
2	11 kV Distribution Line	km	32,393	210	291
3	400 V Distribution Line	km	87,318	463	904
4	33/0.4 kV Distribution Transformer	Nos.	800	10	0
5	11/0.4 kV Distribution Transformer	Nos	21,877	565	148
6	33/11 kV Substation	Nos	100	0	0
7	Energy Meter (Single & Three Phase)	Nos.	3,172,424	79,519	64,000
8	Distribution Poles	Nos	2,347,146	37,170	12,500
9	Substation Equipment (Power Transformer, CT, PT, Control & Relay Panel, Battery & Charger etc.)	Set		335	0
10	Physical Infrastructure (Control Building, Staff Quarter, Office Building, Boundary Wall, Guard Room)	sqm		44,789	9524
		Nos.		45	0

*The scope of works is intended for construction of healthy line, physical infrastructure & rehabilitation of substations in affected areas where the power supply has been restored temporarily.

**The scope of works is intended for construction of line & physical infrastructure for new resettlement. However, the cost is not include in the reconstruction cost as there are lot of uncertainties in the finalization of the new resettlement

1. With the help of the Power Grid Corporation of India, NEA managed to fix the four affected substation in Kathmandu and electricity supply restored within four days. At this stage Government of India is supporting NEA/MOE by providing poles and distribution transformer. Till now about 37-100 percent electricity supply has been resumed in all the 14 badly affected districts.
2. **Off-grid Micro-hydro Plants.** It is reported that 262 numbers of MHPs with 3.7 MW installed capacity and 115,438 Solar Home Systems and 156 ISPS are damaged. This has affected more than 81 thousand households. Summary of MHP damaged in 14 districts is presented in Table 6. Alternative Energy Promotion Center is trying to assess exact nature of damage and to come up with the cost estimate to repair the damage including strategy and action plan.

Table 6: List of Micro Hydro Project damaged by earthquake

		Number of MH Plant	Installed Capacity (kW)	Total HH
	Severly Affected Districts			
1	Rasuwa	7	45.0	478
2	Gorkha	35	604.5	6,198
3	Nawakot	7	23.0	240
4	Dhading	40	582.0	5,267
5	Sindhupalchok	14	123.0	948
6	Dolakha	27	431.0	4,553
7	Ramechhap	16	170.0	1,888

	Subtotal:	146	1978.5	19,572
	Disaster Hit Districts			
8	Kavrepalanchok	42	615.5	5,847
9	Sindhuli	22	166.5	1,887
10	Okhaldhunga	47	912.5	9,347
11	Makwannpur	5	42.2	447
12	Lalitpur	-	-	-
13	Bhaktapur	-	-	-
14	Kathmandu	-	-	-
	Subtotal:	116	1736.7	17,528
	Total	262	3715.2	37,100

Estimate of financial loss due to Physical Damage: Technical (engineering) assessment of damage is prerequisite for the estimate of the value of loss from physical damage in power plants under operation as well as in under construction projects. Such engineering assessment is yet to be done therefore estimate of financial losses of physical damages in the on-grid generation, transmission and distribution systems and associated civil structures, and off-grid electricity services are only indicative and preliminary one. These preliminary information of physical damage are provided by NEA, Independent Power Producers Association of Nepal (IPPAN) and Alternative Energy Promotion Center (AEPIC). Based on these information, estimated loss of damage to physical infrastructure in generation is given in Table 7. As there are no detail assessment of damage to hydropower plants and transmission line, a provision of NPR 2,000 contingency is used. One of the objective of PDNA is to ascertain the reconstruction requirement and its associated cost to identify the resource implication. This contingency amount is also reflected in reconstruction cost for Building Back Better this sector, this gives a figure of NPR 17,807 million of physical damage to assets inclusive of NPR 2,000 million as contingencies sum. Summary of details of resource implication for reconstruction is given in Table 7.

Table 7: Cost of Damage in Electricity Sector (million NPR)

Sector	Sub-Sector	Cost of Damage	Remarks
Public-NEA	Generation		
	Hydropower: Severely damage	200.0	not in operation
	Partially Damage	800.0	in operation
	Under Construction	400.0	
	Total Generation	1,400.0	
	Transmission	347.0	
	Distribution	1,829.0	
	Total Public	3,576.0	
Private	Generation		
	Hydropower: Severely damage	2,294.0	Not in operation
	Partially Damage	85.0	In operation
	Under Construction	3,950.0	
	Distribution (meters)	1,497.0	
	Total Private	7,826.0	
Total Grid		11,402.0	
AEPIC	MHP	747.0	
	Solar Home System and ISPS	3,658.0	
	Total Off-Grid	4,405.0	
Contingency		2,000.0	
Grand Total Electricity		17,807.0	

Note: Basic cost estimates are prepared in USD and exchange rate 100 NPR to 1 USD is used.

ASSESSMENT OF CHANGE IN ECONOMIC FLOWS (CEF)

Estimation of Change in Economic Flows (CEF) or financial loss is carried out to assess impact of the disaster in the sector. It is ascertained by estimation of the loss to three sub sectors: namely *Public sector entity such as NEA, Private companies (eg, IPP) and Government*. Change in loss of net revenue is taken as the basis for calculating the CEF.

NEA Revenue Loss. NEA system is vertically integrated and sales revenue is realized in distribution sub sector. Therefore financial loss of this system is accounted in distribution system. However, it is noticed that NEA is better off in terms of net revenue as a result of reduction in sales due to power plant outage of IPPS. The reason behind is that the cost of service from IPP purchase is higher in comparison to sales revenue from the same (*mismatch of cost of service vs retail tariff*). As a result, energy unavailable for the sales from IPP resulted in reduction in power purchase expenses leading to positive impact in net revenue of NEA. Hence, net change in revenue of NEA is not considered for total change in CEF.

IPP Revenue Loss. Loss of generation is calculated on the basis of outage period –from the date of interruption of supply due to earthquake to the date of resumption of supply from the plant. In general six months outage is assumed for all the affected power plant. However, in case of Bhotekoshi 12 months of outage is assumed. Total loss of sales is calculated on the basis of estimated time for restoration of generation from existing power plants and its average monthly energy sales to NEA. Financial loss is calculated assuming the associated loss of energy sales during the outage time of generation multiplied by PPA rate. Change in IPP net revenue is estimated as 3,338.0 million NPR. The summary of calculation financial loss of CEF in IPP generation is presented below.

Table 8: IPP Revenue Loss (million NPR)

Description	Pre Earthquake	Post-Earthquake	Net Revenue Loss
Sales revenue	3,407.0	0.0	
less Royalty to GON	77.0	9.0	
Net Revenue	3,329.0	(9.0)	3,338.0

GON Royalty Revenue Loss: Royalty is applicable in capacity and energy generation from the power plants and is the source of government revenue from electricity sector. Change in Royalty from the affected projects is estimated to be at around NPR 97 million. Summary of calculation is presented in the following Table 9.

Table 9: GON Royalty Revenue Loss (million NPR)

Description	Pre Earthquake	Post-Earthquake	Net Revenue Loss
Royalty from NEA	216.0	187.0	
Royalty from IPP	77.0	9.0	
Total	293.0	196.0	97.0

Summary of Estimates of Damage and Loss of Revenue: The total loss of revenue is sum of revenue loss of IPPs and GON royalty revenue loss. Summary of calculation is presented in the following Table 10.

Table 10: Summary of Estimates of Damage and Loss of Revenue

	Value of damages (M NPR)			Value of revenue losses(M NPR)			
	Total	Public	Private	Total	Public	Private	Impact fiscal
Generation							
NEA	1,400.0	1,400.0		-	-		
IPPs	6,329.0		6,329.0	3,338.0		3,338.0	

Local communities	4,405.0		4,405.0		-		
Government Royalty					97.0	97.0	
Transmission							
NEA	347.0	347.0					
Distribution							
NEA	1,315.0	1,315.0					
Consumers	1,497.0		1,497.0				
Civil Structures							
NEA	514.0	514.0					
Contingencies	2,000.0	2,000.0					
Total Damages	17,807.0	5,575.0	12,232.0		3,435.0	97.0	3,338.0

Disaster Effects and Impact

Major impacts: About 600,000 households are directly affected by the earthquake with loss of access to electricity services. This impact is either through damage of electricity facilities, on-grid and off-grid, or loss of houses. Loss of access to electricity impacts on people's ability to derive their livelihoods and generate income, particularly for rural communities engaged in medium and small-scale enterprises. Loss of power has also had a negative impact on women who use electricity for productive as well as reproductive work. Women interviewed in Kavre indicated that there has been increase in work burden as they are now allocating as much as three hours to fetch firewood due to loss of electricity. Cooking time is also taking longer than before power disruptions. Furthermore, good lighting can be a deterrent for gender and sexual violence especially for female headed households and in taking into account that many families are still sleeping under unsecured tarpaulins.

The impact will further pose challenges to the Government goals of universal access to modern energy services by 2030 in Nepal. It should also be noted that, due to loss of generation from hydropower plant, the available electricity supply has been reduced. As imports from India is limited to available transmission capacity and limited thermal plants, NEA has resorted to increased load-shedding hours to consumers. The impact of this increased in electricity generation from captive diesel generator (DG) sets. Total loss of generation from the damaged hydropower plant and corresponding increase in generation from DG sets would be about 428 GWh. The typical cost of generation from DG sets is about 30 UScent/kWh including capital and fuel costs.

Recovery Needs and strategy

The recovery electricity in grid and off-grid could be achieved through alternative sources of electricity supply. The commonly used alternatives in Nepal are imports from India, Diesel generation set, roof top solar. Initiatives for Recovery:

- Short-term: Load shedding, and distribution of solar lantern in the affected house holds
- Medium term: Completion of ongoing cross-border transmission line to facilitate additional imports of electricity from India
- Long term: Construction of new hydropower plants and reconstruction of damaged hydropower plants

Initiatives for reconstruction On-grid Facilities would include repair and maintenance of damaged power plants, transmission lines and distribution lines.

Off-grid facilities. The reconstruction for off-grid electricity services will be carried in two phases:

Phase I – Immediate Relief Package offering domestic clean cooking and lighting solution. Under this package, the focus will be on the domestic RET solutions which can be supplied to the needy people within current Fiscal year and will be initiated immediately. This package primarily includes; i) Solar Home System (SHS) with mobile charging for household, ii) Improved Cooking Stove (ICS) and iii) community mobile charging station iv) water purification iv) immediate solar lighting solutions for health post and schools, v) biogas, vi) rapid assessment of Photo Voltaic Pump Set (PVPS) and micro hydro and vii) Income Generation Activities (IGA) and Micro Small and Medium Sized Enterprises (MSME) activities. Immediate relief package will be implemented immediately up to December 2015.

Phase II – Reconstruction, Rehabilitation and Mid Term Relief Solutions. Under this package, the focus will be to deliver long term relief solutions which will include: (i) repair, maintenance and new installation of solar system for schools, (ii) installation of solar mini/micro grids, (iii) repair, maintenance and new installation of solar system for health posts, (iv) repair, maintenance and new installation of biogas, (v) repair, maintenance, re-construction and commercial operation of micro hydro and (vi) repair, maintenance and re-construction of damaged medium small micro enterprises and revival of income generating activities. This phase is expected to be completed before December 2016. However, re-construction of micro hydro may extend up to June 2017.

Table 11: Value of Physical Damage and Cost of Reconstruction

S.No	Asset Category	Damages (million NPR)			Reconstruction (million NPR)		
		Total	Public	Private	Total	Public	Private
1	Generation	11,524.0	1,400.0	10,165.0	11,896.0	1,440.0	10,456.0
2	Transmission	347.0	347.0	-	417.0	417.0	-
3	Distribution	2,812.0	1,315.0	1,497.0	3,118.0	1,322.0	1,796.0
4	Civil Structures	514.0	514.0	-	514.0	514.0	-
5	Contingencies	2,000.0	2,000.0	-	2,000.0	2,000.0	-
	Total	17,238.0	5,575.0	11,663.0	17,945.0	5,693.0	12,252.0

Policy Gaps in Electricity Sector related to risk and vulnerability of earthquake in Nepal

It is well established from the scientific research that Nepal lies in one of the most earthquake vulnerable zone with high risk due to infrastructure. However, there are no policy in place till today in Nepal to address such risk of the earthquake or other natural disaster in the electricity sector. In this context, it is imperative to initiate and adopt at least following policies in the electricity sector:

- Formulation and implementation of Dam safety and security policy in public and private sector hydropower projects for existing as well as future projects
- Standardization of parameter for seismic factor in design of electricity infrastructure such as Dam, waterways, power stations, substation and transmission line etc.
- Preparation of guidelines for safety and evacuation of electrical equipment and personnel in post disaster situation
- Adoption of appropriate insurance policy by Public Utilities
- Design of early warning system in hydropower projects
- Policy for selection of hydropower projects in various river basins to diversify the impact of natural disaster
- Policy guidelines and procedures for disaster management in restoration of power at the earliest possible

- Policy guideline for asset management as well as it's spare management

Implementation Arrangements

Overall Planning. Under the on-going development program, a Master Plan for Rural Electrification is under preparation under ADB-funded activity. Under the on-going and proposed World Bank projects a Transmission Master Plan is under preparation by an international consultant, with targeted completion by September 2015, and an Integrated River Basin Development Planning including a Hydropower Generation Master Plan will be initiated soon to ensure coordinated approach for generation, transmission and distribution system development and rural electrification programs.

On-grid Facilities: NEA and IPPs will be responsible for assessment, planning and implementation of investment programs for recovery the electricity services for their respectively hydropower facilities damaged. For recovery of grid electricity facilities including generation, transmission and distribution, the investment, international standards will be applied and system planning will be followed to ensure better quality of facilities, safety and earthquake resilience of dams, and improved optimization of distribution system. The recovery process will include:

Generation – hiring internal Panel of Experts (POE) to carry out a rapid dam safety assessment of all major hydropower dams in the earthquake affected area to informed recovery investment plan to ensure full recovery or increased dam safety and resilience to future earthquake disasters;

Transmission – All damaged substations are made operational after rectification and so far all transmission lines and substations are in operation. To avoid potential risks of interruption due to earthquake effects in on set monsoon season, NEA will conduct a walk through inspection along the transmission line in the earthquake affected areas to check foundation stability, structure defects and landslide risks and to prepare and implement investment program as needed. In the process of restoration of substation equipment, available spares already consumed, attention is needed for spare management to procure and maintain adequate spares to take care of future contingencies. Emergency restoration systems (ERS) for transmission lines may be thought of as a part of Disaster management of transmission lines for future disasters so that transmission lines are restored quickly with ERS minimizing loss of revenue.

Distribution – Following Distribution Master Plan and international standards for distribution systems to plan new feeders in closely coordinating with housing sector activities to re-construction distributions system in parallel of new house construction and ensure recovery of electricity services in new settlement areas as soon as new houses are re-built.

Off-grid Facilities: AEPC will be responsible for implementation of the recovery and reconstruction for off-grid electricity services. The off-grid initiatives for recovery and reconstruction will adopt international technical standards for design and installation of specific MHPs and Solar Systems and follow the Master Plan to ensure,(a) optimization of site and size selection of MHPs, and (b) better coordination with grid extension plan.

Assessment Methodology

The damage and effects assessment method has been conducted in accordance with the guidance provided by PDNA Secretariat of the Government of Nepal. It is primarily dependent on the government initial assessment data, which have been refined and re-categorized in accordance with PDNA Guidelines through selected field verifications and intensive discussions with the NEA, MOE, DOED, IPPAN and the PDNA electricity sector team.

As the electricity is supplied through integrated grid system as well as through off-grid system, the estimate is done separately for grid and off grid system. Assessment of damage of physical assets for generation, transmission and distribution in grid system is being established with the help of information provided NEA and IPPAN, whereas information of damaged assets in off grid system is provided by AEPC.

The effects of damage resulted into financial loss due to physical damage and loss of revenue (Change in economic flows-CEF). Value of financial loss due to physical damaged of electricity infrastructure is estimated in historical cost. Financial loss is attributed to decline in demand due to interruption in supply or loss of sales to electricity customer due to loss of customer connection, loss of revenue of IPP and loss of government revenue in the form of Royalty from Electricity sector.

Considering load shedding situation prevailing in Nepal, reduction in sales due to loss of connection is not considered. The reason is that the available energy as a result of lost in demand in earthquake area is being supplied to other areas and reduction in sales did not occur at all due to this reason. However, there are outages in power plants causing reduction in supply which lead to reduction in sales. Accordingly, loss of revenue is estimated on the basis of estimated decrease in sales due to generation lost multiplied by current average revenue rate of NEA. For this purpose, loss of sales is calculated from lost generation after adjustment for system lost factor of 25. 5%. In case of IPP, change in economic flows (CEF) is estimated on the basis of loss of generation multiplied by power sales price. CEF to government is established as per the change in government royalty from this sector.

MHPs are run in community ownership and management with no saving from the sales of electricity service. Accordingly, it is assumed that there will be no financial loss in off-grid system of electricity sector. Hence, total financial loss of electricity sector is calculated by considering only the financial effects in grid system.

PDNA electricity sector team led by the World Bank and comprised of MOE, NEA, DOED and IPPAN with team members from ADB, JICA, Government of Norway, KfW, GIZ, India (PGCIL), who have provided inputs to the assessment.

COMMUNICATIONS

Summary

The Communications sector PDNA covers the strategic public and private telecommunications networks (both fixed and mobile), internet service providers; postal services, print and broadcast media (newsprint, radio, television) and cable television operators. It also includes the Ministry of Information and Communications (MOIC) responsible for the Information and Communications sectors, and its associated agencies including the Department of Information, Department of Printing, Press Council, National News Agency, Film Development Board, Radio Service Broadcast Development Committee (Radio Nepal) and Nepal Television. The MOIC and Nepal Telecommunications Authority (NTA) have policy and regulatory oversight of the sector.

The total damage and loss in economic flows are estimated at NPRs 3,610.2 million (US\$36.10 million) and NPRs 5084.6 million (US\$ 50.85 million), respectively. The estimated cost of recovery and reconstruction is estimated at NPRs 4,938.8 million (US\$49.39 million).

The long term recovery goal for the Communications sector is to rebuild and put in place a future proof communications infrastructure and services sector that will serve the needs of a digital Nepal. In line with this vision, the reconstruction effort should be anchored on a future proofed approach, that ensures increased investments in the telecommunications sector, the establishment of a resilient public service broadcast sector and the convergence of the Information and Communications Technology (ICT) sector that will allow for Nepal to take best advantage of the opportunities provided by technological developments.

In the near term, communications infrastructure in the worst affected districts will be rehabilitated as quickly as possible using available financial resources, including the existing Rural Telecommunications Development Fund (RTDF). Broadband wireless internet services will also be provided in the worst hit districts so that affected communities have access. These initiatives will be led by the NTA in close coordination with the MOIC and service providers.

Pre-Disaster Context and Baseline

Nepal's communications sector before the earthquake was characterized by competition and growth in market size and coverage. In particular, there was impressive growth in the cellular market, a well-developed community and FM radio ecosystem, a large number of print and broadcast media players, and a competitive cable television market. The postal network extended to every Village Development Committee (VDC) across the country. Table 1 below provides a summary of the communications sector and market structure prior to the earthquake.

Table 1. Communications Sector and Market Structure in Nepal

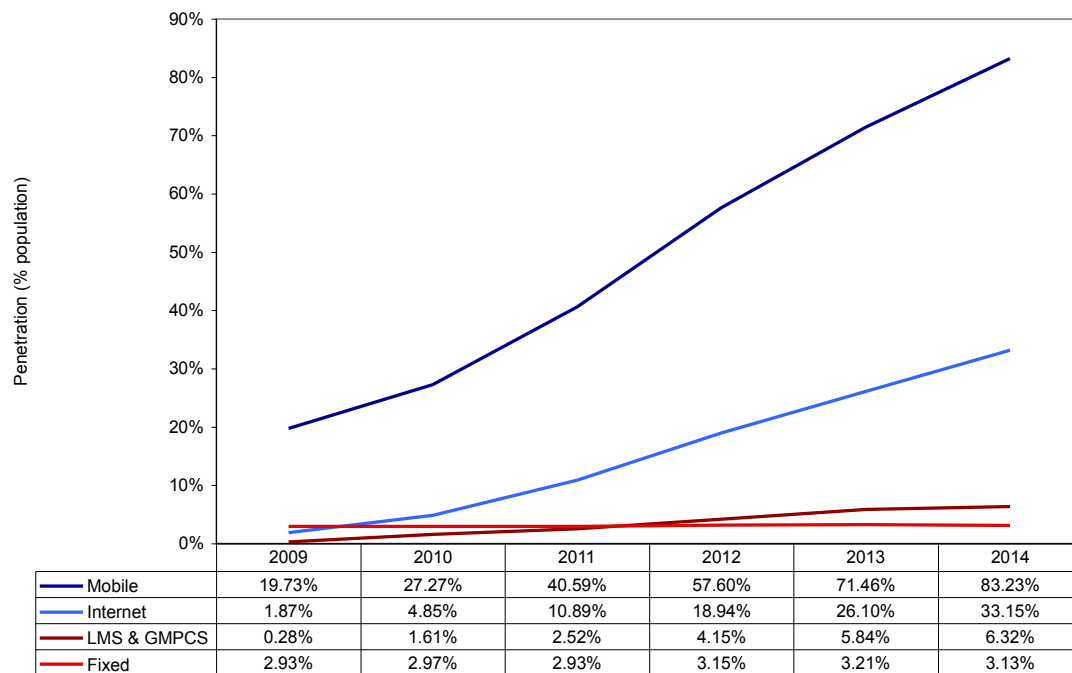
Policy maker	Ministry of Information and Communications (MOIC)
Telecommunications Regulator	Nepal Telecommunications Authority (NTA)
Spectrum management	Frequency Management Division (FMD) at the MOIC. Telecommunications spectrum is allocated on a "block" basis to NTA to manage. Broadcast and other spectrum is managed by FMD. Overall spectrum management policy, including pricing is decided by the Radio Frequency Policy Determination Committee (RFPDC)– a cross-sectoral

	committee headed by the Minister MOIC and comprising Ministry of Home Affairs (MOHA), Ministry of Defense (MOD) and Ministry of Civil Aviation and Culture (MOCAC).
Department of Information & Press Council Nepal	Accredits journalists Concurs registration of print media operations Houses the print media information
Telecommunications Operators and Market share	Nepal Telecom (vertically integrated state owned operator) - 46% NCell (mobile operator majority owned by Telia Sonera) - 46% Smart Telecom Private Limited (Basic telecom operator) - 5% United Telecom (WLL operator – majority Indian owned) - 2% Others (Nepal Satellite, STM, etc.) - 1%
Telecom Sector Statistics (end January 2015)	Fixed penetration: 3.12% Mobile penetration: 87.55% Others (Limited mobility, satellite): 7.63% Internet users: 38.78%
Number of Television Broadcasters	1 state owned Television broadcaster, Nepal Television 25 private television broadcasters in operation
Print Media	2 owned Government newspapers 7016 privately owned newspapers; magazines and other weekly publishing houses.
Postal Services	Government owned Nepal Post with presence in every Village Development Committee (VDC) and municipality across Nepal. Multiple private courier service providers
Cable Television Providers	850 registered private operators, 6 digital cable providers.
Internet Service Providers	46 licensed private operators; all telecommunication operators also provide internet services.

Nepal’s telecommunication’s market is comprised of two major operators with almost equal market share, Nepal Telecom and Ncell and four other small operators. With mobile services providing greater mobility, and with close to full population coverage achieved nationwide, mobile services will continue to dominate the market. While Nepal’s mobile communications sector is well developed and all districts and Village Development Committees (VDCs) have access to mobile services, Nepal’s internet penetration is still less than 40%. The chart below¹⁶ indicates growth in access (percentage of population with access to various services).

¹⁶ Source: Nepal Telecommunications Authority (July 2014)

Chart 1: Communications Market Access
 (Source Nepal Telecommunications Authority July 2014)



Telecommunications is a major source of tax and royalty revenues for the Government of Nepal (GON). As such, overall sector revenues for 2014 were estimated at NPRs 85,900 million (US\$859 million) and GON received approximately NPRs 3,450 million (US\$34.5 million) in royalties. The two major telecommunications operators are some of the largest taxpayers in Nepal. One of the largest foreign direct investors in Nepal has been the telecommunications operator Ncell. Before the earthquake, the telecommunications sector faced a number of policy and regulatory challenges including:

- a policy and regulatory framework that requires revision, given significant technological developments in the sector;
- lack of an emergency and disaster communications strategy, plan and network infrastructure;
- large unutilized amounts accumulated (approximately NPRs 10,000 million) in the Rural Telecommunications Development Fund (RTDF); and
- limited mobile Value Added Services and Applications designed to serve economic and social sectors including in particular mobile financial services which lacks a clear regulatory framework for mobile network operators (MNOs).

Despite potential challenges, ICTs have been adopted across the Nepalese public and private sectors. ICTs have been extensively used in the provision of many public and private sector services: banking and financial services, public sector financial management, agriculture, health, education, social protection, transport, energy, and rural development, among others. A National Government Integrated Data Center, Nepal eGovernment Interoperability Framework (NeGIF) and National Enterprise Architecture were key foundational infrastructure and frameworks established to enable eGovernment in Nepal. The National Identification Management Center (NIDMC) of the MOHA was also in the process of implementing a pilot project to establish a digital National Identification infrastructure based on biometric data.

Damage and Loss

Effects on Infrastructure & Assets and Effects on production of goods and services and access to services: The Communications sector faced significant damage from the earthquake of April 25, 2015 followed by the strong aftershocks of April 26 and May 12.

- **Telecommunication networks** were affected, as mobile base transceiver stations (BTS) were damaged, and power disruptions and lack of fuel supply impacted service provision. All operators reported damage to some of their sites, including buildings. This resulted in significant network congestion and down time in the immediate timeframe of a week, following the three major earthquakes. It has been reported that some owners of houses on which rooftop BTS's were installed are hesitant to continue renting space, given additional loading factors on their rooftop premises. While the international gateways, which enable international communications, were not affected, network backhaul infrastructure (both aerially installed fiber optic cables and microwave links) were damaged in a number of areas. The fixed line network in Kathmandu sustained damages, as well. In order to cope with the after effects of the earthquake on network coverage and congestion in the Kathmandu valley, NTA made additional frequency available for GSM operators on request for a one month period. Ncell utilized its additional spectrum, while Nepal Telecom did not. Operators provided free voice, data and SMS services. At this time, services have been largely restored. In the worst hit districts, mobile communication services are available, but quality is being impacted by low reliability of power supply and dead spots in the network.
- **Internet Service Providers:** Internet services were disrupted, but have been restored. Erratic power supply remains a challenge.
- **Postal services:** At the post offices, damage was limited to physical buildings at 32 locations. Postal services continue to be provided, albeit with delays due to road blockages among others.
- **Broadcast Media:** Both television and radio broadcasters were affected. The Association of Community Radio Broadcasters (ACORAB) reported damage to community radio equipment and buildings at 60 locations across 19 affected districts. Approximately 50 FM radio stations were impacted by the earthquakes. 20 of the 50 FM stations were off-air for approximately 3 days post April 25, 2015. The state owned Radio Nepal which continued its broadcast for 24 hours for a few days after the disaster, halted all advertising and focused on public service announcements. Corporate clients of FM broadcasters cancelled advertising, impacting the financial position of these broadcasters. Television broadcasters sustained physical damage to their buildings and equipment. Nepal Television, the state owned broadcaster continued its broadcasts on a 24/7 basis, despite challenges. It too lost revenues from advertising and time slot sales.
- **Print Media:** Although print media agencies faced physical damage to their buildings and some equipment, their operations were not halted.
- **Government Agencies:** The building of the Department of Information was seriously damaged. The Press Council of Nepal, National News Agency and Radio Service Broadcast Development Committee (Radio Nepal) also faced damages at their office premises. The Film Development Board reported that 57 private cinema halls were physically impacted by the earthquake. Their own office premises were also affected. The rented office premises of NTA were damaged, forcing a move to another location.
- **Effect on sector investments.** While MOIC and NTA provided all regulatory support to service providers, the earthquake will likely impact future investments in the telecommunications sectors. As such, the cost of insurance for private operators is likely to increase.

Effects on government functions and systems: The communications sector is key to ensuring that government can communicate and manage its disaster response, relief and rehabilitation efforts.

While initial network congestion and lack of coverage was experienced, there has been no adverse effect of communication sector damages observed on governance and decision making processes at the key government decision makers' level. However, in the event that the networks had failed and could not be restored in time, the government would have been very adversely affected and the situation in country would likely have been chaotic. Following the earthquake, as government seeks to make cash transfers to severely affected constituencies and individuals, that the adoption of mobile financial services would have been very effective and would have greatly facilitated the process of service delivery at such a critical time.

Effects on risks and vulnerabilities. As Nepal does not yet have a National Emergency Telecommunications Plan, the sector faces an increased vulnerability to network downtime. A lack of power supply and damage to road networks in rural Nepal following the earthquake implies that operators need to rely on back-up power solutions, such as diesel engine generators and solar power for their rural networks. This increases the risk of network downtime, as it is challenging to get fuel to remote sites. Further, communication towers located in earthquake affected and landslide prone areas are at risk of collapse.

Damage costs are estimated on initial assessments by MOIC, based on information¹⁷ provided by public and private operators, print and media broadcasters, the post office and other agencies. These estimates have not been verified through detailed engineering assessments. The loss figures mainly consist of damage to physical premises, network equipment and additional maintenance costs (largely for fuel supply for sites where commercial power is unavailable and/or erratic) and immediate rehabilitation/reconstruction works.

As telecommunication networks were impacted immediately after the earthquake, significant revenue losses were borne by operators due to network outages, mainly the two large mobile network operators. They also provided free services (e.g., airtime, SMS). The operators also reduced call charges to key international locations where a large number of Nepalese residents are based. Finally, media broadcasters accumulated revenue losses due to the non-carriage of commercial advertising and time slots.

The overall cost of damage and loss in the Communications sector is estimated at NPRs 3610.2 million (US\$36.10million) and NPRs 5084.6 million (US\$ 50.85 million), respectively, as summarized in Table 2 below:

Table 2: Summary of Estimated Damage and Losses in the Communications Sector

	Sub Sector	Estimated Damage (Million NPRs)	Estimated Damage (Million US\$)	Estimated Loss (Million NPRs)	Estimated Loss (Million US\$)
1	Ministry of Information and Communications and related agencies	817.6	8.2	-	-
2	Telecommunication operators	1,735.5	17.4	4,550.1	45.50
3	Internet Service Providers	20.8	0.2	467.0	4.67
4	Postal Sector	509.8	5.1	-	-

¹⁷ Qualification: Information provided is preliminary and subject to more detailed on the ground assessment (including engineering and technical) by providers of the information.

5	Television Broadcasters	248.3	2.5	50.0	0.50
6	News papers	143.0	1.4	-	-
7	Radio Broadcasters	56.2	0.6	17.5	0.18
8	Cable Television	79.0	0.8	-	-
	TOTAL	3,610.2	36.1	5,084.6	50.85

Disaster Effects and Impact

The total population of the most severely affected 14 districts is about 5.37 million. Most of them are in the remote rural communities and have faced challenges in accessing social and economic services. An underdeveloped mobile money ecosystem in Nepal has impacted access to finance. An underdeveloped broadband ecosystem has impacted access to public services. The lack of a digital National Identification System is likely to hamper public service delivery.

The ability of government agencies and people to communicate and receive information following the disaster, demonstrated the need for having a very robust and resilient communications infrastructure in Nepal. While operators had provided coverage to all districts and VDCs and were in the process of increasing coverage of mobile broadband networks, in the short term, their focus will be on restoring coverage to pre-disaster status. As a result, the expansion of mobile broadband networks in particular will likely be delayed.

ICT and telecommunications in particular is a crucial economic infrastructure and its early recovery and restoration is important to support economic and public service delivery activities in Nepal. Post disaster relief efforts relied heavily on telecommunications, internet and broadcast media.

Government of Nepal has invested in a number of cross-sectoral ICT infrastructure (government integrated data center) and service frameworks (NeGIF and NEA). The adoption and mainstreaming of these across all government agencies will: (i) enable faster and cheaper deployment of ICT solutions and applications across government; (ii) reduce the cost of providing public services using ICT; and (iii) support government in the business process reengineering process and allow for data sharing among agencies.

The Government's disaster risk reduction (DRR) strategy includes the use of monitoring and early warning systems some of which rely on telecommunications networks. Further, geo-mapping activities (e.g., OpenStreetMap) rely on availability of internet access.

Telecommunication networks depend upon the availability of power supply. Lack of reliable power and insufficient supply of fuel for diesel engine generators caused significant network downtime. Also, a large number of subscribers were out of reach as they were unable to charge their mobile phones, or use their computers due to a lack of power. Further, as telecom and internet providers start using optical-fiber ground wire (OPGW) on power transmission networks, the linkage between the ICT and the power sector will only become stronger.

Fiber optic cables for network backhaul that were ducted and buried were not adversely affected, as opposed to aerial cables. There is thus a need to coordinate with the Department of Roads and urban authorities in order to facilitate the development of underground ducts to enable buried fiber networks.

The earthquake response has demonstrated the challenges faced in correctly identifying and verifying affected persons based on biometric information.

Recovery Needs and strategy

Reconstructions needs resulting directly from the disaster in the Communications sector is estimated at NPRs 4938.8 million (US\$49.4 million) over a 24-month period.

In recovering and reconstructing, GON is recommended to pursue the development of a future ready communications infrastructure and service industry that meets the country's long-term development objectives in terms of inclusive, equitable and sustainable growth and a well-functioning digital economy.

In the principle of "building back better", GON and operators should consider a telecommunications network that includes the following measures:

- **Burying Cables:** strengthen the resilience of telecommunication infrastructure by promoting underground cabling in ducts for fiber optic cables rather than aerial cables.
- **Improving the resilience of BTSs** by: (i) making provisions for vehicles with microwave transceivers combined with the function of a base station as well as a satellite ground station. These could be shared between operators; (ii) adjusting the output power and reconfiguring base station antennas to cover more ground to serve low population density and low network traffic areas better; (iii) Increasing back up power at base stations and all other communication facilities to counter electricity outages. BTSs identified as crucial to be earmarked to also receive reliable fuel supply.
- **Increasing back up power at the base stations and all other communication facilities** to counter electricity outages (deploying more optical fiber on power transmission networks (OPGW and ADSS) and building redundant routes) and the use of techniques such as large-zone base stations (to widen existing coverage). Such base stations will have to be deployed in highly populated areas covering a radius of 7 Km on buildings that have high standards of earthquake resistance.
- **Ensuring multiple route redundancies for the backhaul network, both domestic and regional** in order to ensure that Nepal's telecommunications and internet connectivity is not compromised in the future.
- **Ensuring creation and usage of hazard maps** created by local authorities and taking necessary safety precautions while building communications infrastructure
- **Taking measures to mitigate traffic congestion** on the network such as call restriction, call prioritization and appropriate disclosure of network capacity by operators through a pre-determined process.
- **Building Critical Tower Infrastructure in key strategic locations nationwide** and enabling infrastructure sharing for all operators and potentially broadcast media providers.

While it is expected that telecommunications coverage will eventually be restored to pre-earthquake status, the ability of operators to provide broadband internet access across the country will be limited by factors such as:

- (i) lack of access to affordable backhaul networks (including fiber optic networks);
- (ii) inadequate access to radio spectrum resources; and
- (iii) high taxes and sector specific duties and royalties.

It is important to note that these factors impact the total cost of ownership and usage for consumers. Populations in severely affected districts will likely have less disposable income to spend on communication services (both voice and internet). Thus Nepal is likely to fall behind in digitally connecting its people, particularly in rural areas to the internet, if policy decisions and regulatory actions are not taken up as a priority.

Public service broadcasters including Radio Nepal and Nepal Television were instrumental during the disaster in ensuring that the Nepalese people were kept fully informed of the disaster and developments thereof. Given their extremely critical public service role, it is important to ensure their resilience for the future. This could include the development of back up production studios in locations outside of Kathmandu.

As ICT is a cross cutting sector and key infrastructure such as Government Data Centers and the National Identification (NID) infrastructure are key enablers, the building back better strategy should also address these infrastructure. The NID infrastructure should be addressed under the governance agenda.

Overall, given Nepal’s reliance on ICT in general, the disaster recovery Government Integrated Data Center should be considered for completion on a priority basis. Potentially, a second disaster recovery center, based on containerized data centers, could be established in the far west region of Nepal. Government could also plan on a cloud strategy for the hosting of government data, applications, and services.

GON should accelerate the implementation of its digital National Identification (NID) program to enable government to better provide public services and target beneficiaries of social protection and other support, both in the post disaster and long term.

The Communications sector in a digitally converged¹⁸ environment cannot be treated separately from the ICT sector. Nepal is the only country in South Asia today, where two separate Ministries are responsible for communications and IT. This has impacted the development of the ICT sector in Nepal. Nepal should consider how to address ICT more holistically and a first step is to transfer the IT policy making and implementation function from Ministry of Environment, Science and Technology to the Ministry of Information and Communications, thus providing it with the mandate for the overall converged ICT sector. The GON may consider an integrated ICT policy. This will enable for improved disaster risk and business continuity ICT planning across government and will enable Nepal to take advantage of digital economy opportunities.

While recovery costs for telecommunications in particular have been borne by the service providers as they have had to restore services, there are short term reconstruction needs. The table below shows the reconstruction needs of the Communications sector based on information provided by operators and service providers. These estimates are for a 12 month period in the fiscal year 2015-2016. In addition, there is an urgent need for building back better access (cellular and internet services) and eGovernment infrastructure platforms (including disaster recovery government integrated data center). This cost is estimated at NPRs. 1500 million over the next 2 years.

Table 3: Estimated Recovery and Reconstruction Costs

	Sub Sector	Estimated Reconstruction (Million NPRs)	Estimated Reconstruction (Million US\$)
1	Ministry of Information and Communications and related agencies	798.7	7.99
2	Telecommunication operators	517.8	5.18
3	Internet Service Providers	5.9	0.06

¹⁸ Digital convergence of telecommunications, IT, consumer electronics and media.

4	Postal Sector	742.0	7.42
5	Television Broadcasters	855.5	8.56
6	Newspapers	193.3	1.93
7	Radio Broadcasters	246.6	2.47
8	Cable Television	79.0	0.79
9	Build Back Better of Access and eGovernment infrastructure	1500.0	15.00
	TOTAL	4,938.8	49.39

Implementation Arrangements

The proposed strategy revolves around a two-phase intervention: short/immediate term, medium/long term.

The table below summarizes key immediate priorities, both related to restoring basic communications services and to use of ICTs in broader cross-sectoral relief operations. Those that are considered crucial and highest priority are rank ordered. The overall estimated cost to implement these high priority actions to ensure resilience and build back better is approximately NPRs 3,500 million (US\$35.0 million) with more details provided in Annex 2.

Table 4: Short-Term Actions

Area	Immediate needs	Specific actions
Restoring Nepal Telecom's local network for priority customers	<ol style="list-style-type: none"> 1. Repairing local access networks in Kathmandu and affected districts for priority customers (government, hospitals, schools) 2. Emergency power generators 	<ol style="list-style-type: none"> 1. Confirm locations and cost of repairing access network for priority customers 2. Pool requests for power generators across sectors
Cellular and Internet services	<ol style="list-style-type: none"> 1. Restore cellular service by repairing fallen/ damaged sites 2. Provide high speed broadband connectivity in worst affected districts. 3. Lease government land where available within Kathmandu valley to operators to build towers 	<ol style="list-style-type: none"> 1. Use RTDF to build new towers in severely affected districts and ensure infrastructure sharing between operators 2. Use RTDF to support development of wireless broadband networks in worst affected districts 3. Use government resource and RTDF to finance the early build out of community information centers in every VDC in rural Nepal. 4. NTA and MOIC to identify in collaboration with operators, sites for leasing from government.
Postal service	<ul style="list-style-type: none"> • Immediate restoration of postal service for official (government and diplomatic) correspondence 	<ul style="list-style-type: none"> • Repair and rebuild 32 damaged post office buildings.
Public Service Broadcasters	<ul style="list-style-type: none"> • Strengthen Public Service broadcasting agencies 	<ol style="list-style-type: none"> 1. Build emergency public service studio infrastructure 2. On a fast track, merge Radio Nepal and Nepal Television into a single Public Service Broadcasting agency.

Area	Immediate needs	Specific actions
Financial system	<ul style="list-style-type: none"> Redundancy of fiber network in Kathmandu connecting banks in the capital 	<ul style="list-style-type: none"> Conduct a quick assessment and deploy redundant network solutions in consultation with the Banking association.
Public finance and mobile payments and solutions	<ul style="list-style-type: none"> Use mobile money for transfer of benefit payments Use mobile applications for service delivery 	<ol style="list-style-type: none"> Nepal Rastra Bank to approve mobile money regulations and allow mobile operators to participate in service provision. NTA to lead the mobile service delivery agenda in partnership with stakeholders. Use ICT solutions to identify and verify beneficiaries of cash transfer and other relief benefits.
Displaced Persons (DPs)	<ol style="list-style-type: none"> Provide internet access and community telecenters at DP camps Continuation of education of displaced population through e-learning 	<ol style="list-style-type: none"> Use RTDF to finance this initiative as a priority. Provision of digitalized textbooks (including teacher's guides) and educational material electronically to displaced population.
eGovernment Platforms	<ol style="list-style-type: none"> Ensure continuity of Government Integrated Data Center National Identification System to be deployed 	<ol style="list-style-type: none"> Current Government Integrated Data Center to be expanded and Disaster Recovery Center to be built Complete ADB pilot for national identification program as a priority and scale up initiative across the country.
Creation of a favourable environment for good sectoral governance	<ol style="list-style-type: none"> Implement the National Broadband policy Review and revise licensing regime; and telecom sector taxation regime Develop a spectrum roadmap Convergence approach to ICT sector 	<ol style="list-style-type: none"> Approve and adopt the National Broadband Action Plan currently under preparation. Merge ICT function under one Ministry – with IT function moved to MoIC from Ministry of Environment, Science and Technology. Approve and implement the integrated National ICT policy currently under preparation Committee to review/revise licensing and telecom taxation regime formed and revisions drafted. RFPDC and FMD to develop a draft spectrum roadmap

Medium/long term ICT requirements related to building the country's resilience to further natural shocks and promoting overall competitiveness of the economy are identified in Table 5 below.

Table 5: Medium-Term Needs and Actions

Area	Medium-term needs	Specific actions
Building resilience in international and national communications	<ol style="list-style-type: none"> Establish redundancy for international gateways at both the India and China borders. 	<ol style="list-style-type: none"> RTDF fund utilized for redundant network build-outs, with infrastructure sharing mandated. Review of telecommunications sector policy and regulatory framework to

	<ol style="list-style-type: none"> 2. Deploy short terrestrial fiber networks to India and China at border points. 3. Deploy national backbone network with open access (e.g., by including it in the electricity network rebuilt) 4. Install additional towers in rural areas to provide increased coverage and ensure tower sharing 5. Install and operationalize the emergency communications network 6. Implement a disaster recovery telecommunications Standard Operating Procedures (SOPs) 7. Develop and raise citizen awareness of telecommunications and ICT services and applications for use during disasters 	<p>ensure that infrastructure investments are future proofed.</p> <ol style="list-style-type: none"> 3. Adopt a policy, legal and regulatory framework for infrastructure sharing across utilities and sectors (roads, urban, power) and easier rights of way access. 4. Identify critical network points and implement early warning systems (EWS) in coordination with other agencies that have existing EWS. 5. Develop SOPs for disaster recovery in the telecommunications sector. 6. Develop mobile applications for both smart and feature phones that can send messages from a customer to pre-selected numbers. 7. Raise awareness among consumers on using telecommunications and ICT services during disasters in order to prevent network congestion.
Postal service	<ul style="list-style-type: none"> • Postal network resilience improved 	<ul style="list-style-type: none"> • Complete restoration of postal service network
Media Broadcast sector	<ol style="list-style-type: none"> 1. Digital switchover completed 2. Digitalization of public broadcasters and national news agency's information. 	<ol style="list-style-type: none"> 1. Work with MOIC and NTA for digital switchover by 2017 2. Nepal Television to procure portable broadcasting equipment. 3. Archive all production materials in a digital format.
Building resilience to loss of critical data across sectors	<ul style="list-style-type: none"> • Create system of redundant repositories of data for critical government information systems 	<ol style="list-style-type: none"> 1. Establish government disaster recovery data centers. 2. Pilot and adopt the concept of "cloud computing"
Urban planning and transport	<ul style="list-style-type: none"> • Integrate ICT into urban planning in Kathmandu and road construction 	<ol style="list-style-type: none"> 1. Integrate deployment of fiber optic networks into the reconstruction of Kathmandu's urban infrastructure 2. Include ducts for telecom infrastructure in roads, as well as in buildings (both new and rebuilt)

Assessment Methodology

The assessments in this report have been carried out following the guidance of the National Planning Commission (NPC) and the Post Disaster Needs Assessment (PDNA) secretariat and based on the initial assessment provided by MOIC and NTA, which have been reviewed by the PDNA team.

The damage, loss and recovery assessments are highly dependent on data provided by operators, service providers and government agencies to the MOIC. This data was reviewed in accordance with

PDNA Guidelines through discussions with the government and the PDNA Communications sector team, led by the Ministry of Information and Communications, World Bank and supported by Asia Foundation.

Annex 1: Summary of Estimated Damages, Loss and Cost of Reconstruction in NPRs (Millions)

S.N	Sub-Sectors	Key	Estimated Damage		Revenue Losses		Reconstruction Cost	
			Public	Private	Public	Private	Public	Private
TOTAL			1783.78	1838.23	1684.48	2979.78	3996.24	835.54
1	Ministry of Information and Communications (MOIC) and Related Agencies	Buildings	630.72	147.50			623.90	147.50
2	Telecommunications	Buildings	174.97	89.00			81.34	436.46
		Equipment	205.11	1266.46	1616.98	2933.08		
3	Internet Service Providers	Buildings	1.00					5.90
4	Post offices	Equipment	20.68			46.70		
		Buildings	509.80				742.00	
5	Print and Broadcast Media							
	Television	Buildings	170.00	55.73				96.52
		Equipment		22.59	50.00		829.00	
	News Papers	Buildings	50.00	141.85			50.00	143.29
		Equipment		1.44				
	Radio Broadcasters	Buildings	21.50				30.00	5.87
		Equipment		34.68	17.50		140.00	
	Cable TV providers	Buildings						
		Equipment		78.99				0.01
6	Build Back Better							
	Better Cellular and Internet Services	Equipment					900.0	
	Internet Access for Displaced persons	Equipment					100.0	
	Disaster Recovery Integrated Data Center	Equipment					500.0	

Annex 2: Summary of Cost of Reconstruction in NPRs (Millions) over a 4 year period

	Sub Sector	Relation to Earthquake Recovery	Estimated Reconstruction (M NPRs)				
			FY15-16	FY16-17	FY17-18	FY19-20	
1	Ministry of Information and Communications and related agencies	Direct	399.35	199.68	199.68		798.7
2	Telecommunication operators	Direct	466.0	51.8			517.8
3	Internet Service Providers	Direct	5.9				5.9
4	Postal Sector	Direct	371.0	371.0			742.0
5	Television Broadcasters	Direct	513.3	342.22			855.5
6	Newspapers	Direct	193.3				193.3
7	Radio Broadcasters	Direct	147.95	98.63			246.6
8	Federation of Nepal Cable TV providers	Direct	79.0				79.0
9	Build Back Better	Direct (Access)	500.0	500.0			1,000.0
10	Build Back Better	Indirect (Data Center)	125.00	250.0	100.00	25.0	500.0
	TOTAL		2,800.79	1,813.31	299.68	25.00	4,938.8

COMMUNITY INFRASTRUCTURE

Summary

Community infrastructures are small scale facilities owned, planned, built, operated and/or maintained with the active involvement of the community. For the day to day purpose, the local service structure or life-line structures are very key to the community though due to low levels of socio-economic development and complex topography, community infrastructure in Nepal is still in developing phase. After the 2015 April post-earthquake scenario, as per PDNA's Community Infrastructure cluster requirement, the assessment of post-disaster need has been described in the both social and economic terms. As per local infrastructure policies of the government, seven sectors have been covered in this cluster, though the damage/need assessment of the three areas only covered in this cluster in order to avoid the duplication among the PDNA's 23 cluster.

The earthquakes of 25 April 2015 and its aftershocks, have caused substantial damage to community infrastructure. Roads, bridges and trails were damaged or swept away by the earthquake and landslides; irrigation, micro-hydro and drinking water schemes were impacted – and in some cases became completely nonoperational due to changes in the hydrological regime; electricity networks that connected house, as well as solar installations were damaged; community buildings used for meetings, social events and child care collapsed; and many of the micro infrastructure facilities such as ponds, dug-wells or threshing/drying areas were broken.

Government policies defines community infrastructure as covering seven sectors: Rural Transport; Water Supply & Sanitation; Irrigation; Electricity; Community Buildings; Social Infrastructure; and Solid Waste Infrastructure. However, in order to avoid the duplication Damages and losses related to rural roads, irrigation, electricity and drinking water are covered by the concerned cluster reports. The damage and losses of the remaining items – trails bridges, footpaths, community buildings and micro communal works, amount to NPRs 3,349 million (USD 33.5 million).

The long term recovery goal for community infrastructure is to rebuild destroyed and damaged community infrastructure to better and more resilient standards, and to expand it in order to improve availability and access of the poor and marginalized groups. A lot of lessons from the damage as well as the designing and maintaining of the rural community structures have widened the scope of the sustainable community development. The assessment report show the importance of grass-rooted small structure, if it disrupt - this limits access to districts and national systems of services and markets, as well as to the organisational and institutional structures that surround the community development efforts of Government, NGOs and development partners, and from the technology and market opportunities that the private sector can provide.

In line with this vision, the reconstruction effort should be anchored on a highly participative approach explicit mechanisms to involve the poor and the marginalized sections of the population and women; a streamlined approval, implementation, monitoring and reporting process for rapid funds disbursements, and to enhance accountability and transparency; improved institutional mechanisms for operations and maintenance, including sustainable cost recovery; priority to areas that are at risk from landslides and floods, and where economic opportunities should be created for populations to relocate; and promotion of suitable technologies, light weight construction material, local materials and earthquake resistant designs, and to incorporate the role of the private sector. Reconstruction and recovery costs based on these enhanced criteria have been estimated at NPRs 4,451 million (USD 44.5 million). This is in addition to the costs estimated for community level works in the Transport, Irrigation, Drinking Water and Electricity sectoral report.

The Government of Nepal has long experience of developing community infrastructure and currently there are a number of ongoing major projects and programmes aim to address the challenges and develop community infrastructure in a better way. Though governmental, non-governmental as well as partner organizations working together for building back better reconstruction and rehabilitation.

The existing system for governance and implementation needs to be strengthened. The planning and prioritization for rehabilitation should be done in a participative manner formalizing community platforms alongside assessment by government's local bodies, i.e. DDC, VDC, or MNC. To prevent duplication of efforts, clear guidance and allocation of work areas/ projects needs to be formally provided by DDC, VDC, MDC to all involved development stakeholders and policy as well as technical backstopping by the MoFALAD, Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) and the District Technical Offices (DTOs), which need to be strengthened. To sum up, local bodies (DDC/MNC/VDC) is proposed to lead the community infrastructure rehabilitation and reconstruction and DoLIDAR/DTO will technically support it with more strengthened capacity of itself.

Pre-Disaster Context and Baseline

Most communities in the earthquake affected districts live in scattered settlements. These settlements are normally formed of households of the same clan and tribe, and sometimes may even comprise one large extended family. This sector report covers the 14 Districts that are most severely hit which comprise 741 Villages Development Committee and Municipalities. The landscapes of most of the villages are hilly with some mountainous areas, which limited flat areas at the valley bottoms. A few villages are in the inner Terai area and have relatively large areas of flat land. In most of the affected area, existing infrastructure is limited with traditional designs and technology, and mainly labour based with local materials. Both the quantity and quality of local infrastructure varies with the topography and are vulnerable to disasters and extreme weather events, particularly due to weak maintenance.

Much of the smaller community infrastructure, including footpaths, trails, drinking water supplies and small hydro or solar electricity producing schemes, are built with involvement of local communities. Public infrastructure, such as an irrigation scheme, a bridge or a road linking to a highway or district road, may be built by one or several villages but this tends to be rare and requires substantial community mobilization.

The community infrastructures, as defined for the PDNA purpose, which is normally described as community owned, managed and/or operated local small scale infrastructure which could provide the service to the local community. The government has categories following types in the community infrastructure:

- 1) Rural Transport
- 2) Water Supply & Sanitation
- 3) Irrigation
- 4) Electricity
- 5) Community Buildings
- 6) Social Infrastructure
- 7) Solid Waste Infrastructure

The baseline data for community infrastructure has been provided in *Annex I* of this report. In the affected districts there were some 13,000 kms of village roads, 1,000 trail bridges and 11,000 km of foot trails; small scale irrigation facilities to cover about 130,000 ha; about 800 drinking water schemes; 260 small hydro electricity schemes and 70,000 solar installation; and over 2,000 community buildings. In addition, most settlements and villages have a range of micro communal facilities which serve small groups of 15-20 households. These structures usually comprise of small ponds or tanks to capture rainwater, or small solar pumps, for getting water for humans, cattle or kitchen gardens; sheds for

storage and to provide shelter for livestock; and areas for drying and threshing crops such as rice – these micro communal facilities are covered by items 6 and 7 of the list above. These small micro-infrastructure facilities are valued at almost NPRs 4,000 million (USD 40 million).

Infrastructure services such as irrigation, electricity and drinking water substantially improve productivity and quality of life in the communities. The transport network, though limited, provides a critical linkage to markets and social services outside the immediate vicinity of the community – of these the most important are schools, clinics and hospitals.

Generally, community infrastructure has been implemented or guided by the local bodies such as District Development Committee (DDC), Municipalities Village Development Committee (VDC) which also oversight and are responsible for maintenance support. Over several years various efforts have been ongoing to empower community level organizations in order to operate the local service/infrastructure as an interface with beneficiaries. Likewise, local level non-governmental organization (NGOs) have partnered with ongoing programmes such as the Rural Community Infrastructure Works (RCIW) programme and the Poverty Alleviation Fund (PAF) to mobilize people to form Users Group (UG) or Community Organization (COs). Often cash-for-work or food-for-work modalities are used to construct of community infrastructure, particularly when the works are technically simple.

Generally, COs tend to be small and only cover one or few settlements. As a result projects and programmes prepared and implemented through them tend to be small and focus on very local needs. Regular operations and maintenance could have been seen as challenging, particularly if technical problems arise or if substantial cash outlays are needed for repairs.

All infrastructures are subject to kind of risk of weather, climatic and geological changes and there is little effort has been made for the resilience of the service-projects. However, the fragility of community level infrastructure in exacerbated by the harsh environment; locally designed and the low level of technologies; and limited funds for good construction and maintenance. As a result most community infrastructure is vulnerable to rapid deterioration, even in the face of climatic events such as the heavy monsoon rains, landslides etc.

Disaster Effects and Impact

The earthquakes of 25 April and 12 May 2015, caused substantial damage to community infrastructure. Roads, bridges and trails were damaged or swept away by the earthquake and landslides; irrigation, micro-hydro and drinking water schemes were impacted – and in some cases became completely non-operational due to changes in the hydrological topography; electricity networks that connected house, as well as solar installations were damaged; and many of the micro infrastructure facilities such as ponds, dug-wells or threshing/drying areas were damaged.

Proportionately the damage was greatest around the epicentre of the earthquake area and the 14 districts. The overall impact of the earthquake was greater in economic terms. In addition to the monetary value, damages to the community infrastructures pose hardships and have negative social impact on the villagers and in particular to women who are responsible for fetching grass for the cattle, as well as water and firewood.

The different types of community infrastructures got affected by the earthquake shock and its associated after-shocks. Following sector wise effects are generally seen in the affected areas:

- 1) **Rural Transport:** Rapid and safe transportation remains a major challenge in Nepal with some rural communities located many hours from the nearest arterial road or district headquarters

where essential social and economics services are available. The weakest segment of the transport network remains community level roads particularly trail bridges and walking tracks that link households and settlements to each other and to the village, and the village level roads – typically 10-15 kms long - that link to the district road network. District level reports have detailed the damage to the various trail bridges which mainly comprise cracks, breakages and movements in the foundations and the associated structures. In the case of village walking trails damages have been mainly due to landslides and in some cases will only need clearing while in others it will require opening new paths. Damage has also occurred to village, district and municipal roads which, along with losses, are detailed in the sector report related to PDNA's Transport Cluster report.

In this report, damages to the trail bridges and foot trails are estimated in the order of of NPRs 469 million (USD 4.7 million) are detailed in Annex III.

- 2) **Community Irrigation:** In the mountainous and more hilly areas, with steep slopes and fast flowing streams, damages have been mainly to the intake structures of irrigation canals, as well as to the canals themselves which often run along the contours for lengths of 0.5 to 2 kms. In the less hilly and flatter areas, including the valley bottom, the damage has been less, with problems mainly related to water storage and diversion structures and channels. Community irrigated lands in the 14 districts are some 130,000 ha – of this 44,000 ha are Farmer Managed Irrigation Schemes under the purview of the Irrigation Department, and 87,000 ha are community irrigated areas that farmers do not pay charges for. Damage will have an impact on the summer crops, and local water shortage may lead to a substitution from rice to maize. The impact of the damage will be higher in the case of winter crops which need irrigation as rainfall is low. The damage estimates for small-scale community irrigation schemes, as well as the quantification of losses, are provided in the PDNA's Irrigation Cluster report.
- 3) **Micro-Electricity:** At community level there are a number of hydropower and solar powered electricity generation facilities that have been damaged or destroyed. Similarly, some of the local distribution systems that draw from the national grids and provide electricity to houses and settlement have been damaged. The damage estimates for small-scale electricity generation and distribution, as well as the quantification of losses, are provided in the PDNA's Electricity Cluster report.
- 4) **Community Drinking Water:** Many of the settlements and villages in the mountains and higher hills rely on streams and springs for domestic water supply. However, those at lower altitudes use local storage tanks that are replenished water pumped from streams or wells. Generally, a high proportion (60-80%), theoretically, has access to a drinking water but many schemes are in poor condition even prior to the earthquake. The earthquake has damaged tanks, pipes, pumps and the associated supply structures. In some cases changes in the geological structures have resulted in some streams and springs running dry. In addition to physical damages, effects on drinking water infrastructure have particularly negative impacts on women and young girls who are responsible for fetching the drinking water for the entire household. The damage estimates for drinking water and sanitation, as well as the quantification of losses, are provided in the PDNA's WASH Cluster report.
- 5) **Community Buildings:** There are a number of buildings at village level that are used by communities and community organizations such as “Ama samuha” (“Mother’s group”), “Chetna Samuha” (“Awareness Group”), public libraries, community hall, Ward Citizen Forums etc, for social gatherings and training purposes. Such buildings enable community empowerment by providing a physical infrastructure to gather, discuss and decide on actions that impact the community. Furthermore, they provide safe meeting grounds for women’s and

minority groups. As such, community buildings are critical physical component of rural landscape. The damage estimates has been provided in *Annex III* of this report. The monetary value of the damages has been estimated at NPRs 2,500 M (USDs 25 M).

- 6) **Micro Communal Structure:** Most settlements and villages have a range of micro facilities which serve small groups of 15-20 households. These comprise small ponds or tanks to capture rainwater for drinking, washing, animals or even small irrigation for the kitchen garden; sheds for storage and to provide shelter for livestock; and areas for drying and threshing crops such as rice. The damage estimates has been provided in Annex III of this report. The monetary value of the damages has been estimated at NPRs 379 M (USD 3.8 M).

Damage and Loss

The damage estimates in this sectoral report do not include damages to local irrigation works; rural roads; hydro/solar electricity generation and local networks connecting to the national grid; and drinking water schemes. Damages and losses in these areas are covered by the sectoral reports related to irrigation, transport, electricity and WASH cluster.

This sector report therefore only covers damages related to trail bridges and footpaths, community buildings and micro-level communal works.

Description	Unit	Damage Cost	
Trail Bridge	85 Nos.	NPRs 118.8 m	USD 1.2 m
Foot Trail	500 km	NPRs 350 m	USD 3.5 m
Community Buildings	1667 Nos.	NPRs 2501.9 m	USD 25 m
Others (Micro Community Structure)	Lumpsum	NPRs 378.6 m	USD 3.8 m
Grand Total		NPRs. 3349.3 m	USD 33.5 m

Total damages for the above mentioned works are estimated at NPRs 3,349 million (US\$33.5 million). The largest proportion of these costs are related to community buildings (NPRs 2,500 million, US\$25 million), followed by the costs of micro communal works. District wise breakdown of the damage estimate can be found in *Annex III* of the report.

The damage to local infrastructure caused by the earthquakes have caused negative economic, social and quality-of-life impacts as discussed above – reducing productivity, as well as access to key services such as electricity and drinking water. In addition, it is increasing isolation in many areas of mountains and hills where communities are not increasingly cut from trade, commerce, education and medical facilities which can have severe cultural and social impacts. In addition, in many cases the loss of community facilities has reduced the interaction of people for cooperative economic and social activities which could, if not addressed rapidly, significantly erode social capital.

The earthquake has also left some of the community infrastructure in a precarious state - cracks in irrigation structures, cuts in roads and trails, damaged foundations for bridges, and unsafe community buildings. With the imminent onset of the monsoon which will imply heavy rains, landslides and high water in streams and rivers, there is likely to be significant further damage.

Recovery Needs and strategy

While considering the recovery and reconstruction strategy, principally the scope of community infrastructure shall be conceptually clearly defined and scoping accordingly. As Community infrastructure covers all local level small-scale infrastructures that is planned, built, operated and/or

maintained by the community. In the context of Nepal, the specific items that are normally covered by the term community infrastructure are:

- i. **Rural Transport** – village roads and farm to market roads; suspension bridges and other structures to cross streams, rivers or ravines; and footpaths and trails
- ii. **Community Irrigation** - schemes with command areas of less than 25ha. Irrigated from surface or ground water.
- iii. **Electricity** - schemes including those from hydro, bio gas or solar, as well as local systems linking to the national grid.
- iv. **Drinking Water** - drinking water schemes whether from streams, springs or wells, or with the use of solar pumps.
- v. **Community Buildings** - community centers and meeting places, buildings of local community groups, cooperatives, caste and ethnic group specific cultural places
- vi. **Other Communal Infrastructures** – dug wells, ponds, rainwater collection tanks, small solar pumps, and drying floors for crops.
- vii. **Solid waste management.**

In the case of this PDNA, damage and needs data have been collected by the sector teams dealing with Irrigation, Electricity, WASH, and Transport above. Damage and needs for the trail roads and bridges, community buildings and other micro communal infrastructure are covered in this Sectoral Report.

However, during the recovery and reconstruction phase it is essential that a unified and comprehensive approach be followed for all community level infrastructure work. This is particularly important after the earthquake, which could exacerbate the sense of isolation and abandon, particularly among the weaker sections of the population and women.

Due to developing levels of socio-economic development and complex topography, community infrastructure in Nepal is not properly developed and most of them are completely out of reach to Person with Disability.. For many households this limits access to districts and national systems of services and markets. This physical and economic isolation also cuts off communities from the organisational and institutional structures that surround the community development efforts of Government, NGOs and development partners, and from the technology and market opportunities that the private sector can provide. A major effect of this is that traditional systems related to gender, ethnicity and caste persist without any impact from national efforts to address issues, and that production systems remain anchored on low level subsistence production.

There is consensus that as countries affected by disasters rebuild damaged or destroyed infrastructures, they need to “Build Back Better”. This usually means that services, infrastructure and governance mechanisms, need to be rebuilt to a higher level than in the past, as well as being more resilient to future shocks. However, in Nepal, community infrastructure was extremely limited, even prior to the earthquake. In such a context a broader concept of “Build Back Better” is needed where a strong effort has to be made not only to rebuild the community infrastructure which was damaged or destroyed, but to expand it further with a clear goal of improving the access of the local communities including marginalized, disadvantaged and vulnerable social and ethnic groups, and of women, children and Person with Disabilities.

In this context, the long term recovery goal for community infrastructure is to rebuild destroyed and damaged community infrastructure to better and more resilient standards, and to expand it in order to improve availability and access of the vulnerable and marginalized groups also.

The targeted outcome is thus to: **put in place a network of community infrastructure that links all households and all segments of population to the national and district level services, infrastructure,**

markets and social development efforts, and to create equitable opportunities for the local social and economic development.

Based on the above vision, the community infrastructure recovery effort will require:

- a highly participative approach for the planning, resourcing, implementation and governance of community infrastructure, with strong and explicit mechanisms to involve the poor and the marginalized sections of the population and women;
- priority to areas that are at risk from landslides and floods, and where economic opportunities should be created for populations to relocate;
- promotion of suitable new technologies, light weight construction material, use of local material and earthquake resistant designs, and to find ways to enhance the role of the private sector;
- skill development for the community to enable them to do minor repairs in line with new technologies;
- improved institutional mechanisms for operations and maintenance, including sustainable cost recovery; and
- a streamlined approval, implementation, monitoring and reporting process for rapid funds disbursements, and to enhance accountability and transparency.
- Using the basic principle of recovery such as safety first, building back better, appropriate technology, socially acceptable, harmonized and one-door policies etc.
- Using basic principle of ensuring access for people with specific needs especially women, children and to Person with Disabilities

Actions are also needed to strengthen District Development Committees (DDCs) to play a coordinating role to ensure that all communities and population groups are access to minimum infrastructure services and prevent duplication of efforts. For this purpose DDC should improve the current systems of monitoring of community infrastructures and in particular to ensure that they are adequately maintained and operated

Following recovery and reconstruction initiatives are require to rehabilitate the community livelihood:

Building Back Better (BBB)

As suggested above, BBB in Nepal would imply social aspects - greater involvement of the communities, particularly women and other sections of the population; geographical aspects, in particular a moving to less fragile and risky locations; and technological aspects, particularly use of appropriate/local materials and designs. In addition, better management and operation & maintenance would be needed. These improvements are expected to imply higher costs/resources. It addition, it is proposed that funds be provided to communities in the priority basis such as lacking even the minimal set of facilities needed for their social and economic well being, particularly those impacting women and the quality of family life. This would comprise drinking water supplies for animals and humans; sanitation and solid waste disposal; electricity supply either through a hydro/solar installation or by linking to the national grid; and a community building that can be used for social activities, mothers to leave their babies while working/child care center, and a safe place for the refuge after disasters. Providing this minimum set of facilities to communities that do not have them, many of which are in the more remote and high mountainous areas, is estimated to require another NPRs 600 million (USD 6 million). BBB also means that the new infrastructure will be designed in such a way that they meet and respond to the specific needs of Person with Disability and for Children and Women

Needs and Costs

The earthquake recovery and reconstruction effort will require some NPRs 4,451 million (USD 44.5 million). Of this NPRs 3,850 million (USD 38.5 million) is for repair and reconstruction of community infrastructure considered in this report - NPRs 3,349 million (USD 33.5 million) for direct repair and reconstruction of damaged facilities and NPRs 502 million (USD 5 million) for building back better with a greater focus on the vulnerable and more marginalized sections of the population and for women, better more resilient designs with modern technologies, and relocation to areas less prone to natural hazards. In addition, NPRs 600 million (USD 6 million) is provided for gap filling of essential infrastructure in villages what are poorly served due to the fact that they are marginalized and isolated. Please refer to *Annex IV* for the breakdown by community infrastructures discussed in this report.

Implementation Arrangements

Nepal has several decades of experience of developing community infrastructure. Generally these projects have been successful in improving the economic life of beneficiaries. However, their equity, efficiency and sustainability were jeopardized by problems of slow implementation, lack of resources, lack of effective scientific planning and funds management, weak operation and maintenance, less awareness/reluctance of the local community, and lack of inclusiveness particularly of marginalized population and of women.

A number of ongoing major projects and programmes aim to address the challenges and develop community infrastructure in a better way. Since long time, MoFALD and its agencies have been implementing the community based programs such as the Rural Community Infrastructure (RCIW), the Community Irrigation Project (CIP) and a rural water supply project, etc. Some of the key features of these new generation of community infrastructure projects include a strong effort at social and community mobilization, working closely with local governmental and non-governmental agencies and partner organizations; community involvement in construction and maintenance through cash-for-work and food-for-work; well-functioning financial and monitoring systems; and technical wing that can promote low cost, technologically advanced, environmentally friendly designs.

The current institutional, organizational and programmatic setup is able to handle the recovery and reconstruction effort in the affected areas. For the sustainable community infrastructure, the government has shouldered the responsibility to the local bodies (DDC/MNC/VDC) and supported by the technical wings of Department of Local Infrastructures Development and Agriculture Road (DoLIDAR) and District Technical Officer (DTO), which policy coordination is doing by Ministry of Federal Affairs and Local Development (MoFALD). The network of this agencies are upto village level which needed to be institutionally strengthen further for the BBB reconstruction strategy. Simultaneously, a number of improvements in operational practices would be needed including in the social mobilization effort, financial management, use of new technology, and improved reporting and monitoring. Furthermore, private sector support as per the recovery strategy is necessary to rehabilitate the community livelihood. To sum up, community infrastructure recovery responsibility should be lead by local bodies and funding arrangement will decided upon the programme document.

Assessment Methodology

The Assessment focused on 14 districts. Of these seven are “Severely Affected” (Rasuwa, Gorkha, Nuwakot, Dhading, Sindhupalchok, Dolakha, and Ramechap) and seven which are “Crisis Hit” (Kavrepalanchok, Sindhuli, Okkhaldhunga, Makauranpur, Lalitpur, Bhaktapur and Khatmandu).

The Assessment is based on data obtained from various sources including from districts offices, DDC, MNC, VDC (through MoFALD); damage assessments done by institutions with ongoing activities related to community infrastructure such as the Alternative Energy Promotion Centre (AEPCC), the Poverty Alleviation Fund (PAF), as well as data from published sources such as district profiles and from various technical departments such as DoLIDAR, Department of Irrigation etc. Moreover, selective field visits were made to verify and validate data, and to discuss reconstruction modalities with local officials and communities.

Cluster Participants:

The following representatives have contributed substantially in meeting as well as by other means. MoFALD recognizes and thanks them for the contribution as well as that of representatives of development partners.

Organization	Representative Name and Position
1. National Planning Commission	Mr. Pushpa Lal Shakya, JS
2. MoFALD	Mr. Purna Chandra Bhattarai, JS
3. MoFALD	Mr. Gokarna Mani Duwadee, JS
4. DoLIDAR	Mr. Jeevan Kumar Shrestha, DG
5. MoFALD	Mr. Suman Ghimire, US
6. MoFALD	Mr. Prakash Dahal, US
7. MoFALD	Mr. Bed Raj Phuyel, SO
8. Alternative Energy Promotion Center (GoN)	Mr. Ram Prasad Dhital, ED
9. DoLIDAR	Mr. Jeewan Guragain, SDE
10. The World Bank	Mr. Jie Tang
11. The World Bank	Mr. Rabin Shrestha
12. The World Bank	Ms. Mio Takada
13. World Food Programme	Ms. Meenu Hada
14. International Organization for Migration	Mr. Anup Poudel
15. Poverty Alleviation Fund	Mr. Santosh Nepal
16. GIZ/EnDev	Ms. Pooja Sharma
17. GIZ/EnDev	Mr. Rajendra Pradhananga
18. USAID/Nepal	Mr. Shanker Khagi
19. World Food Programme – Consultant	Mr. Daud Khan
20. MMDC	Mr. Rupesh Malla
21. MMDC	Mr. Subash Adhikari

Annex I: Baseline Data on Community Infrastructure

Districts	Transport				Irrigation		Drinking Water		Electricity			Community Buildings	Others ⁹	
	Village Road Core Network ¹	Rural Roads (Earthen) ²	Trail Bridges ³	Foot Trails ³	Community ⁴	Farmer Managed Irrigation Scheme ⁵	Drinking water schemes ⁶	Micro-hydro schemes ⁷	Solar ⁷	Community rural electricity schemes ⁷	Buildings with average area of 100 sq. m ⁸	Micro-structures (ponds, wells) monetary value ⁸	(NPR s M)	(US\$ M)
	(km)	(km)	(no)	(km)	('000 ha)	('000 ha)	(number)	(number)	(number)	(number)	(number)	(NPR s M)	(US\$ M)	
Rasuwa	530	16	58	383	770	950	12	7	895	0	9	90	0.90	
Gorkha	1,019	119	102	1,054	10,019	2,682	71	35	4725	6	32	335	3.35	
Nuwakot	840	25	80	719	13,161	4,822	111	7	1857	7	29	310	3.10	
Dhading	1,313	30	87	1,257	10,199	4,018	97	40	8873	0	24	255	2.55	
Sindhupalchok	2,396	69	98	1,247	11,634	4,851	78	14	1656	0	37	395	3.95	
Dolakha	803	20	127	1,027	6,322	2,591	17	27	2199	1	25	260	2.60	
Ramechhap	1,085	49	112	880	5,030	2,952	33	16	8674	1	26	276	2.76	
Kavrepalanchok	1,570	4	88	657	8,852	3,769	152	42	2519	12	43	451	4.51	
Sindhuli	639	130	67	1,411	6,716	3,545	61	22	18340	0	26	270	2.70	
Okhaldhunga	375	63	99	432	4,313	2,039	8	47	7992	0	26	280	2.80	
Makwanpur	819	70	36	1,224	4,039	3,024	100	5	9409	0	21	220	2.20	
Lalitpur	517	33	38	198	1,521	3,467	11	0	1082	1	19	200	2.00	
Bhaktapur	198	7	-	10	1,505	3,081	13	0		0	8	80	0.80	
Kathmandu	810	37	4	103	3,206	2,562	15	0		0	27	290	2.90	
Total	12,914	672	996	10,602	87,287	44,353	778	262	68,221	28	352	3,712	37.1	

1. Source: DoLIDAR, Data from District Transport Master Plan (DTMP).
2. Source: Department of Road 2009/10
3. Source: DoLIDAR, Trail Bridge Support Unit (TBSU)
4. Community Irrigation is under the purview of Ministry of Agriculture

5. Farmer Managed Irrigation Scheme is under the purview of Department of Irrigation
6. Source: Fund Board, RWSSP, 2011
7. Source: Alternative Energy Promotion Center
8. Source: DoLIDAR estimates and AEPC for damage estimates of solar PV pumps under micro-structures
9. Includes infrastructures such as community wells, ponds, and solar PV pumping systems.

Annex II: Summary of Damages to Community Infrastructures

Districts	Transport				Irrigation		Drinking Water	Electricity				Community Buildings	Others ²	
	Village Road Core Network	Rural Roads (Earthen)	Trail Bridges ¹	Foot Trails ¹	Community	Farmer Managed Irrigation Scheme	Drinking water schemes	Micro-hydro schemes	Solar ⁷	Community rural electricity schemes	Buildings with average area of 100 sq. m ¹	Micro-structures (ponds, wells) monetary value ¹		
	(km)	(km)	(no)	(km)	('000 ha)	('000 ha)	(number)	(number)	(number)	(number)	(number)	(NPRs M)	(US\$M)	
Rasuwa	Please refer to the report from the Transport sector		31	18	Please refer to the report from Agriculture sector		Please refer to the report from WASH sector	Please refer to the report from Electricity sector				41	9.0	0.1
Gorkha			6	50								151	33.5	0.3
Nuwakot			7	34								140	31.0	0.3
Dhading			2	59								113	30.1	0.3
Sindhupalchok			12	59								178	39.5	0.4
Dolakha			5	48								117	26.5	0.3
Ramechhap			5	42								124	28.1	0.3
Kavrepalanchok			6	31								203	46.0	0.5
Sindhuli			2	67								122	27.4	0.3
Okhaldhunga			-	20								126	28.2	0.3
Makwanpur			-	58								99	22.3	0.2
Lalitpur			-	9								90	20.0	0.2
Bhaktapur			-	0								36	8.0	0.1
Kathmandu			-	5								131	29.0	0.3
Total	-	-	76	500	-	-	-	-	-	-	1,667	377.5	3.8	

1. Data source: DoLIDAR and AEPC for damage estimates of 37 solar PV pumps under micro-structures

2. Includes infrastructures such as community well, ponds, 37 damaged solar PV pumps etc.

Annex III: Summary of Damages (Monetary value)*

Districts	Transport				Community Buildings		Others ²	
	Trail Bridges ¹		Foot Trails ¹		Buildings with average area of 100 sq. m ¹		Micro-structures (ponds, wells) monetary value ¹	
	(NPRs M)	(US\$M)	(NPRs M)	(US\$M)	(NPRs M)	(US\$M)	(NPRs M)	(US\$M)
Rasuwa	41.2	0.41	12.6	0.35	60.8	0.61	9.0	0.1
Gorkha	9.8	0.10	34.8	0.24	226.1	2.26	33.5	0.3
Nuwakot	11.0	0.11	23.7	0.41	209.3	2.09	31.0	0.3
Dhading	20.0	0.20	41.5	0.41	168.8	1.69	30.1	0.3
Sindhupalchok	13.9	0.14	41.2	0.34	266.6	2.67	39.5	0.4
Dolakha	6.5	0.06	33.9	0.29	175.5	1.76	26.5	0.3
Ramechhap	4.9	0.05	29.1	0.22	185.6	1.86	28.1	0.3
Kavrepalanchok	8.3	0.08	21.7	0.47	303.8	3.04	46.0	0.5
Sindhuli	3.2	0.03	46.6	0.14	182.3	1.82	27.4	0.3
Okhaldhunga	-	-	14.3	0.40	189.0	1.89	28.2	0.3
Makwanpur	-	-	40.4	0.07	148.5	1.49	22.3	0.2
Lalitpur	-	-	6.5	0.00	135.0	1.35	20.0	0.2
Bhaktapur	-	-	0.3	0.03	54.0	0.54	8.0	0.1
Kathmandu	-	-	3.4	0.35	195.8	1.96	29.0	0.3
Total	118.8	1.2	350.0	3.5	2,501.9	25.0	378.6	3.8

*Monetary damage estimates of only those sub-sectors that are addressed in this report have been shown. Please refer to other respective reports for monetary values of sub-sectors not included in this report.

1. Data source: DoLIDAR and AEPC for damage estimates of 37 solar PV pumps under micro-structures
2. Includes infrastructures such as community well, ponds, 37 Solar PV pumps etc.

Annex IV: Needs Assessment

NPRs Million

	Short Term	Medium Term	Long Term	Costs for BBB ²	Total needs
	0-6 months	6 -12 months	12-18 months		
Foot Trail	88	175	88	52	397
Trail Bridges	30	60	30	18	150
Community Buildings	625	1,250	625	375	2,838
Other small/ micro community infrastructure ¹	95	190	95	656	1,038
Total	NPR 837	NPR 1,674	NRP 837	NRP 1,102	NRP 4,451

US\$ Million

	Short Term	Medium Term	Long Term	Costs for BBB ²	Total needs
	0-6 months	6 -12 months	12-18 months		
Foot Trail	0.9	1.8	0.9	0.5	4.0
Trail Bridges	0.3	0.6	0.3	0.2	1.5
Community Buildings	6.3	12.5	6.3	3.4	28.4
Other small/ micro community infrastructure ¹	1.0	1.9	1.0	6.5	10.4
Total	USD 8.4	USD 16.7	USD 8.4	USD 11.2	USD 44.5

1. Micro-structures include community wells, ponds, solar PV pumps etc. The needs assessment figure for includes NPRs 600 million (US\$6M) for gap filling for essential local infrastructure, particularly in poor and remote villages
2. Build Back Better implies highly participative approach with explicit mechanisms to involve the poor and the marginalized sections of the population and women; reconstruction in areas that are less at risk from landslides and floods, and where services and economic opportunities should be created for populations to relocate; promotion of new suitable new technologies, light weight construction material and earthquake resistant designs, and to find ways to enhance the role of the private sector; improved institutional mechanisms for operations and maintenance, including sustainable cost recovery; and a streamlined approval, implementation, monitoring and reporting process for rapid funds disbursements, and to enhance accountability and transparency.

TRANSPORT

Summary

The transport sector PDNA covers the strategic road network, local road network (district road core network as well as village road core network) and air transport subsectors. Department of Roads (DoR), Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR) and Civil Aviation Authority of Nepal (CAAN) are responsible agencies of the Government of Nepal for these subsectors.

The assessments in this report have been carried out following the guidance of the two day workshop organised by the PDNA secretariat and based on the initial assessment provided by CAAN, DoLIDAR and DOR, which have been reviewed by the PDNA team.

The total damage, loss in economic flows are estimated at \$171.88 million and \$49.30 million, respectively. The total recovery need is estimated at \$282 million. About 68% of the estimated total needs are in the local roads network (LRN), which are the lifeline infrastructure for the rural communities. The share of strategic roads network (SRN) is about 32%.

The airports experienced minor damages to some of the structures, but these did not affect the air transport operations. Damage to the civil aviation sector was \$1.1 million and the loss was \$1.3 million.

Recovery Needs resulting from the earthquake disaster of 25 April and 12 May 2015 in the transport sector is estimated at NRs28,185 million (\$282 million) for 60 months from 25 April 2015. The estimate is based on the damages and cost data provided by DoR, DoLIDAR and CAAN. Majority of the recovery needs, representing 68% are in LRN. This is because LRN are not designed to be resilient in disasters with considerations to the relatively low traffic volumes. There are urgent needs to recover the normal accessibility to the remote areas.

The recovery needs comprise of the needs for short term (up to 6 months), medium term (up to 24 months) and long term (up to 60 months). Short term activities include immediate opening of blocked roads, repair of minor damages to prevent further damages by monsoon rains, and repair of non-structural and minor structural cracks in the office and workshop buildings of DoR, DoLIDAR and CAAN. Medium term works include rehabilitation or reconstruction of relatively small infrastructure. Build back better (BBB principles, based on risk assessment, will be applied for these rehabilitation and reconstruction works to the extent possible. Relatively large works for rehabilitation, reconstruction or improvement with BBB features, which need over 24 months, are categorized as long term works.

The nature of the recovery works, however, is to provide a good opportunity for building more disaster resilient infrastructures.

Pre-Disaster Context and Baseline

Transport infrastructures located in the affected areas are roads and airports. Roads being the predominant mode of transport in the country, the development and adequate maintenance of road network are critical for achieving the regionally balanced economic growth and for rapidly responding with support services in case of disasters. The domestic air transport demand has recently been increasing with the Tribhuvan International Airport (TIA) in Kathmandu, sole international airport in Nepal, as the hub.

Nepal has the lowest road density in the region. Still 22% of the population is far from road accessibility. Nepal has about 14,902 km of the strategic road network (SRN), the core network of national highways and feeder roads connecting district headquarters. About 51% of SRN is paved, 13% is gravelled and 36% is earthen. The condition of SRN is 10% in good condition, 74% in fair condition and 16% requires urgent repair. Nepal also has about 50,944 km of Local Roads Network (LRN). About 3% of the LRN is black-topped, about 68% earthen and the remaining about 29% gravel roads.¹ LRN comprises two types road networks: District Road Core Network (DRCN) and Village Road Core Network (VRCN). Road network in the affected 31 districts extends to 5,140 km of SRN and about 29,443 km of LRN. The LRN in the affected districts is critical infrastructure for the rural communities. The total vehicle population in the country now stands at 1.63 million at the end of first quarter of 2014. This is a two fold increase over the period of last 5 years. Motorcycles are the major constituents of vehicle population and stands at over 77.6% of total registered vehicles in Nepal.

There are 2 central government departments involved in the road network development and operations in Nepal, namely the Department of Roads (DOR) under the Ministry of Physical Infrastructure and Transport (MPIT) and the Department of Local Infrastructure Development and Agricultural Road (DoLIDAR) under the Ministry of Federal Affairs and Local Development (MoFALD). The former is in charge of SRN and the latter for LRN. DOR directly develops and maintains SRN. On the other hand, DoLIDAR manages LRN in a decentralized manner. DoLIDAR executes and provides technical support for the development and maintenance of LRN through the District Technical Offices (DTO) within the District Development Committees (DDCs), a local government body.

Civil Aviation Authority of Nepal (CAAN) plays both roles as the regulator and operator of all airports in Nepal. Revenue of CAAN mainly comes from TIA, sole international airport in Nepal, representing over 90% of CAAN revenue.

Department of Roads (DOR) is a technical organization comprising 428 Engineers under the Ministry of Physical Infrastructure and Transport (MPIT). DOR has 34 Divisional Offices, 5 Regional Offices, 7 Heavy Equipment Divisions, and 10 Mechanical Divisions for the construction and maintenance of the strategic roads all over the country. Major projects funded by the donor agencies are implemented under separate project management offices. Consultants are engaged for the design and supervision of such projects. Procurement of work, goods and services are done under the prevailing Public Procurement Act except for the donor funded projects, which are guided by the provisions of the funding agreements. Almost all procurements are based on competitive bidding under the provisions of the public procurement act or the provisions of the funding agreement with foreign donors. Procurement process tends to be slow and cumbersome under the Public Procurement Act (PPA), 2063.

DoLIDAR has a strength of 79 staff including 44 Engineers in its Department. It additionally has 578 Engineering staff assigned to District Technical Offices (DTO). DoLIDAR manages its technical services to LRN through District Technical Offices (DTOs) located in all 75 districts to assist the District Development Committees (DDCs) to implement the construction and maintenance of the local infrastructures. Key characteristics of LRN is participatory and low cost in nature, with high level of community participation in decision making but low level of engineering inputs in their development. This often results in significant portion of network being un-engineered low quality and earthen roads. For example, absence of essential retaining and drainage structures and poorly maintained cut and fill slopes are very common in LRN, exposing them to damage even in normal

¹ DoLIDAR. 2012. *Summary of Rural Roads Record, 2069*, Department of Local Infrastructure Development Agricultural Roads, Lalipur.

rainfall and traffic conditions. The motorable bridges in LRN are very few and many are needed. Consequently, significant portion of the VRCN and some DRCN roads require heavy investment to make them accessible, usable or indeed to have safe public transport on these roads. This has resulted in the limited accessibility or usability of LRN even before the current earthquake. The situation was exacerbated by the earthquake.

Procurement for local infrastructure works is carried out under the provisions of local body financial rules guided by the prevailing Local Self Governance Act 2055 and PPA. The works are either undertaken by Users Committees (UC) or by local contractors through competitive bidding process, depending on the nature and the volume of the work.

Damage and Loss

The major earthquake of 25 April 2015 and the aftershock of 12 May 2015 have destroyed almost all of the rural houses made of random rubble/stone masonry in mud mortar. Almost all houses built in cement mortar brick masonry and (reinforced cement concrete (RCC) frames have experienced minor non-structural cracks, but only a small number of houses experienced structural cracks or complete failure/collapses.

Regarding SRN, very small percent of the network have suffered settlements or sinking or complete damage/washout due to the earthquake. In the hill/mountain roads, landslides have caused a partial blockage of road traffic for a few days in limited sections of the SRN only. A major disruption of traffic has been experienced in the entire 26 km of Arniko Rajmarg sections adjacent to the Chinese border causing interruption of trade flows between the 2 countries.

Damage costs are estimated based on the initial damage cost as per the assessment of DOR. The loss figures mainly consists of road opening cost, additional maintenance cost during the next monsoon due to the earthquake damage and estimated inflation cost of inputs for the rehabilitation/reconstruction works due to the shortage of supply after the earthquake. In addition, loss in vehicle operations cost (VOC) due to the road closure after the earthquake damage is estimated as NRs12.6 million (\$0.12 million). No major rerouting has been observed after the earthquake. No loss in tolls has occurred since there are no toll roads in the affected areas. The loss also includes the cost of equipment operation during the relief works, which is estimated at NRs15 million (\$0.15million). The total estimated damage and loss on SRN are NRs4,589 million (\$45.9 million) and NRs526 million (\$5.26 million), respectively.

Regarding LRN, extensive road blockages were reported in DRCN for a number of days, while VRCN, most of which were in the non-motorable conditions even before the 25 April earthquake, have suffered further blockages and inaccessibility. The obstructions were mainly due to landslides. Some road sections were completely destabilised and damaged. DTOs have received reports of persisting instability in fragile areas with visible cracks and fissures noted above the road sections. However, the impacts and the severity vary widely between districts. For example, the damages in LRN in Dolakha and Sindhupalchowk districts have been observed throughout the districts, while the damages are mostly concentrated in the northern sections of Gorkha and Dhading districts. The damage cost is the cost of specific repair and reconstruction cost. The loss is the cost of road opening plus 30% for additional cost due to increase in price and additional risk in monsoon triggered by the earthquake. The recovery cost is the damage cost plus 50%. The estimated damage and loss on LRN are NRs12,485 million (\$ 124.85 million) and NRs 4,274 million (\$42.74 million), respectively.

In the LRN, loss in transportation cost due to road closure has been estimated assuming the demand does not change and the transportation is done by non-motorized transport. This gives a loss to the economy of about NRs3,986 million (\$39.86 million) over the recovery period. This amount is an indicative loss which is not included

in the transport sector loss because this may overlap with the other sector's assessment in the assessment of loss due to the blockage of roads such as loss of agricultural products, health etc.

In the airports, TIA and 13 domestic airports experienced only minor damages to both the airside and landside facilities, which did not affect air transport operations. While airport operation were not suspended after the earthquake, TIA incurred revenue losses during the rescue and relief operations due to the waivers of charges for landing and cargos and airport terminal fees, reduction of passengers on regular flights and additional operational expenses for 24 hours operations immediately after the earthquake on 25 April 2015. The estimated damage and loss on airports are NRs114 million (\$1.1 million) and NRs130 million (\$1.3 million) respectively.

In Kathmandu, which is the home to 25 million people, no significant reduction in transportation services have been observed, and no major destruction of public transportation vehicles has been reported.

The overall damage and loss on the transport sector is estimated as NRs17,188 million (\$171.9 million) and NRs4,930 million (\$49.30 million), respectively, as summarized in Table 1.

Table 1: Summary of Damages and Losses on Transport Sector (NRs. Million)

Subsectors	Component	Estimated Damage	Estimated Loss
1. Strategic Road Network (SRN)	Highways and Feeder Roads	1,660	526
	Bridges	2,676	0
	Government Buildings	253	0
Subtotal		4,589	526
2. Local Road Network (LRN)	District Road Core Network (DRCN)	8,858	2,674
	Village Road Core Network (LRCN)	3,627	1,600
	Subtotal	12,485	4,274
3. Civil Aviation	Airports	95	130
	CAAN HQ, Academy, Safety, Fire Building	19	0
Subtotal		114	130
Total for Transport Sector		17,188	4,930

Note: Strategic urban roads are included in SRN and the remaining municipal roads are in LRN.

Effects on government and decision making process: Kathmandu city's transport has not experienced serious discontinuation of transport flows. Thus, no adverse effect of transport sector damage has been observed on governance and decision making processes at the key government decision makers' level.

Effects on risks and vulnerabilities: Due to mountainous terrains and climate in Nepal, road networks in Nepal are prone to damages and blockages by landslides and road formation washouts during monsoon seasons. The earthquake increased the risk of landslides by further loosening mountain slopes and damaging the mountain slope protections where they are provided. Damage to drainages structures further increase the risk of floods. The already-poor pavement of TIA may have been weakened by the earthquake which will further deteriorate

during the coming monsoon season. It is necessary to carefully evaluate the pavement strength and initiate at the earliest the required rehabilitation works.

Disaster Effects and Impact

The total population of the most severely affected 14 districts is about 5.37 million. Most of them are in the remote rural communities and have faced the inaccessibility to social and economic services. The losses in economic flow due to this inaccessibility after the earthquake are to be accounted for in the respective sector, e.g. agriculture, health, education etc.

The damages to the LRN and the consequent interruption of traffic from the earthquake affected areas have severely impacted the more vulnerable members of the communities. The proportion of women and children were higher among those severely injured or deceased from the disaster. One of the reasons is that most women, children and differently able persons were inside the houses at the time of earthquake. The breaking of the land transport through LRN meant that many of the women, children and those from disadvantaged groups, including *dalits* and people with disadvantages, were not able to access necessary treatment and relief support. When these supports are in limited quantities due to blockage of roads, it is often captured by more influential and stronger members in the communities. While this situation has improved with temporary opening of blocked LRN sections, it is important that the LRN rehabilitation and reconstruction process is designed with sensitivity to these vulnerable groups. Women and vulnerable communities should be prioritized for employment for the repairs and rehabilitation works of LRN.

SRN is the crucial economic infrastructure and its early recovery will serve early recovery of the economic activities in the country. LRN contribute to the economic activities to the rural communities inducing more agricultural production and technology transfers from urban areas. LRN contributes to the development of the social sector, such as health and education through the provision of easier access to social amenities (hospitals and schools) to the rural communities. In fact, loss due to the blockages of LRN arises more in agriculture, education and health sectors than in the transport sector. Closure of SRN and airports is expected to cause losses to the tourism sector development, but this earthquake did not cause serious damages to SRN and airports as to affect the decline in tourism needs.

Recovery Needs and strategy

The long term recovery outcome of the transport sector PDNA is to restore the pre-disaster services of the various modes of transport damaged in the earthquake disaster affected areas. In doing so, the structures damaged or at the verge of damage are rehabilitated/reconstructed based on BBB principles. This includes 4 different stages in the approach to the recovery outcome, namely (i) preparing for minimizing the damages to the infrastructures by the coming monsoon, including identifying emergency transport or evacuation routes (ii) repairing the minor damages of the affected structures to the original standards, including retrofitting of undamaged structures, where necessary, based on risk assessments, to a reasonable degree depending upon the importance of the structure (iii) rehabilitating the fully damaged elements of the main structures with improved standards to make it resilient to monsoon and future earthquake disasters, and (iv) reconstructing the fully damaged sections of the linear infrastructures such as roads and airports to design standards that can withstand the impacts of rainfall, flood and future earthquakes of reasonable degree.

The recovery strategies involve short term (ST), medium term (MT), and long term (LT) works. Short term works should be completed within 6 months, which include immediate works for opening the traffic in the landslide blocked and washed out sections of the road; repair of damages such as clearing remaining landslides debris,

clearing drains, filling the potholes, sealing the cracks, protecting the outfalls, and repairing partial damages; and the works relating to pre-monsoon preparedness. Medium term works should be completed in 24 months, which include rehabilitation or reconstruction of relatively small infrastructure. BBB principles will be applied for these rehabilitation and reconstruction works. Relatively large works for rehabilitation, reconstructions or improvement with BBB features, which need over 24 months are categorized as long term works.

Design philosophy, procurement modalities and implementation strategies shall be different for the short, medium and long terms works and for the type of transport infrastructure. Short term works should be completed with the existing government resources including the utilization of existing contractors for the government works. Variation orders or direct contracting should be considered for these works. Labour based approaches using local workers shall be considered for repair works and earthworks in rehabilitation. Medium term works need the recruitment of fresh consultants for designs and contractors for civil works, but fast track procurement should be considered to complete the works as early as possible. Long term works needs more cautious designing and procurement of large contracts, which shall follow the standard procedure. Design philosophy for medium term and long term works shall be based on assessments of risks. However, due to the nature of disaster recovery works, executing agencies should establish the most efficient implementation arrangement. Special provisions shall be considered by the government for the purpose. GON Cabinet decisions for procurement under special circumstances under the provisions of Article 41 (1) (gha 3) of amended PPA 2063 and Article 66 of the PPA, 2063, and under the provisions in the bilateral or multilateral agreement as per Article 67 (1)(kha) for foreign funded projects may be references.

Urban roads in Kathmandu are to be a part of urban recovery planning of Kathmandu metropolitan area. Long-term comprehensive urban recovery planning on Kathmandu metropolitan area, based on the future population forecast, future urban structure, land use plan, transportation plan, BBB based on risk assessment, including several kinds of recovery projects, such as evacuation routes, evacuation place like parks, land readjustment project, etc. are to be addressed in the Housing and Settlements Sector of the PDNA.

Design for LRN will be consistent with Equipment Supported Labour-Based Environmental Friendly approach of the Government of Nepal. Among them, the designs of roads in the mountainous regions should generally follow Mountain Risk Engineering (MRE) approaches developed by ICIMOD with special attention to earthquake risks. LRN could be constructed using community-based approaches but the shortage of labour due to the chaotic situation in rural communities requires the utilization of more equipment, which will be more costly than under the normal situations.

Approaches for the village road core networks (VRCN) shall be different because these roads are mostly non-engineered, non-climate resilient roads requiring significant improvements to meet the traffic demand. These roads are typically for low volume of traffic, but those which serve as lifeline transport infrastructure to communities, may be considered to be built back better to have a certain climate resilience designs. This may include construction of water management facilities such as side drains, pipe culverts or gravelling and black topping of the weak subgrade sections and wet areas, additional retaining structures, slope stabilization measures, and landslide stabilization.

In sum, the guiding principles are (a) fast track repairs of minor damages and opening of blocked roads in the short term that is within 6 months, (b) speedy and efficient construction or rehabilitations of various components of the road using BBB principles employing relaxed procurement regulations in the medium term that is within 24 months, (c) speedy and effective procurements of long term works using BBB approaches, and (d) improvement of the reliability of the highways, feeder roads, district roads and village roads that may not have been affected by the earthquakes but would constitute a basic access to the more damaged and populated areas.

Table 2 below shows the recovery needs to be a total of NRs28,185 million (\$282 million), 68% of which is in the LRN subsector. The SRN and Air Transport comprise 32% and 1% of the total recovery costs, respectively.

Short term Actions (up to 6 months)

Following are the required immediate actions. These works or services should be conducted through the variation orders to the existing contractors of the government works or the mobilization of local communities to avoid the lead time required for procurement.

- Removal of landslide debris and opening the roads to traffic.
- Minimum restoration of roads and bridges including repair of highly vulnerable sections. Construction of temporary bailey bridges securing the lifeline access to communities. Temporary repair works to avoid secondary disasters.
- Stabilization of road embankment and vulnerable bridges to withstand the monsoon.
- Comprehensive condition surveys and risk assessments of all damaged roads to plan and prioritize the rehabilitation, reconstruction and recovery works.
- Repairs of minor damages in all affected airports.
- Minimum repairs of the TIA runway pavement.
- A total of NRs1,935 million (\$19.35 million) will be needed for this phase.

Medium term Recovery (up to 24 months)

- Development of the urban recovery plan in Kathmandu metropolitan area based on BBB concept.
- Planning and engineering design of large rehabilitation works (construction period up to 24 months) and reconstruction works to be completed within 60 months based on BBB concept. This shall include the BBB concept-based urban development plan in the Kathmandu metropolitan area.
- Rehabilitation of SRN and LRN in accordance with BBB concept.
- Comprehensive conditions surveys of the structures of all existing roads and bridges to assess the vulnerability to the disaster of future earthquakes of similar degree and to plan and prioritize the necessary retrofit works.
- Risk mitigation planning of the potential landslides on lifeline roads through the risk assessment, hazard mapping and evacuation planning, to be reflected in the long term recovery works. Procurement and mobilization of contractors for the large rehabilitation/reconstruction works of LRN and SRN.
- Full-fledged rehabilitation of TIA runway pavement.
- A total of NRs11,521 million (\$115.21 million) will be needed for this phase. Cost of TIA runway rehabilitation is not included in this cost.

Long term Recovery (up to 60 months)

The long term works includes planning, design and reconstruction of the fully damaged/ rerouting sections of the SRN and LRN under the BBB principle. The estimated cost of this phase is NRs14,729 million (\$147.29 million).

Table 2: Summary of Short, Medium and Long Term Needs (NRs. Million)

Sub-sector		Short Term	Medium Term	Long Term	Total Needs Amount
1. Strategic Road Network (SRN)	Highways and Feeder Roads	691	1,859	3,442	5,992
	Bridges	803	1,873	0	2,676
	Government Buildings	0	349	0	349

Subtotal		1,494	4,081	3,442	9,017
2. Local Road Network (LRN)	District Road Core Network (DRCN)	252	5,951	7,336	13,539
	Village Road Core Network (VRCN)	75	1,489	3,951	5,515
Subtotal		327	7,440	11,287	19,054
3. Civil Aviation	Airports	95	0	0	95
	CAAN HQ, Academy, Safety, Fire Building	19	0	0	19
Subtotal		114	0	0	114
Total for Transport Sector		1,935	11,521	14,729	28,185

Implementation Arrangements

Monitoring and evaluation. Given the high level of investment and the enormous amount of work to be delivered in the limited period especially in the first 24 months, increased risk of fraudulent practices, corruption and serious compromise in quality of works have been observed in other countries. While there is a limitation on the government resources, careful planning of implementation arrangement is required to enable efficient implementation. Creating additional layers for decision making for the close monitoring purpose usually does more harm in most cases, which will delay the achievement of intended outputs through the recovery operations. Direct monitoring by the office of the top decision makers is a good practice for the quick and appropriate decision making and implementation.

The implementing capacity of DOR for SRN is assessed as sound with extensive experiences in implementing donor funded projects. However, the capacities of DDCs, which will be responsible for implementing local and rural road projects vary from district to district. DoLIDAR's staff base is already overstretched with a large number of scattered projects in a number of districts. The additional volume of design and supervision works needed for recovery works is a heavy burden to DoLIDAR. It is recommended that additional resources including consultants be allocated to DoLIDAR for the project management. It is also recommended that women, *dalits* and ethnic groups, who are most affected from the earthquake, participate in suitable works related to rehabilitation or reconstruction of rural roads. In such case, coordination will be needed with concerned agencies in accessing crèche facilities for children to enable women with children to participate in works and take full benefits.

CAAN can work on the recovery works mostly by insurances and with issuing variation orders to the existing contractors since the recovery needs are minor. Additional burden for these works are not expected to CAAN.

Annual Budget needs for the five years FY2014-015 to 2018-019 has been assessed as per Tables 3A, 3B, and 3C below. It is seen that the budget requirements for SRN and LRN shall be 183, 7,744, 8,010, 6,641, and 5,493 million Nepali Rupees for FY2014-15, 2015-16, 2016-17, 2017-18, and 2018-19, respectively.

Table 3A. Budget Plan for SRN, in million NRs

S.N	Term	Recovery Needs	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	Short term	- Removal of debris, - minor repairs to drains, culverts, walls, bridges - minor back cutting & filling - Temporary bridges/crossing - Reopening of traffic - Condition survey and risk assessments Procurement Method: Force Account, Variation, Quotation	150	1,344	-	-	-	-
2	Medium Term	- Designs based on BBB and Type of Road -Procurement planning and award of works -Construction Procurement Method: Direct Contract, Request for Quotation, Variation, LT/LIB	-	1,632	2,040	409	-	-
3	Long term	- Designs based on BBB and Type of Road - Procurement planning and award of works - Construction Procurement Method: Contract, NCB, ICB, LT/LIB		344	688	1,205	1,205	

Table 3B. Budget Plan for LRN - DRCN, in million NRs

S. N.	Term	Recovery Needs	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	Short term	- Removal of debris, - minor repairs to drains, culverts, walls, bridges - minor back cutting & filling - Temporary bridges/crossing - Reopening of traffic - Condition Survey and risk assessments Procurement Method: Force Account, Variation, Quotation	25	227	-	-	-	-
2	Medium Term	- Designs based on BBB and Type of Road - Procurement planning and award of works - Construction	-	2,400	2,951	600		-

S. N.	Term	Recovery Needs	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
		Procurement Method: Direct Contract, Request for Quotation, Variation, LT/LIB						
3	Long term	- Designs based on BBB and Type of Road - Procurement planning and award of works - Construction Procurement Method: Contract, NCB, ICB, LT/LIB		730	730	2,938	2,938	

Table 3C. Budget Plan for LRN - VRCN, in million NRs

S. N.	Term	Recovery Needs	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	Short term	- Removal of debris, - minor repairs to drains, culverts, walls, bridges - minor back cutting & filling - Temporary bridges/crossing - Reopening of traffic - Condition Survey and risk assessments Procurement Method: Force Account, Variation, Quotation	8	67	-	-	-	-
2	Medium Term	- Designs based on BBB and Type of Road - Procurement planning and award of works - Construction Procurement Method: Direct Contract, Request for Quotation, Variation, LT/LIB	-	600	750	139		-
3	Long term	- Designs based on BBB and Type of Road - Procurement planning and award of works - Construction Procurement Method: Contract, NCB, ICB, LT/LIB	-	400	851	1,350	1,350	

Assessment Methodology

The damage and effects assessment method has been conducted in accordance with the guidance provided by PDNA Secretariat of the Government. It is primarily dependent on the government initial assessment data, which have been refined and re-categorized in accordance with PDNA Guidelines through selected field verifications and intensive discussions with the government and the PDNA transport sector team. However, we need to note here

that the assessed needs, especially medium and long term needs, are still rough due to the nature of rapid assessment, which shall need to be further refined through detailed surveys at the early stage of recovery works. The assessment team included the cost for the detailed survey needs in the short and medium terms efforts.

PDNA transport sector team led by ADB comprised of DOR, DoLIDAR, CAAN with team members from DFID, the World Bank, JICA, Switzerland, India, ILO, and UNOPS, which have provided inputs to the assessment.

WATER, SANITATION AND HYGIENE

Summary

The Post-Disaster Needs Assessment (PDNA) for the Water, Sanitation and Hygiene (WASH) Sector was part of the broader PDNA conducted for all sectors under the overall leadership of the National Planning Commission. It was a joint exercise of the Government and the Development Partners, and has been guided by the Ministry of Urban Development (MoUD) with technical support from the Department of Water Supply and Sewerage (DWSS). The overall objective of this assessment was to take stock of the damages and change in economic flows faced by the sector as a result of the 7.8 magnitude of 25 April earthquake and its aftershocks, and provide estimates of the recovery and reconstruction needs using the principle of 'building back better'.

The damages and change in economic flows for the sector were calculated by DWSS based upon rapid assessment surveys undertaken by Districts Divisional- and sub-Divisional Water Supply and Sanitation Offices in the 14 severely affected districts where emergency was declared by the government. A data quality assurance exercise was carried out between 23 - 28 May 2015 by three Sector Assessment Teams led by Embassy of Finland, JICA and the Rural Water Supply and Sanitation Fund Development Board who visited 9² of the affected districts. These field visits not only verified data from the rapid assessments, they also gained additional insights into the extent of damage to physical infrastructure and assets and gained a better understanding of the broader effects of the disaster on water supply and sanitation services delivery and governance mechanisms, as well as emerging risks and vulnerabilities. This assessment also includes estimates for damage and change in economic flows for additional 17 districts³ that were classified by the government as moderately impacted by the earthquake. In addition, consultations were held with representatives of relevant line agencies and development partners to better understand the effects of the disaster on the functioning of the water and sanitation sector and to solicit their suggestions for formulating recovery strategies and needs.

The net total value of damages and change in economic flows to the water and sanitation sector is estimated at **NPR 11.4 billion** at pre-disaster prices. Of this, the damage to infrastructure and physical assets is estimated at **NPR 10.5 billion**. The total needs for recovery and reconstruction using the principle of building back better is estimated at **NPR 18.1 billion**, of which 25% is needed for FY 2015-16, 40% for FY 2016-17 and 35% for FY 2017-18. The specific needs are described in more detail in the body of this report.

From WASH PDNA assessments it is clear that safe water supply and sanitation needs are considered of highest priority by affected populations, in addition to food and shelter. This priority is further amplified by risks of diarrhoeal diseases outbreaks among these populations from imminent monsoon. The following principles will be pursued: alignment to approved institutional systems, standards and procedures of the sector; cost-effectiveness that is accountable to both central and local oversight; gender sensitivity and social equitability of service delivery that takes the human rights based approach to reach the unserved; and, adapting technology and service levels to local contexts. Likewise, it is central to fully engage the inter-cluster cooperation in this effort.

Furthermore, the WASH sector damage and change in economic flows assessment covers communities that have been impacted by the earthquake. However, there remains approximately 788,000 population (13%) in the 14

² Dhading, Dolakha, Gorkha, Kavre, Lamjung, Nuwakot, Ramechhap, Rasuwa, Sindhupalchowk.

³ Arghakhanchi, Baglung, Bhojpur, Chitawan, Dhankuta, Gulmi, Kaski, Khotang, Lamjung, Myagdi, Nawalparasi, Palpa, Parbat, Syangja, Solukhumbu, Sankhuwasabha, Tanahun,

most impacted districts not served in any manner prior to the earthquake. The cost of providing WASH services to this un-served population is approximately NPR 7.9 billion.

Pre-Disaster Context and Baseline

The Ministry of Urban Development (MoUD) is the lead ministry for the Water Supply, Sanitation and Hygiene sector. Its main operational agency, the Department of Water Supply and Sewerage (DWSS), was established in 1972. The DWSS operates through a network of 5 regional offices, 48 divisional offices and 22 sub-divisional offices, and has a total staff of 1,660 including 170 professionals. It supports the implementation of rural and small town water supply schemes. In recent years, DWSS at national level has taken on sector support and regulatory roles.

At the district level, the District WASH Coordinating Committee (DWASHCC) is the main instrument for the planning, coordination and monitoring of WASH infrastructure development, including leading the “open defecation free” (ODF) campaigns together with other local government agencies. The District Technical Office (DTO) as part of the local authority structure of the Ministry of Federal Affairs and Local Development (MoFALD) undertakes smaller WASH projects and supports minor repairs in accordance with decentralization policies including water supply. It is guided by the Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR) in MoFALD. The Rural Water Supply and Sanitation Fund Development Board (RWSSFDB), under MoUD, promotes demand-led rural water supply and sanitation services using non-governmental and private organizations as implementing partners. As of 2015, the Fund Board operates under the guidance of the respective District Development Council (DDC) /DWASHCC.

The Kathmandu Valley Water Supply Management Board (KVWSMB) is an autonomous government body that reports to MoUD. It is responsible for developing and overseeing service policies, and providing licenses to service providers for the operation and management of water supply and sanitation service system in Kathmandu Valley (comprising the districts of Kathmandu, Lalitpur, and Bhaktapur). Its main contracted service provider is Kathmandu Upatyaka Khanepani Limited (KUKL). The Nepal Water Supply Corporation (NWSC) provides water services to some 21 towns in Nepal, some of which are also in the affected areas (e.g. Banepa, Kavre, etc.). Water supply services in the Kathmandu Valley are being upgraded through the Melamchi Project.

There are several important prevailing sector policies and strategies including the Rural Water Supply and Sanitation National Policy, Strategy and Sectoral Strategic Action Plan 2004, that sets a National goal of universal water supply and sanitation coverage by 2017, and makes provision to allocate 20% of the WASH sector budget for sanitation and hygiene promotion. There is also the Urban Water Supply and Sanitation Policy 2009, and the Sanitation and Hygiene Master Plan 2011 that emphasises the elimination of open defecation and total behaviour change with regard to sanitation and hygiene. Community Led Total Sanitation (CLTS) is now the main approach to sanitation, with its focus on behaviour change and a no-subsidy principle.

The WASH Umbrella Act and Comprehensive WASH policy is being formulated to streamline the sector, address institutional fragmentation, overlapping responsibilities and project driven modalities. Improvements in coordination among government WASH actors, donor agencies, UN and (I)NGOs is raising sector quality and facilitating a gradual movement towards a sector wide approach. Following the Second Joint Sector Review (April 2014), which drew together sector specific thematic priorities, the outline of a Sector Development Plan (SDP) was shared with stakeholders in 2014 for review. The key objective of SDP is to enhance coherence and harmonization in the sector aligned to government policies and strategies. At the same time, the Terms of Reference for the Sector Financing Strategy was approved by the Government. However, preparation of the Strategy is expected to be delayed because of the earthquake until third quarter of 2015.

The 2015 update of the Joint Monitoring Programme (JMP), reports that 92% of Nepal’s population have access to improved drinking water, and 46% have access to improved sanitation⁴. The sustainability of drinking water systems however remains a priority concern for the sector. According to DWSS/NMIP data for 2012, just 25% of water schemes were functioning well; 36% need minor repair, 9% need major repair, 20% need rehabilitation, 9% need reconstruction, and 1% are non-functional. The underlying causes of the low rates of functionality can be attributed in part to inadequate management of operation and maintenance. Just 31.5% of schemes have a Water Supply and Sanitation Technician (WSST), only 38% of the schemes have registered Water and Sanitation Users Committees (WSUC), and less than 5% have an O&M fund. Considering the overall functionality of schemes, effective coverage of water supply is only 40% without even accounting for water quality. Nepal needs to significantly increase its performance to realize national target of universal access to basic water supply by 2017. The recent Multiple Indicator Cluster Survey (MICS survey 2014) and the DWSS database, suggest that there has been a significant acceleration in sanitation progress both in terms of access to improved sanitation and, very importantly, a substantial decrease in open defecation. So far 21 districts have been declared ODF, and a further 21 districts have reached more than 50% ODF status. The main challenge lies in accelerating the sanitation movement nationwide, equitable targeting, achieving total sanitation and sustaining sanitation outcomes and behaviour.

With ongoing rural to urban migration coupled with newly demarcated municipalities, the urban population in Nepal today stands at 38%, up from 17% in 2014. This requires a more in-depth planning in new urban areas so as to provide appropriate levels of water supply and sanitation and also, to assure compliance with the “Urban Water Supply and Sanitation Policy 2009”.

TOTAL WATER						TOTAL SANITATION				
Estimated coverage 2015 update						Estimated coverage 2015 update				
Year	Total improved	Piped onto premises	Other improved	Other unimproved	Surface water	Year	Improved	Shared	Other unimproved	Open defecation
1990	66%	6%	60%	27%	7%	1990	4%	2%	6%	88%
1995	72%	9%	63%	22%	6%	1995	13%	6%	5%	76%
2000	77%	13%	64%	18%	5%	2000	22%	9%	5%	64%
2005	82%	17%	65%	14%	4%	2005	30%	12%	5%	53%
2010	87%	21%	66%	10%	3%	2010	38%	15%	5%	42%
2015	92%	24%	68%	6%	2%	2015	46%	18%	4%	32%

Table: Access to improved drinking water and sanitation in Nepal (JMP Update 2015 – in press)

The safety of the drinking water is another issue that must be addressed. The 2014 MICS survey included water quality testing and found that 71% of drinking water sources, and 82% of household stored water were contaminated with *E.coli* (≥ 1 cfu/100ml). This will require both technical and social interventions.

Equity of access to water and sanitation services is an important concern, as access varies significantly according to location, wealth quintile, ethnicity, and level of education. For example, the 2014 MICS survey finds that access to piped water in the household or yard is 55% in the wealthiest population quintile, compared to 16% in the poorest quintile; open defecation is practiced by 39% of households with no education versus 8% of households with the highest level of education, and open defecation is much more widespread in rural areas (31%), than urban areas (6%). Access to improved drinking water in the Mid-Western Mountain and Mid-Western Hill regions

⁴ NMIP/DWSS estimate for water supply coverage is 85% and for sanitation is 70%.

lags behind other regions by around 15%, and with regard to improved sanitation it is the Eastern Terai and Central Terai regions where least progress has been made.

Post-Disaster Context

Infrastructure & assets

In the 14 severely affected districts, the vast majority of the 11,288 water systems are gravity-fed, with springs or streams as the source. A substantial number of these have suffered either partial damage, or have been completely destroyed. It is estimated that around 1,570 systems have been totally damaged, and a further 3,663 systems have suffered partial damage that requires repair. More than 90% of the damaged schemes are rural, though is mainly because urban schemes are fewer in number and serve larger populations. The earthquake caused multiple impacts to the water supply schemes. There are many reports of water sources either drying up completely or re-emerging at lower elevations. In a few cases it has been reported that the source flow has increased. Problems with water quality have mostly been due to increased turbidity as a result of damage to intake works or transmission pipelines. Landslides have caused much of the damage leading to blockage of intake works, and carrying away sections of pipeline - including buried pipeline in some cases. Structural damage to reservoirs and break-pressure tanks has resulted in leakage; overhead reservoirs and tap stands have also been damaged and are no longer structurally sound. The nature of damage to both rural and urban systems is similar.

Access to sanitation has been severely affected by the earthquake. In urban areas most households have toilets located within the house, and thus the collapse of housing has led to a total loss of sanitation facilities. In rural areas the situation is slightly different. Although some households have adjoining toilets or have incorporated them into the house structure, it is more common that toilets are sited within the household yard. Nevertheless, there has been substantial loss of toilets in rural areas. One difference, though, is that toilets built in the yard are more likely to have the sub-structure intact, and could potentially be rebuilt. It is estimated that in these 14 districts approximately 220,000 toilets have been partially or totally destroyed.

Office buildings of DWSS and other water and sanitation service providers have also been damaged in many districts. The assessment reports that six DWSS buildings have completely collapsed, and a further 47 have suffered partial damage. It has not been possible to assess the extent of damages and change in economic flows to equipment such as office furnishings, computers, etc.

Effects on production of goods and services and access to services

As a consequence of partial or total damage to water supply systems and sanitation, many socio-economic effects have been observed and assessed. Economic loss is likely to occur through the non-collection of revenues (water user fees) by service providers such as KUKL in Kathmandu Valley, and by WSUC in rural communities. Reduced revenue collection is partly due to the disruption of water supplies but also because of financial hardship among the affected population, a proportion of whom will be unable to pay water user fees.

In both urban and rural areas households are generally required to pay for water supply connections, and in urban areas also for water meters. Given the level of destruction to households it is very likely that new connection fees will be charged to cover labour and materials costs. This constitutes a loss of investment by the householder. Similarly, a large proportion of households have lost the investment made in the construction of toilets, and especially so in the predominantly rural population. Many households take out small loans to build their toilets, and are unlikely to see these debts waived even though they have lost their investment.

In rural areas, communities are expected to contribute to the capital costs of the water system through providing labour, materials and in some cases a cash contribution. Regardless of whether the water system needs repair,

reconstruction or relocation, communities will be expected to contribute to the overall investment costs. Where this involves contributing labour or providing local materials, it represents an opportunity cost to the household. Livelihoods have been impacted through the disruption to the water supply, including loss of wages among village water system caretakers, restaurant businesses, rearing of livestock and poultry, and cultivation of cash crops.

Women have reported that where serious damage to the water system occurred, they are walking between 1 – 3 hours to collect water from alternative sources. Water collection is often for both household members and livestock, incurring a time, energy and child care cost. Additionally, women in focus group discussions observed that disruption to water supply and loss of sanitation facilities has compromised personal hygiene including menstrual hygiene management. The impact to women’s dignity through loss of access to sanitation is not yet measurable. Neither is it feasible to quantify the quality of life impacts on children, the elderly, infirm and disabled population through the disruption to water supply and sanitation services.

Effects on sector governance functions and systems

As mentioned above, the earthquake led to significant damage to DWSS and WSUC offices, furnishings and equipment. In some cases staff have had to move into temporary office space or operate from tents. System records, work plans, and other essential documents have been lost in some districts. In order to support the assessment and recovery process, DWSS has temporarily moved staff from non-affected districts resulting in reduced service capacity in those districts. Given the scale of the disaster, individuals involved in water supply and sanitation administration, operation and maintenance, and governance such as members of the WSUC are less available to the recovery process due to the demands of managing their own personal and family needs. In order to deliver on the build back better principle in the recovery strategy, capacity building of staff will be required especially in the area of risk reduction and disaster preparedness.

Increased risks and vulnerabilities

The disruption to water supply and sanitation services is not only inconvenient but presents several increased risks and vulnerabilities. Foremost among these is the public health risk and the prospect of diarrhoeal disease outbreaks. The difficulties in maintaining good personal hygiene practices, the reduced access in sanitation and thereby increase in open defecation, and the deterioration in water quality all combine to substantially increase the risk of faecal-oral disease. The water-related impacts to livelihoods leaves people more vulnerable to disease through reluctance to spend scarce financial resources on medical treatment, and may subsequently lead to reduced household productivity. Infants and young children under-five years of age are particularly vulnerable to diseases associated with poor hygiene practices, unsanitary conditions and unsafe drinking water as these further undermine their health and nutrition status. Girls and women may face additional risks of violence and sexual abuse due to the lack of access to gender separated, and safe toilets in schools, or through having to walk long distances to alternative water sources, or when seeking privacy to defecate in the open.

Damage and Loss

Summary table of estimates of Damage and Change in economic flows (USD)

Sector	Damages, NRs	Losses, NRs	Total effects, NRs	Total effects, USD
14 severely affected districts				
Water Systems	5,571,802,656.0	579,875,557.1	6,151,678,213.1	60,310,570.7
Sanitation	1,195,746,350.0		1,195,746,350.0	11,723,003.4

Sub-total	6,767,549,006.0	579,875,557.1	7,347,424,563.1	72,033,574.1
Other 17 affected districts				
Water Systems	2,822,337,000.0	293,523,048.0	3,115,860,048.0	30,547,647.5
Sanitation	915,835,772.1	-	915,835,772.1	8,978,782.1
Sub-Total	3,738,172,772.1	293,523,048.0	4,031,695,820.1	39,526,429.6
Total	10,505,721,778.1	873,398,605.1	11,379,120,383.3	111,560,003.8

Damage and losses of the severely affected 14 districts

Name of district	Water damages (NRs)	Sanitation damages (NRs)	Losses (NRs)
Okhaldhunga	29,430,000.0	54,500,000.0	12,405,310.4
Ramechhap	931,489,475.0	136,250,000.0	16,987,556.3
Sindhuli	17,467,250.0	32,700,000.0	24,829,398.4
Kavre	344,870,039.1	141,700,000.0	32,017,292.6
Dolakha	1,095,678,900.0	114,450,000.0	15,638,835.9
Sindhupalchok	838,114,080.0	125,350,000.0	24,125,740.1
Kathmandu	67,852,500.0	68,277,600.0	236,193,564.0
Lalitpur	131,422,857.1	61,590,450.0	63,391,371.3
Bhaktapur	191,295,000.0	93,522,000.0	41,253,844.3
Rasuwa	65,400,000.0	38,150,000.0	3,629,783.9
Nuwakot	426,920,300.0	119,900,000.0	23,260,040.8
Dhading	588,835,817.3	26,781,300.0	28,172,068.9
Makwanpur	426,918,937.5	62,675,000.0	35,248,051.8
Gorkha	416,107,500.0	119,900,000.0	22,722,698.6
Total of 14 districts	5,571,802,656.0	1,195,746,350.0	579,875,557.1

Damage and losses of other moderately affected 17 districts

Name of district	Water damages (NRs)	Sanitation damages (NRs)	Losses (NRs)@ 10.4% of damages in the 14 districts
Dhankuta	155,652,000.0	41,001,440.0	16,187,808.0
Khotang	212,877,000.0	29,448,393.2	22,139,208.0
Solukhumbu	85,837,500.0	11,083,582.2	8,927,100.0
Tanahu	262,090,500.0	85,331,740.0	27,257,412.0
Baglung	199,143,000.0	67,015,380.0	20,710,872.0
Gulmi	230,044,500.0	63,767,309.9	23,924,628.0
Parwat	149,929,500.0	38,910,820.0	15,592,668.0
Palpa	254,079,000.0	46,701,028.2	26,424,216.0
Nawalparasi	62,947,500.0	63,437,476.8	6,546,540.0
Myagdi	76,681,500.0	30,222,430.0	7,974,876.0
Chitwan	43,491,000.0	72,128,025.0	4,523,064.0
Lamjung	135,051,000.0	45,832,320.0	14,045,304.0
Kaski	171,675,000.0	136,750,310.0	17,854,200.0
Syangja	252,934,500.0	73,927,244.4	26,305,188.0
Bhojpur	180,831,000.0	28,940,461.4	18,806,424.0

Sankhuwa Sabha	137,340,000.0	30,297,471.1	14,283,360.0
Arghakhanchi	211,732,500.0	51,040,340.0	22,020,180.0
Total of other 17 districts	2,822,337,000.0	915,835,772.1	293,523,048.0

Disaster Effects and Impact

The effects of the earthquake represent a major setback for the water and sanitation sector. In particular, achieving the national target of “Water and Sanitation for All by 2017” is now clearly in doubt. Of particular concern is the impact to the momentum and success of the Social Movement for Sanitation. As mentioned earlier, sector monitoring and the MICS 2014 survey indicate that the efforts to eliminate open defecation are paying dividends with an accelerated trend in the number of VDCs being declared ODF. While concern about lost sanitation facilities has been widely voiced, households that have lost everything will inevitably place sanitation as a lower priority over rebuilding their homes and livelihoods. The sanitation situation for recovery is complicated partly because of the no-subsidy principle, which may significantly delay the resumption of current progress towards sanitation targets. Equally the national target to achieve universal access to water supply by 2017 will be extremely difficult to achieve given the magnitude of damage to water supply schemes. This may require a reconsideration of the existing zero subsidy policy for sanitation towards some form of household incentives, given their severe change in economic flows in this regard.

Sector development with regard to policy development, strategy review and institutional reform will also be setback. Government and development partner stakeholders that have been putting in place the building blocks for the Sector Development Plan, have recognised that this process will be delayed but is still expected to be completed during 2015.

The linkages between livelihoods and water supply have been addressed earlier but prolonged disruption to water and sanitation services can be expected to have a disproportionate impact on women and girls through the ‘social costs’ incurred through the time and energy spent collecting water, threat of violence and sexual harassment, diminished child care, reduced school attendance, dignity and self-esteem.

Recovery Needs and strategy

The recovery and reconstruction strategy is based on the principles of DRR and build back better. It aims to return the sector to a better and more resilient state than the pre-earthquake status as quickly as possible, and enable it to resume progress towards achieving the national goal of universal access to water supply and sanitation. The strategy is not only intended to restore infrastructure and governance but also ensure that the sector as a whole is more resilient, that access to water and sanitation services are more equitable, that services are developed to a higher standard, and that governance is strengthened through enhancing sector coordination, professionalism and accountability.

Short-term activities will build on the ongoing emergency response and run through to the end of 2015. In this regard, the WASH cluster has begun planning on how to transition its work into the normative WASH development structures at National and District levels. Priority activities through end of 2015 will include temporary or provisional repairs to water systems, rebuilding of toilets and hand-washing facilities through a resumption of the CLTS total behaviour change approach, household water treatment, restore and strengthen institutional capacity to coordinate and implement short-term recovery needs, and undertake disaster preparedness measures. The latter is in reference to the monsoon season which is widely expected to induce landslides causing further disruption to water supply. Given the heightened risk of diarrhoeal disease outbreaks due to the reduced access to water supply and sanitation, it is imperative that short-term activities give priority to the most vulnerable

communities. The short term activities in sanitation and hygiene will be further informed by the ongoing Sanitation and Hygiene Assessment at District level, initiated by the National WASH Sector, which will further compliment and add depth to the PDNA WASH assessment of toilet damages. The following table summarises the main short-term activities (June to December 2015), details of which will be worked out prior to intervention.

Priority Recovery Needs	Interventions	Expected Outputs	Intended Outcomes
Reconstruction of toilets and hand-washing facilities	<ul style="list-style-type: none"> Incentivise households to rebuild toilets and hand-washing facilities through cash or materials support 	<ul style="list-style-type: none"> n thousand toilets and hand-washing facilities re-built 	<ul style="list-style-type: none"> n thousand people have access to sanitation and hand-washing facilities
Provision of temporary toilets and hand-washing facilities	<ul style="list-style-type: none"> Build toilets and hand-washing facilities in temporary shelters for earthquake and/or monsoon affected population 	<ul style="list-style-type: none"> n hundred toilets and hand-washing facilities built 	<ul style="list-style-type: none"> Reduced risk of diarrhoeal disease outbreak Dignity and safety of girls, women, elderly and infirm enhanced
Resume CLTS programme	<ul style="list-style-type: none"> Follow-up activities to sustain ODF behaviours Refresher triggering Celebration of national sanitation week 	<ul style="list-style-type: none"> n hundred VDC declared ODF 	<ul style="list-style-type: none"> As above, and Restored sense of normality and business as usual
Restore partially damaged water systems	<ul style="list-style-type: none"> Incentivise communities to clean and repair minor damage to water systems through cash or materials support Provide technical supervision 	<ul style="list-style-type: none"> n hundred water systems restored to at least minimal service levels 	<ul style="list-style-type: none"> n thousand people have access to safe drinking water Reduced water collection time
Disaster preparedness	<ul style="list-style-type: none"> Develop user-friendly operational manual to address preparedness and response. Identify frequent landslide locations Pre-position emergency supplies Establish and train rapid response teams 	<ul style="list-style-type: none"> n districts prepared to respond to emergency water supply, sanitation and hygiene needs 	<ul style="list-style-type: none"> n thousands of people can potentially receive emergency water supply and sanitation
Restore governance capacity	<ul style="list-style-type: none"> Provide logistics support to DWSS, WSUC etc Capacity building on objectives and approaches to short term recovery 	<ul style="list-style-type: none"> n rented offices, vehicles, furnishings, tools, equipment, budget, etc. n watsan staff trained 	<ul style="list-style-type: none"> n water and sanitation institutions have capacity to deliver short-term recovery outputs
Develop build back better guidelines	<ul style="list-style-type: none"> Conduct a consultative review of options for build back better water and sanitation services. Advocacy and awareness on risk management and BBB 	<ul style="list-style-type: none"> Guidelines developed for medium-long term recovery 	<ul style="list-style-type: none"> Key sector actors 'own' build back better guidelines

Establish coordination and monitoring mechanisms	<ul style="list-style-type: none"> Undertake consultation with key sector and community actors Undertake consultation with other sectors e.g. housing, health 	<ul style="list-style-type: none"> Roles and responsibilities agreed Short-term recovery targets established Monitoring mechanism developed 	<ul style="list-style-type: none"> Key sector actors adopt results-based management approach
Develop detailed medium to long-term recovery plan	<ul style="list-style-type: none"> Undertake consultation with key sector actors Task team develops medium to long-term recovery plan 	<ul style="list-style-type: none"> Detailed medium to long-term recovery plan 	<ul style="list-style-type: none"> Key sector actors 'own' medium-long term recovery plan

Medium to long-term recovery activities will be implemented from early 2016 through to December 2018. These activities will place more emphasis on the principles of DRR and build back better. Activities will include the rehabilitation and construction of new water systems (for resettled communities), as well as to ensure compliance of municipalities to the “Urban Water Supply and Sanitation Policy 2009”. It will also include building-in resilience qualities, developing and implementing the water safety plans, resuming at-scale the Social Movement for Sanitation, implementing urban sludge management projects, building community and institutional capacity in DRM, strengthening governance especially among service providers, establishing guiding principles of equity in the development of services, strengthening sector monitoring, and completing the planned sector reform processes that are embodied in the Sector Development Plan. The following table summarises the priority medium to long-term recovery activities.

Priority Recovery Needs	Interventions	Expected Outputs	Intended Outcomes
Social Movement for Sanitation	<ul style="list-style-type: none"> Resume at-scale CLTS programme 	<ul style="list-style-type: none"> XX districts declared ODF 	<ul style="list-style-type: none"> n thousand people have access to basic sanitation and hand-washing facilities
Private sector sanitation services	<ul style="list-style-type: none"> Stimulate expansion of private sector sanitation service providers 	<ul style="list-style-type: none"> n private sector manufacturer/importer of sanitation products n licensed/registered service providers 	<ul style="list-style-type: none"> n thousand households have higher sanitation service level Affordable and quality products and services available
Urban sludge management	<ul style="list-style-type: none"> Implement faecal sludge management projects 	<ul style="list-style-type: none"> n medium-large towns have faecal sludge management services Waste water treatment facilities of KUKL rehabilitated and capacity increased 	<ul style="list-style-type: none"> Public health risks and environmental degradation mitigated

Water supply	<ul style="list-style-type: none"> • Rehabilitate damaged water supply systems • Construct new water systems with water conservation features 	<ul style="list-style-type: none"> • n water systems that incorporate resilience qualities • n water systems with improved water treatment capacity 	<ul style="list-style-type: none"> • n resilient water systems delivering improved water quality
Water supply management	<ul style="list-style-type: none"> • Develop water safety plans • Train of WSUC and other service providers • Register service providers 	<ul style="list-style-type: none"> • n water safety plans • n service providers trained in O&M, DRR, administration, etc. • n service providers registered and certified 	<ul style="list-style-type: none"> • n service providers with effective management capacity • n service providers brought into regulatory system
Advocacy/Capacity building in DRM	<ul style="list-style-type: none"> • Train WSUC and other service providers in DRM 	<ul style="list-style-type: none"> • n service providers trained in DRM 	<ul style="list-style-type: none"> • n service providers put in place DRM measures
Equity guidelines	<ul style="list-style-type: none"> • Undertake consultation on enhancing equity in development and delivery of services • Task team develop equity guidelines • Revise sector monitoring protocol revised to incorporate equity indicators 	<ul style="list-style-type: none"> • Equity guidelines developed • Monitoring protocol revised to include equity indicators 	<ul style="list-style-type: none"> • enhanced equity in access to water and sanitation services
Sector Development Plan	<ul style="list-style-type: none"> • Prepare financing strategy • Consult with key sector actors • Improve Sector Governance – regulation, compliance to service standards, over extraction, waste water management 	<ul style="list-style-type: none"> • Finalised Sector Development Plan 	<ul style="list-style-type: none"> • Strengthened sector efficiency and effectiveness

Table on recovery and reconstruction initiatives and costs

(Based on Needs, DRM including BBB and recovery and reconstruction strategy)

District/ Buildings	Sanitation (NRs)	Water Systems (NRs)	Build Back Better (NRs)			Total Cost, NRs	Total Cost, USD	Budget allocation, USD		
			WSP/ Upgrading water quality	Infrastructure	Institutional capacity development			2015/16 (25%)	2016/17 (40%)	2017/18 (35%)
A. Severely affected districts (14 districts)										
Okhaldhunga	54,500,000.0	29,430,000.0	2,943,000.0	4,414,500.0	1,258,950.0	92,546,450.0	925,464.5	231,366.1	370,185.8	323,912.6
Ramechhap	136,250,000.0	931,489,475.0	93,148,947.5	139,723,421.3	16,016,092.1	1,316,627,935.9	13,166,279.4	3,291,569.8	5,266,511.7	4,608,197.8
Sindhuli	32,700,000.0	17,467,250.0	1,746,725.0	2,620,087.5	752,508.8	55,286,571.3	552,865.7	138,216.4	221,146.3	193,503.0
Kavre	141,700,000.0	344,870,039.0	34,487,003.9	51,730,505.9	7,298,550.6	580,086,099.3	5,800,861.0	1,450,215.2	2,320,344.4	2,030,301.3
Dolakha	114,450,000.0	1,095,678,900.0	109,567,890.0	164,351,835.0	18,151,933.5	1,502,200,558.5	15,022,005.6	3,755,501.4	6,008,802.2	5,257,702.0
Sindhupalchok	125,350,000.0	838,114,080.0	83,811,408.0	125,717,112.0	14,451,961.2	1,187,444,561.2	11,874,445.6	2,968,611.4	4,749,778.2	4,156,056.0
Kathmandu	68,277,600.0	67,852,500.0	6,785,250.0	10,177,875.0	2,041,951.5	155,135,176.5	1,551,351.8	387,837.9	620,540.7	542,973.1
Lalitpur	61,590,450.0	131,422,857.0	13,142,285.7	19,713,428.6	2,895,199.6	228,764,220.9	2,287,642.2	571,910.6	915,056.9	800,674.8
Bhaktapur	93,522,000.0	191,295,000.0	19,129,500.0	28,694,250.0	4,272,255.0	336,913,005.0	3,369,130.1	842,282.5	1,347,652.0	1,179,195.5
Rasuwa	38,150,000.0	65,400,000.0	6,540,000.0	9,810,000.0	1,553,250.0	121,453,250.0	1,214,532.5	303,633.1	485,813.0	425,086.4
Nuwakot	119,900,000.0	426,920,300.0	42,692,030.0	64,038,045.0	8,202,304.5	661,752,679.5	6,617,526.8	1,654,381.7	2,647,010.7	2,316,134.4
Dhading	26,781,300.0	588,835,817.0	58,883,581.7	88,325,372.6	9,234,256.8	772,060,328.0	7,720,603.3	1,930,150.8	3,088,241.3	2,702,211.1
Makwanpur	62,675,000.0	426,918,938.0	42,691,893.8	64,037,840.7	7,343,909.1	603,667,581.6	6,036,675.8	1,509,169.0	2,414,670.3	2,112,836.5
Gorkha	119,900,000.0	416,107,500.0	41,610,750.0	62,416,125.0	8,040,112.5	648,074,487.5	6,480,744.9	1,620,186.2	2,592,298.0	2,268,260.7
Sub-total of 14 districts	1,195,746,350.0	5,571,802,656.0	557,180,265.6	835,770,398.4	101,513,235.1	8,262,012,905.1	82,620,129.1	20,655,032.3	33,048,051.6	28,917,045.2

B. Other moderately affected districts (17 districts)											
Dhankuta	41,001,440.0	155,652,000.0	15,565,200.0	23,347,800.0	2,949,801.6	238,516,241.6	2,385,162.4	596,290.6	954,065.0	834,806.8	
Khotang	29,448,393.2	212,877,000.0	21,287,700.0	31,931,550.0	3,634,880.9	299,179,524.1	2,991,795.2	747,948.8	1,196,718.1	1,047,128.3	
Solukhumbu	11,083,582.2	85,837,500.0	8,583,750.0	12,875,625.0	1,453,816.2	119,834,273.4	1,198,342.7	299,585.7	479,337.1	419,420.0	
Tanahu	85,331,740.0	262,090,500.0	26,209,050.0	39,313,575.0	5,211,333.6	418,156,198.6	4,181,562.0	1,045,390.5	1,672,624.8	1,463,546.7	
Baglung	67,015,380.0	199,143,000.0	19,914,300.0	29,871,450.0	3,992,375.7	319,936,505.7	3,199,365.1	799,841.3	1,279,746.0	1,119,777.8	
Gulmi	63,767,309.9	230,044,500.0	23,004,450.0	34,506,675.0	4,407,177.1	355,730,112.1	3,557,301.1	889,325.3	1,422,920.4	1,245,055.4	
Parwat	38,910,820.0	149,929,500.0	14,992,950.0	22,489,425.0	2,832,604.8	229,155,299.8	2,291,553.0	572,888.2	916,621.2	802,043.5	
Palpa	46,701,028.2	254,079,000.0	25,407,900.0	38,111,850.0	4,511,700.4	368,811,478.6	3,688,114.8	922,028.7	1,475,245.9	1,290,840.2	
Nawalparasi	63,437,476.8	62,947,500.0	6,294,750.0	9,442,125.0	1,895,774.7	144,017,626.5	1,440,176.3	360,044.1	576,070.5	504,061.7	
Myagdi	30,222,430.0	76,681,500.0	7,668,150.0	11,502,225.0	1,603,559.0	127,677,864.0	1,276,778.6	319,194.7	510,711.5	446,872.5	
Chitwan	72,128,025.0	43,491,000.0	4,349,100.0	6,523,650.0	1,734,285.4	128,226,060.4	1,282,260.6	320,565.2	512,904.2	448,791.2	
Lamjung	45,832,320.0	135,051,000.0	13,505,100.0	20,257,650.0	2,713,249.8	217,359,319.8	2,173,593.2	543,398.3	869,437.3	760,757.6	
Kaski	136,750,310.0	171,675,000.0	17,167,500.0	25,751,250.0	4,626,379.7	355,970,439.7	3,559,704.4	889,926.1	1,423,881.8	1,245,896.5	
Syangja	73,927,244.4	252,934,500.0	25,293,450.0	37,940,175.0	4,902,926.2	394,998,295.6	3,949,983.0	987,495.7	1,579,993.2	1,382,494.0	
Bhojpur	28,940,461.4	180,831,000.0	18,083,100.0	27,124,650.0	3,146,571.9	258,125,783.3	2,581,257.8	645,314.5	1,032,503.1	903,440.2	
Sankhuwa Sabha	30,297,471.1	137,340,000.0	13,734,000.0	20,601,000.0	2,514,562.1	204,487,033.1	2,044,870.3	511,217.6	817,948.1	715,704.6	
Arghakhanchi	51,040,340.0	211,732,500.0	21,173,250.0	31,759,875.0	3,941,592.6	319,647,557.6	3,196,475.6	799,118.9	1,278,590.2	1,118,766.5	
Sub-Total for other 17 moderately affected districts	915,835,772.1	2,822,337,000.0	282,233,700.0	423,350,550.0	56,072,591.6	4,499,829,613.7	44,998,296.1	11,249,574.0	17,999,318.5	15,749,403.6	
Total (A+B)	2,111,582,122.1	8,394,139,656.0	839,413,965.6	1,259,120,948.4	157,585,826.7	12,761,842,518.8	127,618,425.2	31,904,606.3	51,047,370.1	44,666,448.8	
C. Recovery in Melamchi, NWSC, PID, STUEIP and STWSSP supported schemes(@4% total (A+B))		335,765,586.2				335,765,586.2	3,357,655.9	839,414.0	1,343,062.3	1,175,179.6	

D. Meeting municipal standards for new urban population		5,008,586,000.0				5,008,586,000.0	50,085,860.0		20,034,344.0	30,051,516.0
Grand Total (A+B+C+D)	2,111,582,122.1	13,738,491,242.2	839,413,965.6	1,259,120,948.4	157,585,826.7	18,106,194,105.0	181,061,941.1	32,744,020.3	72,424,776.4	75,893,144.4

Implementation Arrangements

The implementation of the recovery strategy should be through the existing sectoral policies and institutional arrangements, with coordination and strategic leadership provided by the MoUD. Although the recovery strategy is clearly focused on addressing the needs of the affected districts, this should not be at the cost of slowing the development of water and sanitation services in other parts of the country. Indeed the risk reduction and build back better principles should be incorporated into nationwide sector development. The continued progress towards a Sector Development Plan should be pursued, as this will facilitate a more effective and efficient delivery of the recovery strategy.

For an effective recovery, it is essential that roles and responsibilities, jurisdictions and resource envelopes are clearly established through consultation with key sector actors. This should set out the underlying principles of the recovery strategy, including the results-based management approach, monitoring and accountability. High-level technical and strategic guidance for the implementation should be developed at an early stage. Dedicated task teams should undertake this work under the coordination of the Sector Efficiency Improvement Unit (SEIU) under overall guidance and supervision of MoUD. The implementation mechanism should seek to further strengthen the decentralisation process and capacity building of local government institutions to ensure that interventions are sustainable. Similarly, the principle of decision-making at the lowest possible organization level is critical to sustainability, meaning that the consultation with communities and their involvement in monitoring must be viewed as an integral part of the implementation strategy. For example, reshaping / revising of ongoing or upcoming WASH projects in affected districts to incorporate rehabilitation, DRR and BBB components.

Assessment Methodology

The sector assessment was led by DWSS with significant contribution from development partners. At a very early stage a comprehensive assessment format to record the extent of damage to the component parts of water systems and sanitation was developed and disseminated to district offices of DWSS. Through a combination of site visits, and information received from WSUCs and VDCs, assessment of individual water systems was undertaken. Standard costs were estimated for repair and reconstruction of both rural and urban systems, and sanitation facilities. Information was collated for each district and transferred to central level to produce an overall summary of damage to assets and the costs of repair or reconstruction.

To supplement the DWSS assessment, a validation exercise was organised for the purposes of collecting qualitative information about the impacts on the affected population as a consequence of disruption to water supply and sanitation services, and also for quality assurance. Field missions were undertaken in nine districts. Site visits were made to visually inspect water systems and sanitation facilities, consultation took place with community members and focus group discussions with women were held to better understand the gender dimensions of the disaster. Stakeholder meetings took place at district headquarters and with DWSS and other water and sanitation actors to discuss views on DRR and approaches and needs to achieve the build back better aims.

Annex 1. SRN- Earthquake Damage & Need Assessment Report

Link no.	Nature of Damage	Damage Value NRs. '000	Recovery Needs, NRs. '000	Remarks
A. Highways and Feeder Roads				
1. East- West highway (H01)	minor slides and pavement cracks	1,500	2,000	Makwanpur
2. Tribhuvan Rajpath	minor Slides, emabnkment settlement, retg wall , drainage, bridge wing wall	4,700	6,500	Makwanpur
3. Araniko Highway	16 km new constructions, 5 to 7km major rehabilitation	1,021,000	1,372,400	Bhktapur, Kavre,, Sindhupalchowk
4. Prithvi Highway	15km affected , slides, retaining wall , embankment and culverts damages 110 to 200m lengths	50,500	47,500	Dhading, Tanahun
5. Narayanghat- Mugling Road	22 km affected, Slides, pvt, retg structures, drainages 50 - 100 m long	3,000	5,000	Chitawan
6. Pokhara- Baglung Rajmarga	8 km affected, minor Slides, emabnkment settlement, retg wall , drainage, bridge wing wall	26,000	40,000	Kaski, Parvat
7. Banepa - Sindhuli - Bardibas Rajmarga		50,000	72,500	
8. Siddhartha Rajmarg	30 km affected, minor slides 70m,pavement 470m, Ret wall 60m	10,500	15,000	Palpa, Syangja
9. Baglung- Beni- Jomsom	12 km affected, Slides 4500m, emabnkment settlemen 1000m, retg wall 150m, drainag	30,000	50,000	Myagdi
9. Abukhaireni- Gorkha	11km affected, minor slides, wall, ret str	3,000	4,000	Gorkha
10. Dumre- Beshishahar	2 km affected, embankment wall, ret str	3,500	5,000	Lamjung
11. Lamosangu- Jiri Road	110 km long, Slides 950m,2800m embnkmt, pvt 4,000m, retg structures 5550m, drainage 3000m, culverts 6nos. Bridge 1 no	65,000	105,000	Sindhupalchowk,Dolakha
12. Charikot- Dolakha urban road	1 km embankment and drainages	7,500	10,000	Dolakha
13. Tamakoshi- Manthali- Khurkot	56km, 1km slides, 1230m embnkmt, pvt 810m,, retg wall 820m , drains 1530m, culvert 1no. , bridge railing	105,000	108,000	Dolakha, Ramechap
14. Dolalghat Chautra Road	25 km, slides 1150m, embnkmt 300m, drain450m, pavements500m, 1 km full reconstrn	25,000	40,000	Sindhupalchowk
15. Suryabinayak- Pilot baba	minor repair 20-50m	1,000	2,000	Bhaktapur
16. Changu Narayan- Duwakot	pvmt 700m	5,000	7,000	Bhaktapur
17. Lubhu- Lamatar- Lakuri Bhanjyang	7 km 50 - 200m slides, pavement 200m,	3,000	5,000	Lalitpur
18. Kanti Rajpath	17 km affected, slides	700	1,000	Lalitpur
19. Sankhu- Bhotechaur Road	13km affected, 100 - 150m slides, walls	8,000	10,000	Kathmandu

20. Maitighar- Singhadurbar Road	15mx2m pavement crack	1,000	2,000	Kathmandu
21. Kathmandu Valley Roads damaged by the track of heavy equipments during rescue operations		30,000	50,000	Kathmandu Valley
22. Galchhi-Devighat-Pipaltar Road	20 km length affected, 75 m slides, 300 m pvt, retg wall	4,000	6,700	Nuwakot
23. Pasang Lhamu Marg	123 km affected, 1140 m slides, 4200m pavement,, 1960 m retg wall, 1 bridge	77,400	112,800	Nuwakot, Rasuwa
24. Gangate-Dhikure-Labdhu-Kharanitar-Samundrarat Road	23km, affected, landslide70m, pavement 700m, retg wall 150m	6,900	10,500	Nuwakot
25. Hetaunda- Bhainse	20 km, 300 m pvmt, 300 m road formation, 100 m retg wall	4,000	5,800	Makwanpur
26. Bhainse- Bhimphedi	0.5 km, slides 30m,, ret wall 15m	700	1,000	Makwanpur
27. Bhimphedi- Kulekhani	2.2km, Embnkmt 100m, pvt 40m, retg wall 60m, drain 100m	2,000	3,000	Makwanpur
28. Kulekhani- Chhaimale	150m slides, 100m retg wall	1,000	1,500	Makwanpur
29. Chhaimale-Dakshinkali	50m slides, formation 125 m, pvmt 100m, retg wall 100m	2,200	3,500	Kathmandu
30. Sitapaila Bhimdhunga	minor slides 50m , pvmt 30m	1,700	2,500	Kathmandu
31. Balaju Bypass	3km, pavement damage	2,000	2,500	Kathmandu
32. Gorakha- Barpak road 48 km	24 km affected, 4700m slides, 4500 m paveemnt, 200m retg wall	43,000	72,500	Gorkha
33. Barpak- Laprak- Gumda road 27 km,	11km affected, 1500m slides, 1000 m embnkmt	30,000	40,000	Gorkha
34. Benighat- Arughat- Soti Road 58 km+other Regional roads	15 km affected, 2700 m slides, 250m retg wall	21,500	45,000	Gorkha
35. Kaligandaki Corridor (Gaidakot-Ramdi- Beni)	27 km, slides 1200m, Formation 2000m, retg wall 50m	5,000	7,000	Palpa
36. Simaltari- Pyuthan Road	Gulmi portion, 500m slides, 1200m formation, 30m retg wall	4,000	5,000	Gulmi
	Sub total for Roads, SRN	1,660,300	2,279,200	
	Other Candidate Roads for Relief		3,713,000	
	Total for SRN		5,992,200	
37. Other Candidate Projects for Relief				
Lamidanda- Melamchi- Timba Road 41 km			1127.5	million
Dolakha- Singati Road 33 km			907.5	million
Dhadingbesi- Salyantar- Arughat Gorkha Arughat			852.5	million
			825	million
	Sub total for additional roads		3,713	million
Bridges		2676000	2676000	
Physical Properties		252900	349,000	
	Grand Total (Recovery Needs)		9,017,200	

B. Physical Property Damaged - Buildings*				
DoR Head office at Babarmahal		177,000	246,500	Kathmandu
Regional Directorate Pokhara		800	1,000	Pokhara
Mechanical Training Center, Chakupat		700	1,000	Lalitpur
Central Lab, Chakupat		200	300	Lalitpur
DRO Lalitpur		3,000	3,500	Lalitpur
DRO Nuwakot		8,200	11,000	Nuwakot
DRO Janakpur		1,000	1,500	Dhanusha
DRO Khurkot			4,000	Sindhuli
DRO Hetaunda		7,500	9,300	Makwanpur
DRO Bhaktapur		300	500	Bhaktapur
DRO Charikot		8,000	10,000	Dolakha
DRO Bharatpur		800	800	Chitwan
DRO Chandranigahpur		200	4,300	Bara, Parsa
DRO Pyuthan		1,000	2,500	Pyuthan
DRO Damauli		1,000	3,000	Tanahu
DRO Kathmandu -1		4,000	5,000	Kathmandu
DRO Palpa		7,000	10,000	Palpa
DRO Pokhara		8,000	11,000	Pokhara
DRO Butawal		3,000	4,000	Butwal
Heavy Equipment Division, Baneshwar		3,500	4,500	
Heavy Equipment Division, Hetaunda		300	500	
Heavy Equipment Division, Butawal		600	800	
Heavy Equipment Division, Pokhara		8,000	1,000	
Heavy Equipment Division, Itahari		2,500	3,500	
Mechanical Office, Janakpur		1,600	3,000	
Mechanical Office, Dumre		1,500	2,000	
Mechanical Office, Bharatpur		700	1,000	
Mechanical Office, Lalitpur		2,500	3,500	
	Sub total	252,900	349,000	
* Office Bldg./Boundry wall Dismantle, Repair, New Construction ets.				
C. DoR Contribution on Road Opening and Rescue Operation				
Heavy Equipments and Machines				
	1 Crane 4 nos	4,326,000	4,326	
	2 Excavator 5 nos	2,937,600	2,938	
	3 Loader 14 nos	2,928,000	2,928	
	4 Back hoe Loader	230,400	230	
	5 Dozer 4 nos.	3,200,000	3,200	
	6 Low bed Trailer 2 nos	954,800	955	
	7 Flat bed Truck 2 nos	18,900	19	
	8 Tipper Truck 5 nos.	488,250	488	
	9 Water Tanker 2 nos	165,550	166	
			15,250	

Annex 2. Districtwise Damage & Needs Assessment for Strategic Road Network (SRN)														
Reference	District	District Population 2011	SRN Length 2012/13 Km	Damage Assessment								Cost '000		Affected SRN Road length %
				Affected Road	Damage Assessed m	Embankment settlement m	Pavement m	Retaining Structures m	Drainage m	Cross-drainage m	Bridge no.	Damage Value	Reinstatement/Reconstruction cost incl. BBB cost	
				Length km										
(i) Crisis Hit Districts (14)														
	Rasuwa	43300	66.2	61	610		2250	1210				47200	68600	92.15%
	Gorkha	271061	180.24	68	8925		150	580				97500	161500	37.73%
	Nuwakot	277471	165.38	71	675		2950	1000				41100	61400	42.93%
	Dhading	336067	173.08	14	135	50	80	150				47000	43000	8.09%
	Sindhupalchowk	296192	206.67	95	18950	23000	21600	21200	22650	13	1	1015000	1370000	45.97%
	Dolakha	186557	147.65	106	1600	3300	3700	2350	3300	5		152500	185000	71.79%
	Ramechhap	202646	110	34.9	50	30	10	20				5000	8000	31.73%
	Kavre	381937	149.12	30	30	100	30					1000	1500	20.12%
	Sindhuli	289148	320.8									50000	72500	0.00%
	Okhaldhunga	147984	70.7									0	0	0.00%
	Makwanpur	420477	335.14	65	360	450						13900	19800	19.39%
	Lalitpur	468132	131.39									3700	6000	0.00%
	Bhaktapur	304651	111.59	8.84		410	1100	370	350	1		56000	79900	
	Kathmandu	1744240	229.99	25.95	150	275	295	200				44900	70500	11.28%
Sub-total											1574800	2147700		
(ii) Hit With Heavy losses Districts (5)														
	Khotang	206312	203.46									0	0	0.00%
	Lamjung	167724	72.04	1		200	200					3500	5000	1.39%
	Solukhumbu	637328	37.2									0	0	0.00%
	Tanahun	323288	179.49				20	30				3500	4500	0.00%
	Chitawan	579984	233.25		200	150	200	100	150	2		3000	5000	0.00%
Sub-total											10000	14500		
(iii) Hit Districts (6)														
	Kaski	492098	112.96	4	30		500	550				18000	30000	3.54%
	Baglung	268613	232.13									0	0	0.00%
	Parbat	146590	85.61	1	45		50	50				8000	10000	1.17%
	Gulmi	280160	189.54		500	1200		30				4000	5000	0.00%
	Palpa	261180	235.89	30	1700	2000	450	100				14000	20000	12.72%
	Syangja	350804	160.58		20		20	10				1500	2000	0.00%
Sub-total											45500	67000		
(iv) Slightly Affected Districts (6)														
	Bhojpur	182459	109									0	0	0.00%
	Sankhuwasab	639284	178									0	0	0.00%
	Dhankuta	163412	135.68									0	0	0.00%
	Argakhanchi	197632	170.91									0	0	0.00%
	Nawal Parasi	643508	375.87									0	0	0.00%
	Myagdi	113641	31	7	4500	1000		150				30000	50000	22.58%
Sub-Total											30000	50000		
Total (Roads)											1,660,300	2,279,200		
Other Candidates Road for Relief												3,713,000		
Physical Properties (All Districts)												349000		
(v) Bridges														
Minor remedial works of estimated of 5,775 m of bridge stock at 0.15 million Rs/m (All Districts)											866,000	866000		
Major remedial works of estimated of 5,170 m of bridge stock at 0.35 million Rs/m (All Districts)											1,810,000	1,810,000		
Sub-Total											2,676,000	2,676,000		
Grand total											4,336,300	9,017,200		
Note: Reinstatement/Reconstruction cost include BBB cost estimated based on the existing possibilities for each road separately														

Annex 5. Damage Assessment to Airports and Civil Aviation Buildings						
Name of Airport/ Affected Structure	Type of Damage	Unit	Quantity	Cost of Repair of Damaged Component, NRs.	Cost of Reinstatement including BBB, NRs.	
1. Tribhuvan International Airport						
a) Runway, Taxiway and Apron	no significant Damage but requires pavement evaluation and design	1	1	50,000,000	50,000,000	
b) International terminal building	no structural damage	1	1			
	i. Expansion Joint damage	m	200	3,000,000	3,000,000	
	ii. Miscellaneous Non-structural damage such as cracks in ceiling and floor marble, wall plasters, masonry, sanitary, water supply etc.	1	1	5,000,000	5,000,000	
c) Domestic Terminal Building including new Annex TB	Cracks in the walls, crack seals and retrofitting	1	1	2,000,000	2,000,000	
d) Fire Building including old storage	Collapse of some walls. Retrofitting required	1	1	4,000,000	4,000,000	
e) Water supply pipes and sewage pipes	Breakages of water supply pipes and sewage pipes	1	1	1,000,000	1,000,000	
2. CAAN Office Buildings		1	1			
a) CAAN Head Quarter Office	Cracks in the walls and some columns	1	1	3,118,050	3,118,050	
a) Civil Aviation Academy Building	Cracks in the walls and some columns	1	1	7,000,500	7,000,500	
b) CAAN Central Store Building	Cracks in the walls and some columns	1	1	5,478,000	5,478,000	
c) Civil Aviation CNS building	Cracks in the walls and some columns	1	1	500,000	500,000	
d) Civil Aviation safety building	Cracks in the walls and some columns	1	1	3,051,750	3,051,750	

3. Domestic Airports		1	1		
a) Biratnagar Airport	Cracks in the walls	1	1	1,332,000	1,500,000
b) Nepalgunj airport	no damage	1	1		
c) Bhairahawa Airport	no damage	1	1		
d) Pokhara Airport	Cracks in the walls	1	1	1,007,500	500,000
d) Bharatpur Airport	Cracks in the walls	1	1	5,270,000	5,000,000
e) Janakpur Airport	Cracks in the walls	1	1	19,500	2,000,000
f) Simara Airport	Full damage requiring reconstruction	1	1	3,080,000	150,000,000
g) Chandragadhi Airport	Cracks in the walls	1	1	722,000	1,000,000
h) Tenjing-hillary Airport	Cracks in the walls	1	1	220,000	1,000,000
i) Jomsom Airport	Cracks in the walls	1	1	3,000,000	30,000,000
j) Tumlingtar Airport	Cracks in the walls	1	1	507,000	2,500,000
k) Lamidanda Airport	Cracks in the walls	1	1	4,000,000	4,000,000
l) Rumjatar Airport	Cracks in the walls	1	1	846,000	40,000,000
m) Ramechhap Airport	Full damage requiring reconstruction	1	1	2,400,000	80,000,000
n) Phaplu Airport	Cracks in the walls	1	1	554,400	1,000,000
o) Thamkharka Airport	Cracks in the walls	1	1	1,000,000	1,000,000
p) Manang Airport	Cracks in the walls	1	1	5,000,000	10,000,000
q) Balewa Airport	Cracks in the walls	1	1	500,000	800,000
				113,606,700	414,448,300
Losses to CAAN due to Rescue and Relief operations:					
1. Non-payment of landing charges by aircrafts during 26 April to 1 May 2015				25,061,421	
2. Non-payment of cargo charges during 26 April to 1 May 2015				9,373,846	
3. Non payment of Passenger Service Charges and Airport Development Charges					
by passengers from 26 April to 1 May 2015				38,766,000	
4. Revenue Loss from 2 May to 26 May 2015				51,265,305	
5. Increase in Operational Expenses due to 24 hr operation				6,050,000	
				130,516,572	

Annex 6. Loss Assessment for SRN								
(VOC Lost due to Blockage of Road due to earthquake for SRN)								
Link no.	Section	Affected km		KM	AADT in PCUs	Blockage day	Remarks	VOC Lost , NRs.
		From	To					
A. Highways and Feeder Roads								
1. East- West highway (H01)								
	Ratmate- Hetaunda			6	10,314	0.042	Makwanpur	79,469
2. Tribhuvan Rajpath								
	Hetaunda- Damechaur			3	449	0.042	Makwanpu	1,730
3. Araniko Highway								
	Koteswar- B Lokanthali			1	25,961	0.125	Bhaktapur	100,015
	Dukikhel- L	59.000	89.000	30.000	4,498	1.000	Sindhupalc	4,158,851
	Lamosangu	89.000	114	25	1,303	5.000	Sindhupalc	5,019,808
4. Prithvi Highway								
	Agara khola	30.000	44.000	14.000	12,511	1.000	Dhading	5,398,246
	86+290 and 153+200				4,823		Tanahun	
5. Narayanghat- Mugling Road (Under WB contract, not to be taken as budget demand)								
	Various pla	11.000	33.000	22.000	14,050	0.500	Chitawan	4,763,231
Baglung- Beni- Jomsom								
	Beni- Maha	25.000	32.000	7.000	820	10.000	Myagdi	1,769,068
Abukhaireni- Gorkha								
		11.500	21.600	10.000	350	5.000	Gorkha	539,350
Lamosangu- Jiri Road								
	Lamosangu	0.000	26.000	26.000	1,272	1.000	Sindhupalc	1,019,279
	Charikot- Ji	55.000	110.00	55.00	1,055	2.000	Dolakha	3,576,661
Charikot- Dolakha urban road								
Tamakoshi- Manthali- Khurkot								
	Tamakoshi	0.000	17.000	17.000	581	2.000	Dolakha	608,818
	Milti- Mant	17.000	54.900	38.000	581	0.500	Ramechhag	340,222
Dolalghat Chautra Road								
	Bandeu- Ch	0.000	23.000	23.000	480	4.000	Sindhupalc	1,361,011
Suryabinayak- Pilot baba								
Changu Narayan- Duwakot								
				2	650	1.000	Bhaktapur	40,066
Sankhu- Bhotechaur Road								
		0.000	13.000	13.000	730	3.000	Kathmandu	877,445
Galchhi-Devighat-Pipaltar Road								
		0.000	20.000	20.000			Nuwakot	
Pasang Lhamu Marg								
	Kakani-Bat	25.000	36.000	11.000	612	0.500	Nuwakot	103,740
	Battar-Betr	66.000	77.000	11.000	1,290	1.000	Nuwakot	437,336
	Betrawati- L	77.000	82.000	5.000	1,290	3.000	Rasuwa	596,367
	Dhunche-Sy	120.00	132.00	12.00	750	12.000	Rasuwa	3,328,560
	Syaprubesi	132.00	148.00	16.00	575	15.000	Rasuwa	4,253,160
Gangate-Dhikure-Labdhu-Kharanitar-Samundrar Raoad								
	Dhikure-Sa	7.000	12.000	5.000	650	0.500	Nuwakot	50,083
Bhimphedi- Kulekhani								
	6.500, 7.200	6.500	8.700	2.200	1,242	0.500	Makwanpu	42,106

Kulekhani- Chhaimale							
	Kulekhani- Chhaimale		3.000	1,242	1.000	Makwanpu	114,835
Balaju Bypass							
		0.000	3.000	3.000	6,231	3.000	Kathmandu
Barpak- Laprak- Gumda road 27 km							
		0.000	11.000	11.000	200	15.000	Gorkha
Benighat- Arughat- Soti Road 58 km							
				20.000	250	5.000	
							42,095,372
Assuming VOC of NRs. 20.5 per PCU/Km in 2008 , the PCU/KM for 2015 at 6% annual increase = NRs30.82							
The entire VOC cost lost due to the road closure in the affected section is not a loss to the operator, because the goods are not transported by alternate mode of transport but are lying idle and the total voc loss may be considered a loss to the economy, while to the operator the additional cost incurred would be due to the idle time and, overhead costs, which would be about 30 % of the total VOC loss.							
Therefore, VOC lost by the transporter in the above SRN is estimated as 0.3x42.095 million = NRs 12.60 million,							
Total economic flow losses = NRs. 42.10 million							

Annex 7. Transport Cost Loss Assessment for Rural Roads - DRCN														
SN	District	Population	Total DCRN, km	Popln/ Length Ratio	Average Traffic, AADT, Utility(3 ton)	Road Length Affect ed/Damaged km	Damages, km				Total Vehkm lost due to road closure	VOC rate	Change in Transportation cost with road and without road	Loss due to increased transportation cost, NRs.
							Minor Damage, km	Specific Damage, km	Full Damage, km					
						50%	100%	30%	20%					
						km	km	km	km	Rs/ per km for a 3 ton utility vehicle	Rs. per km per 3 ton			
Crisis Hit Disticts														
1	Rasuwa	43300	161	269	10	80.5	80.5	24.15	16.1	178710	26.30	263.00	47,000,730	
2	Gorkha	271061	566	479	15	283	283	84.9	56.6	942390	26.30	263.00	247,848,570	
3	Nuwakot	277471	368	754	15	184	184	55.2	36.8	612720	26.30	263.00	161,145,360	
4	Dhading	336067	452	744	6	226	226	67.8	45.2	301032	26.30	263.00	79,171,416	
5	Sindhupalchowk	296192	601	493	42	300.5	300.5	90.15	60.1	2801862	26.30	263.00	736,889,706	
6	Dolakha	186557	316	590	9	158	158	47.4	31.6	315684	26.30	263.00	83,024,892	
7	Ramechhap	202646	688	295	9	344	344	103.2	68.8	687312	26.30	263.00	180,763,056	
8	Kavrepalanchok	381937	682	560	18	341	341	102.3	68.2	1362636	26.30	263.00	358,373,268	
9	Sindhuli	289148	294	983	14	147	147	44.1	29.4	456876	26.30	263.00	120,158,388	
10	Okhaldhunga	147984	318	465	9	159	159	47.7	31.8	317682	26.30	263.00	83,550,366	
11	Makwanpur	420477	270	1557	14	135	135	40.5	27	419580	26.30	263.00	110,349,540	
12	Lalitpur	468132	243	1926	44	121.5	121.5	36.45	24.3	1186812	26.30	263.00	312,131,556	
13	Bhaktapur	304651	21	14507	62	10.5	10.5	3.15	2.1	144522	26.30	263.00	38,009,286	
14	Kathmandu	1744240	290	6015	64	145	145	43.5	29	2060160	26.30	263.00	541,822,080	
		5369863	5270	1019									3,100,238,214	
Hit with Heavy Losses														
						30%	100%	20%	10%					
15	Solukhumbu	637328	183	3483	0	54.9	54.9	10.98	5.49	0	26.30	263.00	0	
16	Khotang	206312	332.9	620	6	99.87	99.87	19.974	9.987	67412.25	26.30	263.00	17,729,422	
17	Chitwan	579984	304	1908	64	91.2	91.2	18.24	9.12	656640	26.30	263.00	172,696,320	
18	Tanahun	323288	583	555	0	174.9	174.9	34.98	17.49	0	26.30	263.00	0	
19	Lamjung	167724	395	425	9	118.5	118.5	23.7	11.85	119981.25	26.30	263.00	31,555,069	
		1914636	1797.9	1065									221,980,811	
Hit														
						20%	100%	15%	5%					
20	Kaski	492098	402	1224	50	80.4	80.4	12.06	4.02	232155	26.30	263.00	61,056,765	
21	Parbat	146590	291.3	503	8	58.26	58.26	8.739	2.913	26916.12	26.30	263.00	7,078,940	
22	Baglung	268613	340.3	789	0	68.06	68.06	10.209	3.403	0	26.30	263.00	0	
23	Syangja	350804	443.4	791	15	88.68	88.68	13.302	4.434	76819.05	26.30	263.00	20,203,410	
24	Palpa	261180	410.2	637	22	82.04	82.04	12.306	4.102	104231.82	26.30	263.00	27,412,969	
25	Gulmi	280160	522.8	536	0	104.6	104.6	15.684	5.228	0	26.30	263.00	0	
		1799445	2410	747									115,752,083	
Slightly Affected														
						10%	100%	10%	3%	0				
26	Bhojpur	182459	392	465	6	39.2	39.2	3.92	1.176	8431.92	26.30	263.00	2,217,595	
27	Sankhuwasabha	639284	255.2	2505	9	25.52	25.52	2.552	0.766	8234.028	26.30	263.00	2,165,549	
28	Dhankuta	163412	489.7	334	6	48.97	48.97	4.897	1.469	10533.447	26.30	263.00	2,770,297	
29	Argakhanchi	197632	354.7	557	0	35.47	35.47	3.547	1.064	0	26.30	263.00	0	
30	Myagdi	113641	206.7	550	9	20.67	20.67	2.067	0.62	6669.1755	26.30	263.00	1,753,993	
31	Nawalparasi	643508	417	1543	38	41.7	41.7	4.17	1.251	56807.91	26.30	263.00	14,940,480	
		1939936	2115.3	86									23,847,914	
		11023880								Grand Total			3,461,819,022	
1. Three days road closure in the sections of partial damage and full damage is assumed.														
2. One year of road block in the sections of partial damage and full damage is assumed.														
3. VOC is based on Road Board 2010 data adjusted for annual increase at 6% and doubled for DRNC and tripled for VRNC														
4. Non-motorized transport cost assumed at NRs. 300/3ton utility Vehicle per km														
5. AADT is assumed and is based on utility vehicle of 3 ton capacity only														
6. Assumed that the demand for transportation volume does not decrease even without road.														

Annex 8. Transport Cost Loss Assessment for Rural Roads - VRCN														
SN	District	Population	Total VCRN, km	Popln/Length Ratio	Average Traffic, AADT Utility	Road Length Affected/Damaged	Damages, km				Total Vehkm lost	VOC rate	Change in VOC	Loss due to Increased VOC
							Minor Damage, km	Specific Damage, km	Full Damage, km					
							50%	100%	30%	20%				
1	Rasuwa		3		5	0	0.45	0.14	0.09	500	39.45	237	118,232	
2	Gorkha		2,366		5	355	354.95	106.48	70.99	393,991	39.45	237	93,257,579	
3	Nuwakot		862		5	129	129.25	38.78	25.85	143,470	39.45	237	33,959,283	
4	Dhading		844		5	127	126.65	37.99	25.33	140,576	39.45	237	33,274,327	
5	Sindhupalchok		1,796		5	269	269.42	80.82	53.88	299,051	39.45	237	70,785,289	
6	Dolakha		457		5	69	68.51	20.55	13.70	76,051	39.45	237	18,001,163	
7	Ramechhap		608		5	91	91.23	27.37	18.25	101,265	39.45	237	23,969,497	
8	Kavrepalanchok		1,390		5	208	208.46	62.54	41.69	231,385	39.45	237	54,768,841	
9	Sindhuli		395		5	59	59.28	17.78	11.86	65,802	39.45	237	15,575,443	
10	Okhaldhunga		84		5	13	12.64	3.79	2.53	14,029	39.45	237	3,320,733	
11	Makwanpur		309		5	46	46.31	13.89	9.26	51,399	39.45	237	12,166,037	
12	Lalitpur		246		5	37	36.83	11.05	7.37	40,876	39.45	237	9,675,290	
13	Bhaktapur		504		5	76	75.56	22.67	15.11	83,869	39.45	237	19,851,882	
14	Kathmandu		290		5	44	43.50	13.05	8.70	48,285	39.45	237	11,429,060	
			10153.4										400,152,655	
Hit with Heavy Losses							30%	100%	20%	10%				
15	Solukhumbu		21		5	3	3.10	0.62	0.31	1,744	39.45	395	688,020	
16	Khotang		142		5	21	21.23	4.25	2.12	11,943	39.45	395	4,711,624	
17	Chitwan		1,472		5	221	220.79	44.16	22.08	124,194	39.45	395	48,994,570	
18	Tanahun		353		5	53	52.93	10.59	5.29	29,771	39.45	395	11,744,610	
19	Lamjung		412		5	62	61.84	12.37	6.18	34,784	39.45	395	13,722,128	
							359.9						79,860,953	
Hit							20%	100%	15%	5%				
20	Kaski		822		5	82	82.20	12.33	4.11	23,736	39.45	395	9,363,670	
21	Parbat		246		5	25	24.65	3.70	1.23	7,117	39.45	395	2,807,700	
22	Baglung		467		5	47	46.67	7.00	2.33	13,475	39.45	395	5,315,698	
23	Syangja		546		5	55	54.60	8.19	2.73	15,767	39.45	395	6,220,044	
24	Palpa		246		5	25	24.65	3.70	1.23	7,117	39.45	395	2,807,700	
25	Gulmi		672		5	67	67.21	10.08	3.36	19,407	39.45	395	7,656,017	
							217.8						34,170,829	
Slightly Affected							10%	100%	10%	3%				
26	Bhojpur		253		5	15	15.21	1.52	0.46	2,726	39.45	395	1,075,222	
27	Sankhuwasabha		159		5	10	9.54	0.95	0.29	1,710	39.45	395	674,570	
28	Dhankuta		359		5	22	21.56	2.16	0.65	3,865	39.45	395	1,524,879	
29	Argakhanchi		146		5	9	8.76	0.88	0.26	1,570	39.45	395	619,456	
30	Myagdi		319		5	19	19.14	1.91	0.57	3,431	39.45	395	1,353,511	
31	Nawalparasi		1,060		5	64	63.62	6.36	1.91	11,403	39.45	395	4,498,649	
							122.6						9,746,287	
											Grand Total		523,930,724	
<p>1. Three days road closure in the sections of partial damage and full damage is assumed.</p> <p>2. One year of road block in the sections of partial damage and full damage is assumed.</p> <p>3. VOC is based on Road Board 2010 data adjusted for annual increase at 6% and doubled for DRNC and tripled for VRNC</p> <p>4. Non-motorized transport cost assumed at NRs. 300/3ton utility Vehicle per km</p> <p>5. AADT is assumed and is based on utility vehicle of 3 ton capacity only</p> <p>6. Assumed that the demand for transportation volume does not decrease even without road.</p>														

Section D: Cross-Cutting

ENVIRONMENT AND FORESTRY

Summary

The analysis of damage and loss revealed that damage in the sector comprised mainly of three types: forest destruction including in protected areas; destruction of previously installed environmental friendly technologies and destruction of office buildings, furniture, equipment and other assets of the Government institutions and community-based natural resource management institutions. The largest loss in terms of value in the sector is from that of loss of ecosystem services. Other losses comprise increased costs of managing solid and hazard waste, reducing pollution from brick manufacture to meet the post-earthquake demand for reconstruction. One of the major impacts include reduced the capacity of the government and local communities in the affected districts, for forest and environment governance. Beyond that the earthquake enhanced the magnitude of several existing environmental hazards such as avalanches, floods especially GLOFs, and landslides. The total damage and loss in the forestry sector as a result of the recent earthquake is **NPR 32,960.3 million** and **NPR 1,061.0 million** respectively (excluding loss of the ecosystem value of **NPR 34,021.3 million**).

The total recovery cost was estimated at **NPR 25,197 million**. Of this the total estimated reconstruction cost is **NPR 6,773 million** and the total recovery costs estimated is **NPR 18,424 million**. The overall aim of the reconstruction and recovery programme for the sector is to increase the resilience of ecosystems, environment and vulnerable communities to future anthropogenic and natural shocks from earthquakes and climate change by enhancing their management, and working with other sectors to promote sound development and reduce unsustainable impacts, in order to build back better, safer and greener. Reconstruction activities such as reconstruction of government and community offices and buildings, reforestation, afforestation to restore damaged forest areas and re-installation of renewable energy technologies such as improved cook stoves and bio gas. Recovery activities include implementing measures and building capacities to address pressures and threats to forests and ecosystems including Protected Areas. Support will be provided to CFUGs to rehabilitate and restore their forests including short term targeted livelihood support help rebuild environmental incomes from forest and natural resources. Recovery activities will also provide for sound management of solid and hazardous waste including safe collection and disposal. Management of large amount of debris and rubble while measures to reduce pollution from brick production from the huge demand post-earthquake are other important recovery activities. Policy adjustments and incentives to promote climate smart environment friendly (green) technology in construction and other sectors involved in the recovery will be prioritized as well.

In addition to the recovery programme under this sector, environment and forestry being cross-cutting in nature, this report recommends ten principles that should be applied to all other sectors (details in Box 1 and Annex 6). Some salient ones are mentioned here: (1) Ensure that reconstruction and recovery activities are environmentally sustainable including recycle and reuse of debris, appropriate to the region, and will withstand future disasters including those posed by climate change; (2) Enforce environmental impact assessment/initial environmental assessment during reconstruction in order to avoid future disasters; and ensure enforcement; (3) Ensure that timber and fuel wood collection complies with existing forest management plans and promote alternative energy and energy efficient technologies to reduce pressure on forests.

Pre-Disaster Context and Baseline

Forests

Forests cover about 5.83 million ha (39.6% of the country's total land area)¹ including 2.15 million ha of shrub lands. The main drivers of deforestation are illegal logging, fuelwood consumption, encroachment and road construction (RPP, 2010; UNREDD, 2014). In addition to government managed forests, community forestry (CF) programs are a major success in sustaining forests. The 31 earthquake affected districts contain around 41% (2,393,535 ha) of all forest area. Around 48 % of this area is community forest managed by 11,554 community forest user groups (CFUGs) and involving more than 55 % of the households in these districts². Another 48% is government managed forest including protected areas (PAs). The rest includes leasehold forests (LHF) (0.73%), private forests, and other categories (see Table 1).

Biodiversity and Protected Areas

Nepal occupies only 0.1% of global land area but harbours 3.2% and 1.1% of world's known flora and fauna respectively³, with many endemic and threatened species. With its great altitudinal range it contains a wide variety of ecosystems and habitat types. PAs are corner stones of biodiversity conservation, covering 23.23 percent of the country and protecting flagship species such as tiger, rhino, red panda and snow leopard. Four national parks and three conservation areas covering around 1,598,800 ha have been affected by the earthquake, one of which (Sagarmatha NP) is a world heritage site. There are a total of 1156 lakes in the 31 districts including two Ramsar sites located in Langtang and Sagarmatha national parks⁴. Some of the major river systems and hydrological dams are also situated in the regions. In addition, three buffer zones adjacent to protected areas have been affected, covering 152,500 ha.

Table 1: Baseline forest data in the 31 earthquake affected districts

Districts	Total Area (ha)	House-holds in District	Forest Area (ha)	Govt. M Forest (ha)	CFUGs			LHFs		
					No	Area (ha)	HHs	No	Area (ha)	HHs
Most affected	2274882	1237264	1101523	683113	5340	400208	549339	3421	17817	30348
Hit with heavy loss	1042260	319299	393623	233758	1440	146987	178611	1259	4410	10147
Moderate losses	783734	416007	334072	202988	2740	110540	293107	58	610	660
Slightly affected districts	1157381	314620	564317	280173	2034	172850	215429	324	1998	2976
Total	5258257	2287190	2393535	1400032	11554	830585	1236486	5062	24835	44131

Landslides and Glacial Lakes

¹ GoN (1999)

² The total proportion of households increases to 88% if Kathmandu, Bhaktapur, Lalitpur, and 2 Terai districts (Chitwan and Nawalparasi) are excluded

³ National Biodiversity Strategy and Action Plan (NBSAP), 2014

⁴ Environment Statistics of Nepal, 2013 published by CBS

Intense monsoon rainfall triggers floods, landslides, debris flow and other hazards. Landslides cause considerable soil erosion and sedimentation, polluting waters and blocking waterways as well as destroying agricultural fields and threatening settlements. The recent extensive road opening with poorly designed and constructed roads has resulted in landslides in many parts of the mid-hills and mountains. More intense rainfall due to increased climate variability may also be contributing. An inventory of glaciers and glacial lakes by ICIMOD⁵ (in 1999; repeated in 2009) identified as many as 3,252 glaciers in Nepal. As glaciers melt and retreat due to climate change, glacial lakes form and rapidly fill up behind natural moraine or ice dams. These dams can breach suddenly, leading to downstream floods (ICIMOD, 2011). The NAPA process defined 6 of these lakes as the most critical (MoE, 2010). Three are located in earthquake affected areas: Tsho Rolpa, Imja, and Thulagi Lake.

Hazardous Substances and Waste Management

Management of solid waste is a growing concern in Nepal. The majority of urban centres lack the capacity to tackle the problem while waste generation is increasing. Application of modern waste management techniques, such as source separated door-to-door collection systems, material recovery and recycling facilities, sanitary landfilling, and private sector participation are limited in most municipalities. Poor management of health-care waste (HCW) exposes health-care workers, waste handlers, the community, livestock and wildlife to infections, toxic effects and injuries. Most healthcare facilities do not implement safe practices such as onsite safe and separate collection, transport, storage, treatment and final disposal in secure landfill sites; most health care waste is dumped together with other wastes. Nepal is Party to number of chemical related MEAs that deal with environmentally sound management of hazardous substance and has banned certain chemicals like DDT, asbestos, lead in paint.

Issues related to Pollution

The predominant source of air pollution in Kathmandu Valley is from the operation of a large number of polluting and inefficient brick kilns. Vehicle emissions, industrial activities, diesel generators and haphazard use of plastic bags are others sources. There are 429 officially registered brick kilns in Nepal while the Federation of Nepalese Brick Industries (FNBI) estimates more than 700 in total, with 103 being operated within the Kathmandu Valley. Coal, which is imported mainly from India, is the major fuel for brick firing in Nepal; annual coal consumption by the sector is estimated at 449,358 tons. Many rivers are polluted with sewage, fertilizer, pesticide, and other pollutants, as well as solid waste.

Existing arrangements and performance of Environmental and Forestry governance

Nepal generally has good environmental and forestry policies and legislation. The implementation of these policies however requires further improvement. In many cases there is inadequate capacity for implementation and monitoring, and penalties for transgressions are too low. There is lack of citizen awareness about development and environment and application of environmental impact assessment tool is currently limited. Community-based forest governance and institutions is very strong while the institutional capacity within concerned government institutions requires further strengthening. MoSTE is mandated to ensure environmental safeguards, maintain environmental quality, and promote renewable energy. It has developed several guidelines and environmental standards for various sectors. The enforcement of these needs to be strengthened. Likewise, the mandate for the management and governance of forests and PAs is with MoFSC. Community forests are managed locally by CFUGs; buffer

⁵ ICIMOD (2011). Glacial lakes and glacial lake outburst floods in Nepal.

zone management councils manage forests in the buffer zones, and leasehold forestry groups manage degraded and marginalized forestlands to restore them.

Disaster Effects and Impact

Effect on infrastructure and assets

Damage to forest area

The formation of several landslides, crevices, soil liquefactions and local floods following the earthquakes resulted in large scale destruction of forest areas. To ascertain forest loss, FAO Rome carried out a systematic analysis of pre and post-earthquake satellite imagery from the Google Crisis Response⁶. Based on this, a forest loss rate of 2.2 percent was estimated for 6 earthquake affected districts⁷ (refer Annex 3 for details on methodology employed). The impact on forests are largely expected to be similar in the 14 severely-affected districts (with the exception of Kathmandu, Bhaktapur, Lalitpur with very limited forest), so the forest loss was applied to the baseline forest area to give the damage of 23,375 ha.

The value of damage and loss as a result of destruction of the forests has been computed using the result of an economic valuation study of the goods and services of forests carried out by the MoFSC in 2005 (annex 4). This study provides both direct (such as timber, firewood, fodder, grass/leaf-litter, edible fruits, tubers) and indirect use (such as biodiversity conservation, ecological function, carbon sequestration, soil and water conservation, ecotourism etc.) values of forests per ha for different forest types. Forest areas damaged by the earthquake were mainly of two types: pine forests (30%) and sub-temperate forest (70%). These values were adjusted to present values with an interest rate of 6%. The direct use values were taken as damage. No differentiation was made between government managed and community forests. A total value of damage of **NPR 29,258.7** (US\$ 29,258.7 million).

Effect on Biodiversity and Protected Areas

Seven protected areas were affected by the earthquake. Among these, were the sacred landscape and world heritage site (Sagarmantha NP) as well as two Ramsar sites (Gosaikunda and Gokyo). These PAs provide refuge to several endangered fauna of global significance such as red panda, snow leopard and musk deer. Damage to the habitats of these key species' are expected. In addition, earthquakes impacts in adjacent areas and on local communities will have a significant bearing on management of PAs. Pressures on PA resources are likely to increase. Localized illicit activities including poaching of wildlife and illegal wildlife trade may also likely increase as several security posts are damaged and vigilance and monitoring activities hampered. In addition, there were reports of extensive damage to eco-tourism infrastructure including walking trails, bridges and hotels. Access to several nature based tourism sites has been disrupted. This will significantly impact income from tourism – endangering the financial sustainability of the PAs and affecting severely the income of local communities and private business operators in the area. Several PAs (e.g. SNP and ACA) are top nature tourist destinations in the world. Nature tourism contributes substantial revenue to national economy. For example, during 2013/14 fiscal year, around 551,680 tourists visited different PAs compared to a total national figure of 797,616 tourists. Thus tourist visiting PAs accounted for close to 70% of all tourists visiting the country. While the damage and loss related to nature tourism will be captured under the tourism sector, it is pertinent that recovery

⁶ Google, 2015

⁷ The FAO studied six districts were Gorkha, Dhading, Nuwakot, Rasuwa, Sindhupalchowk and Dolakha

efforts under this sector integrates measures to revitalize *nature tourism in Protected Areas as a driver of economic growth in Nepal* and continue to make positive contributions towards PA sustainability in the long run. There was no damage reported on the wetlands so far. However sedimentation, landslides and other changes are likely to have impact on wetlands. These may include eutrophication of the lakes and damage to the habitat of aquatic flora and fauna which ultimately affect livelihoods of the poor, marginalized and other rural communities. Further, if landslides block the Trishuli/Narayani or Koshi rivers during the monsoon and result in large floods, this will impact endangered wildlife species and their habitats downstream in Chitwan National Park and Koshi Tappu Wildlife Reserve respectively.

Damage of Office Buildings, Equipment and Furniture

Analysis of damage of government and community based institutions revealed the following: of the 894 government office buildings (district and sector/field level offices) of MoFSC in the 31 earthquake affected districts, 569 are reported damaged with severe damage to office equipment and furniture. A total of 740 CFUGs reported destruction of their office buildings while a further 407 CFUGs reported partial damage; and 222 CFUGs reported cracks and damage. Almost all the affected CFUGs reported loss of important official documents such as Forest Operational Plans, and files. Total damage of around **NPR 1,263.3 million** (US\$ 12.63 million) was estimated for Government buildings and equipment, and **NPR 779.9 million** (US\$ 7.79 million) for CFUG buildings and equipment.

Damage to Environment Friendly Technologies

Renewable Energy Technology (RET) solutions such as improved cook stoves (ICS) and biogas installations promoted in the country through AEPC lead to improvements to household health and livelihood conditions, while they also deliver significant positive environmental outcomes in addition. For example, ICS installations can lead to energy savings of up to 80% and significant reductions of GHG emissions, indoor pollution and deforestation. A rapid assessment by AEPC and its partner network revealed that 146,767 units of ICS, 16,721 domestic biogas installations and 70,000 solar installations have been destroyed. The damage value of **NPR 1,573.3** (US\$ 15.73 million) will be incorporated under the housing sector. The loss to environment and forests as a result was estimated at **NPR 181.4 million** (US\$ 1.81 million). These need to be replaced to prevent environmental impacts including CO₂ emissions.

Effects on production of goods and services and access to services

Loss of ecosystem goods and services

Natural forest ecosystems including wetlands provide several important ecosystem services – simply the benefits people receive from ecosystems. In addition to timber and firewood, non-timber forest products (NTFPs) such as fruits, flowers, bark, dyes, fibers, gums and resins, and also medicinal and aromatic plants (MAPs) are important products. Most NTFPs including medicinal and aromatic plants (MAPs) have a higher commercial value than those of wood products. Income from environmental resources are particularly important for the rural poor and can decrease rural income inequalities and serves to reduce the prevalence, depth and severity of poverty⁸. In addition, forests provide many other ecosystem services including absorbing carbon dioxide, and buffering from floods and landslides. They maintain hydrological processes and conserve soil and water, enable nutrient cycling, and host pollinators. Ecosystem services from forest are particularly important for rural communities especially indigenous people, poor men and

⁸ Smith Hall et. Al (2015). Environmental resource income is important for earthquake-hit rural households. University of Copenhagen, Copenhagen Centre for Development Research. Policy Brief. No 1. June 2015

women, and other forest dependent communities. Using the MoFSC study in 2005, the total loss of ecosystem services has been estimated as **NPR 34,715.3 million** (US\$ 347.15 million).

Increased generation and management demands for solid and hazardous waste

The earthquake has significantly worsened waste management, in particular in camp sites where affected communities have been residing in as their houses have been damaged. Whereas household waste generation was managed somehow and most of rural waste was recycled or composted, the current concentration of people in camps has led to considerable generation of waste without a proper waste management system in place. Waste generation per camp has been estimated to be around 37.66 Kilograms on average per day. Waste collection is done using small bins with very little segregation at source and in some cases no effort is made to collect waste. Only around 40% of the camps have proper sanitation facilities, the majority at best being served through pit latrines. Drinking water is available in half of the camps while the supply of bottled water has increased tremendously resulting in considerable plastic waste. MOSTE has banned production, use, sale and transportation of plastic bag within Kathmandu and initiated promotion of environment friendly alternative bags including clothes, fiber and paper. However, following the earthquake, the increased use of plastics including plastic bag is of concern.

Need for debris and rubble management

With almost 750,000 buildings either completely or partially damaged, the earthquake has generated a large amount of rubble. The total estimated volume of rubble is 18.854 million m³. Of this, estimates for rubble that can be recycled or reused range between 60 and 80%. The remaining debris and rubble will need to be transported and disposed safely. The large amount of debris and rubble pose a threat to community health in several ways (Sah 2015)⁹. Building waste from 31 districts is expected to contain up to 2.7 million litres of paint. Lead in paint may escape into the environment through paint dust, and contaminate soil which can lead to lead poisoning. Similarly, mercury from damaged buildings (for example in light bulbs and hospital equipment) may be contaminating the environment. Other hazardous materials include asbestos in roofing and hazardous chemicals in electronic waste. All potentially hazardous waste, e.g. health care waste, asbestos waste and building rubble contaminated with toxic lead paint and mercury, as well as electrical and electronic items, should be treated separately. Specifically, no burning technology should be used for this waste management. Environmentally sound health care waste management practices need to be promoted and scaled up, as part of building back better.

Increased pollution from brick manufacture

The earthquake has completely damaged close to half a million houses while at least 250,000 buildings were partially damaged. According to the calculations by the housing sector, more than a billion bricks will be required for reconstruction. Manufacture of this many bricks will require coal imports of 1.577 million tons that will lead to around 39,000 tons of CO₂ emissions. In addition, brick firing to generate the required bricks will emit around 2,800 tons of suspended particulate matter. The total cost¹⁰ of air pollution for the 1.12 billion bricks that will be required for reconstruction was calculated to be around **NPR 737 million** (US\$ 7.37 million). In addition, brick making will also deplete and pollute top soil in areas around the brick kilns, affecting agricultural productivity and health of local communities. Chimneys of

⁹ Sah, R.C. (2015). Post disaster needs assessment for hazardous waste especially health care waste management in Nepal. Report to PDNA Environment and Forestry team. Center for Public Health and Environmental Development, Lalitpur, Nepal

¹⁰ Drawing on figures from SAARC Study on Evaluating Energy Conservation Potential of Brick Production in SAARC Countries (2013)

many brick kilns were damaged. Operating such brick kiln may significantly increase air pollution and lead to health impacts. Mercury emission from burning coal in brick kilns will also impact human health and the environment. In addition, production of a large number of bricks without adequate pollution control mechanisms such as chimneys will lead to additional pollution.

Effects on sector governance functions and systems

Forest and Environmental Governance Performance and Issues

The earthquake greatly reduced the capacity of the government and local communities in the affected districts, affecting monitoring and stewardship of protected areas, wildlife, forests and natural resources. A large number of CFUG members and executive members were directly affected by the disaster. Tragically, at least 1,536 CFUG members (731 male, 805 female) and around 150 CFUG executive members (69 male, 81 female) died in the earthquake.

Box 1: The case of Langtang Village



Langtang Village, Before and after the earthquake



Chhowang Thiley Tamang

Langtang village in the Langtang National Park was hit hard by the earthquake of 25 April 2015. An avalanche of ice and rocks completely buried the village killing about 200 of its inhabitants and leaving about 500 homeless. In the incident, four executive committee members of Langtang National Park Buffer Zone User Committee - including its chairman Mr. Chhowang Thiley Tamang - lost their lives. In the same incident, former chairperson of Buffer Zone Management Committee, Tenzing Pasang Tamang, also died. The loss of Mr. Thiley Tamang, an emerging conservation leader from Langtang valley, has created a big gap.

In some villages including Langtang (see box 1) entire village has been destroyed (see box 1). In addition many office buildings, equipment and furniture of both government and community based natural resource management institutions were damaged. The loss of life and damage to property and official documents directly hampers performance of both government and community institutions in delivering services and enforcing laws. Consequently management of government and community managed forests and protected areas will be greatly affected at a time when demand for fuel, food and shelter from forests is likely to increase. This will increase the risk of unsustainable and illegal harvesting of forest produce, poaching of wildlife and exploitation of remaining community owned resources critical to their livelihood, in the guise of recovery and reconstruction. The possible translocation of the few villages will further worsen community based forest governance and resource stewardship.

Increased risks and vulnerabilities

Increased risks from GLOF and landslides

The most significant environmental hazard is the threat of GLOF. While no major damages have been reported to moraine dams of the three largest and dangerous lakes small cracks have been observed on the moraine dam of the Tsho Rolpa Lake while previously constructed man-made channels to siphon out water may be blocked or damaged. A recent outburst following the earthquake was also reported in one of the supra glacial lakes located above the Imja lake causing temporary increase in water flow in the river. These indicate serious risks of GLOF in future. This risk may further be exacerbated by the impacts of climate change. Close monitoring of these lakes including further study on the effect of the earthquake on the stability of the moraine dam is required. In addition, equipment and infrastructure such as gauge readers (at Tsho Rolpa), the meteorological station at Langtang and Beding and also the base house at Kyangjing were destroyed. More than 25 hydro-meteorological stations under the Department of Hydrology and Meteorology have also been damaged. Likewise, field reports and analysis of post-earthquake GIS/Remote Sensing imagery reveal that there were numerous landslides. There were also numerous cracks formed in the hillsides. In the sloping hillsides, disturbances to the soil structure and stability post-earthquake will increase the risks of fresh landslide significantly, in particular during the upcoming monsoon season. Landslides can cause huge losses to lives and property. Monitoring and geotechnical assessment together with measures such as watershed management including afforestation, land and soil conservation and bio-engineering techniques are required to reduce this risk. In addition, with millions of people affected and their houses damaged, there are tremendous pressures on the forests for forest land and timber for building temporary shelters. For instance, data from 5 District Forest Offices (DFO) revealed that a total of 88 hectare of forests have been encroached upon while around 206 hectare forests have been illegally felled. This trend is expected to increase in future as well and will if not monitored lead to significant land use changes and forest area conversions.

Gender and Social Inclusion (GESI)

Many women and socially excluded groups dependent on natural resources have been particularly affected by the earthquake. There is a need to further build women's capacity for active participation in community forests, especially in light of out-migration of men. Forests and conservation areas are key source of livelihood building of local communities, especially of rural women, indigenous peoples, Dalits, poor men and women, and other people living around forests. Loss of forests due to landslides triggered by the earthquake means loss of livelihood assets for many indigenous peoples living in the earthquake affected districts. In addition, with the loss of nearby forests, women, responsible for taking care of livestock, will have to spend much time in collecting animal feed from far-off forests. Nevertheless, forests also provide food and income for households in time of stress and they will become an important resources for coping with food shortages. In addition community forest users in 14 affected districts have reported earthquake damage to water resources. Likewise many energy efficient and alternative energy installations have been damaged. This has direct implications for women and girls, exacerbating their workloads since they now have to collect more water and firewood from forests. The increased workload for women will have a negative impact on their capacity to engage in community leadership, natural resource management, and earthquake recovery in their households, communities and forests.

Table 2: Summary of estimates of damage and losses

SN	Themes	Baseline	Unit	Damage NPR	Loss	Total effect (damage + loss)
	Public sector					
1	Forestry related infrastructure			2,043,318,400		2,043,318,400
	GON offices	894	Nos	1,257,650,400	0	1,257,650,400
	GON equipment and furniture	n/a		5,718,000	0	5,718,000
	CFUG offices	11,520	Nos	694,630,000	0	694,630,000
	CFUG equipment and furniture	n/a		85,320,000	0	85,320,000
2	Impact on forestry, watershed, biodiversity, NTFP			29343674341	142,601,520	29,486275861
	Forest area loss	1,101,523	Hectare	29258769601	0* ¹	29,363,109,121
	Encroachment and illicit felling			0	104,339,520	208,679,040
	NFTP collection loss	4,618,031	kg	84,904,740	38,262,000	123,166,740
3	Environment			1,573,332,200	918,404,300	2,491,736,500
	Air pollution due to brick industry			0	737,000,000	737,000,000
	Private sector³					
	Improved cooking stove	1,237,353	Nos	1,138,512,200	157,187,100	1,295,699,300
	Biogas	79,623	Nos	434,820,000	24,217,200	459,037,200
		Total NPR		32,960,324,941	1,061,005,820	34,021,330,761
		Total USD		\$ 329,603,249	\$ 10,610,058	\$ 340,213,308
SN	Themes	Baseline	Unit	Damage NPR	Loss	Total effect (damage + loss)
1	Forestry related infrastructure			2,043,318,400		2,043,318,400
	GON offices	894	Nos	1,257,650,400	0	1,257,650,400
	GON equipment and furniture	n/a		5,718,000	0	5,718,000
	CFUG offices	11,520	Nos	694,630,000	0	694,630,000
	CFUG equipment and furniture	n/a		85,320,000	0	85,320,000
2	Impact on forestry, watershed, biodiversity, NTFP			29343674341	142,601,520	29,486275861
	Forest area loss	1,101,523	Hectare	29258769601	0* ¹	29,363,109,121
	Encroachment and illicit felling			0	104,339,520	208,679,040
	NFTP collection loss	4,618,031	kg	84,904,740	38,262,000	123,166,740
3	Environment			1,573,332,200	918,404,300	2,491,736,500
	Air pollution due to brick industry			0	737,000,000	737,000,000
	Improved cooking stove	1,237,353	Nos	1,138,512,200	157,187,100	1,295,699,300
	Biogas	79,623	Nos	434,820,000	24,217,200	459,037,200
		Total NPR		32,960,324,941	1,061,005,820	34,021,330,761
		Total USD		\$ 329,603,249	\$ 10,610,058	\$ 340,213,308

Notes:

- *¹ Loss in **ecosystem services** such as forest's contribution in controlling soil erosion and loss of soil nutrient, carbon sequestration and environmental amelioration is estimated to be NPR 34,715,364,285 (USD 347,153,643) which is intangible, and not included in the table.

2. The recovery cost for the forest damage and ecosystem restoration is estimated to be lower than the total damage and loss incurred. It is assumed that about 50% of the losses will be either restored naturally or unable to restore in some cases within planned 10 years period.
3. Although the improved cooking stoves and biogas plant damages have been categorized into private sector, the recovery cost is only from government subsidy and potential 50 per cent additional cost will be incurred by private owner.

Recovery Needs and strategy

The total estimated reconstruction and recovery needs for the environment and forestry sector is **NPR 25,197 million**. This estimate has been based on wide consultation among sector experts, representatives of the two Ministries, NGOs and development partners. Of this the total estimated reconstruction costs is **NPR 6,773 million**. The reconstruction activities will build back the environment and forestry infrastructure and assets that were damaged. The total recovery costs estimated is **NPR 18,424 million**.

The overall aim of the reconstruction and recovery programme for the Environment and Forestry sector is to increase the resilience of ecosystems, environment and vulnerable communities to future anthropogenic and natural shocks from earthquakes and climate change by enhancing their management, and working with other sectors to promote sound development and reduce unsustainable impacts, in order to build back better, safer and greener. Planned investments under the sector will be targeted to recover the loss by creating 'green jobs' under the broader recovery strategy and promote sustainable solutions to address key emerging issues of waste and air pollution based on the principles of reuse and recycle.. Further, the recovery activities will augment actions for carefully managing municipal and hazardous substances and waste, making sensible use of debris and other proven green substitutes during re-construction. These will contribute to build capacities, tools and skills of the key institutions in government, community and private sectors to identify, monitor and manage risks to natural ecosystem and vulnerable populations.

Forests and ecosystems are increasingly negatively influenced by the effects of climate change, including increased variability of water availability, extreme weather events and natural hazards. Natural hazards such as floods including GLOF, avalanches, drought and storms are exacerbated by climate change which is expected to increase the severity and frequency of these hazards. Coupled together, they pose a serious threat to poor farmers and rural communities in the country who live in remote, marginal mountain and hill sides areas with limited resources, communication and transportation networks. In addition natural resources that these people depend on to cope with the impacts of such hazards are also highly climate sensitive – agriculture, forest products, water resources etc. Given this, future recovery investments will need to explore ways to integrate climate risks, strengthen the resiliency of ecosystems and the communities including using the potential of Ecosystem-Based Adaptation (EBA) options and nature based mitigation measures.

The reconstruction and recovery activities have been designed to address short, medium and long term needs of the sector. In the short term, the priority is given to respond to immediate and urgent reconstruction needs. In the medium term measures to restore ecosystem functionality and ensure safe management and use of environmental hazards including solid waste management, promotion of sustainable practices will be prioritised. Long term activities are geared towards improving the resilience and sustainability of ecosystems and the sound management of environment hazards and risks. The following describes in further detail the reconstruction and recovery activities while table 3 provides the

overall summary. In addition, it is strongly recommended that during reconstruction and recovery the important principles (see box 2 and annex 6) are applied by all sectors and clusters.

Box 2: Principles for Green, Resilient Recovery and Reconstruction

The following principles apply across all sectors and clusters involved in the Nepal earthquake recovery and reconstruction. They were developed jointly by the PDNA Environment and Forestry team, and the post-earthquake Rapid Environmental Assessment team. Specific activities under these principles are described further in Annex 6.

- 1) *Ensure that building design and construction is environmentally sustainable, appropriate to the region, and will withstand future disasters.*
- 2) *Enforce environmental impact assessment/initial environmental examination regulations during reconstruction in order to avoid future disasters; and ensure enforcement.*
- 3) *Ensure that fuel wood collection complies with existing forest management plans and promote alternative energy and energy efficient technologies to reduce pressure on forests energy.*
- 4) *Recycle and reuse debris as much as possible, and ensure that solid waste disposal during the reconstruction phase is managed using environmentally sound practices, including the introduction of new systems.*
- 5) *Design water and sanitation interventions to reflect post-earthquake changes in water resources, future climate change scenarios, and awareness of integrated water resource management (IWRM).*
- 6) *Conduct land use planning, including zoning, before finalizing the locations of resettlement areas to minimize risks from landslides and floods, ensure adequate land and natural resources to meet community needs while minimizing environmental impacts.*
- 7) *Ensure that reconstruction of roads and hydropower take the opportunity to build back safer and greener and take account of climate variability.*
- 8) *Prioritize support for rapidly restoring livelihoods in order to take pressure off forests and biodiversity after the earthquake; in the longer term ensure livelihood restoration projects reflect principles of resilient development.*
- 9) *Build capacity for green recovery and reconstruction, and ensure consultation/coordination with relevant stakeholders in recovery and reconstruction.*
- 10) *Promote of energy efficient technology, alternative energy sources, sanitation and human health and conduct environmental disaster risk monitoring and research.*

Government managed forests and watershed management

Reconstruction:

In the short term, reconstruction activities that include nursery and plantations, repair and maintenance of damaged renewable energy schemes will be implemented. Short term interventions will also include geo-stability assessment in selected areas of cracked and disturbed land masses to identify the threats of landslides and help implement measures that reduces these risks. Damage analysis indicated that large forest areas were destroyed by the earthquakes. Removal and salvage operation in the damaged forest and supply of timber, firewood resulting from the salvage operations to the market will come under short term priorities. Likewise measures to enhance surveillance and monitoring of incidences of forest land encroachments will be implemented in the short term.

Recovery:

Building institutional capacities to address pressures and threats to forest more systematically will be done in medium term. Similarly measures to promote and implement bio-engineering and soil conservation/agro-forestry will be implemented in the short term to reduce threats of landslides while

integrated watershed management approaches will be promoted in the medium to long term. Watersheds will be restored with the aim to promote water infiltration, regulate stream flows, protect against mass movement and buffer against climate related hazards. In this regard, sustainable land management practices in all forms of land uses will be encouraged through effective implementation of land use policies for sustainable landscape management that balances competing land uses while reducing negative impacts on forests and ecosystems. Roles for various stakeholders including the private sector will also be explored including creating opportunities for private sector investments in sustainable forestry and forest product management including adopting technologies for improved, seasoned or treated wood products for reconstruction of building and infrastructure. Activities that will ensure the restoration of ecological functions and ecosystem services will also be implemented in the medium term but also continue in the long term. In the long term, this recovery programme should also lead to improvements in sustainable forest management that increases the resilience of forest landscapes and ecosystems to climate change and other threats by employing proven approaches of ecosystem based adaptation and mitigation.

Community forests

Reconstruction

The CFUGs will require immediate support for restoring the services provided by community forest user committees and their federated bodies at district and national levels to deal with physical and material losses. In the short term, direct institutional support and cash transfer to support livelihoods and replace capacities to manage forest will be critical. CFUGs will also require support to carry out detailed assessment to identify and account for losses. Technical support will be required to plan and implement measures to restore the community forests. These may include reforestation or creating conditions for expedited regeneration. Livelihood support is critical both in the short term and the medium term. These can include sustainable alternative livelihood development to reduce pressures on forests.

Recovery

In the long term, community capacity to manage forests to increase resilience of the CFs will be supported. Such aspiration may be incorporated into the revised management plans of CFs, under the medium term. Support should also be provided to restore damaged ICS and biogas installations to reduce pressures on forests. Many women (52.17%) and men (43.83%) in the most affected 14 districts actively participate in community forestry programs both as users and managers of the forest product. Their participation in forestry management will be critical for sustainable management of these resources and will be proactively ensured. In addition, most of the high hill districts affected are rich on forest/herbal products. Skills development and training for women in sustainable harvesting of non-timber forest products and marketing forest products to expand the livelihood base will also be considered as part of the recovery strategy. Similarly, participation of ethnic minorities who depend the most on these resources will be critical for their livelihoods as well as sustainable management of the forest resources

Timber availability and production

Reconstruction

Following huge number of private and public houses that were damaged, a concern for MoFSC is how to source timber and other construction materials required for reconstruction. Initial assessment of inventory data and analysis of growing stock confirms the availability of timber volume totaling 18,552,263 cft – this includes 2,477,163 cft from the Terai region and 16,075,100 cft from the 24 earthquake-hit districts. These will be made available for reconstruction of both public and private

buildings. Where possible, use of locally available timber and poles from community forests and/or government managed forests will be encouraged. To ease timber harvest and distribution process, existing policy and regulatory provisions will require revision such as relaxing legal restrictions on harvest and transport of timber including the overall ban on timber harvest during the period of 15 June to 15 October (by the Forest Regulations, 1995).

Biodiversity and Protected areas

Recovery

Short term activities may include identification of impacts of the earthquake on critical habitats and key species and future risks (e.g. flooding in downstream protected areas). To deter violations of rules and control illegal wildlife poaching and trade, regular patrolling, anti-poaching and monitoring activities will be given priority in the short term. In the medium term implementation of species and habitat recovery that are integrated into revised PA management plans will be implemented, while the long term aim will be to improve resilience of PAs, biodiversity and ecosystems to anthropogenic and climate risks by incorporating climate change and disaster risk reduction into protected areas management strategies.

Waste management and pollution

Recovery

Considering the scale of the waste problem, the short term needs will include safe collection and disposal of waste and disposal and management of debris and rubble. In the short to medium term, efforts to identify low emission environmentally friendly ways of producing and resourcing construction materials will be important. Support to development of a framework / mechanism to reduce pollution including hazardous waste will be a medium term priority. In the long term sustainable management of waste and pollution including legislations, improving capacity to monitor and enforce environmental regulations etc. will be planned.

Environmentally friendly technologies

Recovery

Promotion of ICS and Biogas as a clean alternative to traditional cooking practices by AEPC has substantially decreased the use of fuel wood as energy fuel and contributed to lower carbon emissions. The damaged ICS and biogas plants will be repaired and reconstructed by in two phases: Phase I – Immediate Relief Package offering domestic clean cooking: The focus will be on providing immediate cooking solutions within December 2015 with the installation target of 100,000 ICS and 8,360 biogas plants. Phase II – Reconstruction, Rehab and Mid Term Relief Solutions: Under this package, the focus will be to deliver long term solutions for reconstruction and rehabilitation of damaged cooking stoves and biogas. During this phase, a total of 46,767 ICSs and 8,360 Biogas within the time line of December 2016.

Environmental Governance

Reconstruction

In the short term, reconstruction of damaged infrastructure and equipping them to restore operational capacity is important. In the medium term, strengthening the human capacity of both government and community institutions will be required. Also in the medium term to long term efforts to strengthen the

policy / institutional environment and support for good environmental governance will be made. There is a need to expand the network of environmental institutions at regional and district level with fully equipped environmental laboratories and professional human resources.

Recovery

In the medium term strengthening the human capacity of both government and community institutions to assess and mitigate impacts of hazards (including climate risks) will be implemented. Also in the medium term to long term, efforts to strengthen the policy and institutional environment to support fostering good environmental governance will be intensified. Improved mechanisms for environmental decision-making including environment management information systems (EMIS) and improved environmental assessment processes is an important medium to long term need. Equal importance needs to be given in increasing the capacity of government and non-government actors. At the same time, certain new strategies will be required to ensure resilient recovery and reconstruction, which include: Strategic Environmental Assessment Strategy for developments; Low Carbon Development Strategy; and a comprehensive Sustainable Development Strategy. The DoE will lead the development of an appropriate environmental mitigation plan to reduce negative impacts of the reconstruction and rehabilitation related activities and will prepare temporary shelter environmental management guideline.

Pollution Control

Recovery

The following are the needs: in the short term implement measures to reduce pollution from brick production; in the medium term support identification, recognition and integration of technologies and practices for reuse/recycle in the construction industry; promotion of technological improvements in the brick industry through fiscal measures such as subsidies are also important medium term needs. Fiscal incentives should also be made to support import of climate smart environment friendly (green) technology in construction industry. Another short to medium term need is to establish and operate mobile and stationary stations to monitor air pollution, noise pollution, water pollution and soil pollution in the country. The technical and institutional capacity of Department of Environment to conduct assessment, document, analyze and disseminate information regarding environmental hazards and should be improved in the medium term while long term needs include policy oriented research to lead to adoption of climate smart green technologies and promotion of sustainable consumption patterns.

Assessment Methodology

The Environment and Forestry sector PDNA comprised of about 25 members, from government, donors, I/NGOs, federations and academia. In its first meeting the group identified major issues facing the sector, both direct impacts from the earthquake, and existing indirect and future potential impacts from response to the earthquake by other sectors. The Group further organized into sub-groups as per the priority sub-themes for data collection and analysis which was later validated and compiled in the sector report. Methods for data collection and analysis are summarized below; while the details are annexed.

- Forest loss: GIS analysis was undertaken by FAO to estimate areas of forest loss due to landslides, using a sampling methodology (see Annex 3 for detailed methodology).
- Loss and damage to forest, biodiversity and watershed management capacity: DoF, DNPWC, NTNC and DSCWM undertook rapid assessments to collect information on loss of infrastructure in protected areas; district forest offices and range posts; and district soil conservation and watershed

management offices. FECOFUN provided data on loss of life and injury to members of community forest user groups, as well as CFUG infrastructure.

- Valuation of payments for ecosystem services: please see Annex 4
- Alternative energy installations: AEPC and its partners undertook rapid assessments to collect information. Estimates were made of additional carbon emissions as a result of burning firewood on open fires instead of using the damaged installations, and these were valued using current alternative energy market values for avoided carbon emissions.
- Building materials: calculations were made for the requirement of new bricks for reconstruction, including the amount of soil and energy required for their production, and the environmental cost in terms of carbon emissions and health hazards from air pollution. Estimates were also made for sand, gravel and aggregate extraction, and their environmental cost (15% of their market value).
- Building debris: estimates were made of the amount of building debris that will require disposal (i.e. that is not reused or recycled).
- Hazardous waste: estimates were made of hazardous materials including hospital waste, lead based paint, asbestos and mercury by the Center for Public Health and Environmental Development.

Assumptions and limitations: Given the time available, the assessment of the sector effects were based largely on secondary data and information collected from various government and non-government organizations. Efforts were made to validate data received. The baseline and other post disaster information provided here represent a high level of precision. However, the following assumptions were made and limitations exist in the analysis of the post-disaster assessment.

- In the assessment of the forest damage area, the sample size is small. The average damage (or forest loss) calculated by FAO as described above (2.2%) for 6 districts was extrapolated to 5 other severely affected districts with the assumption that effect of the earthquake is similar in these districts. This will need further confirmation during reconstruction and recovery period through detailed field assessments. Similarly no significant forest cover was assumed for the 3 districts of Kathmandu, Lalitpur and Bhaktapur. Likewise another assumption was that damage to forests was limited in the 17 other districts.
- The economic valuation of the goods and services was based on the study of the Ministry of Forest and Soil Conservation done in 2005. The study considered six different forest types and average economic value computed for similar forest types were used to estimate the value of ecosystem services lost. An interest rate of 6% was used to convert the 2005 values to the present value. However the average inflation rate in during this time is reported around 9%.
- Valuation of damages and reconstruction costs to infrastructure and assets has been based on best estimates from the field offices and informed by expert advice. Many CFUGs operate either from rented private office buildings or private residences of executive committee members. Only some have dedicated office buildings. A uniform standard cost estimate method was applied to all damaged CFUG offices. This should be verified during the implementation of the reconstruction and recovery activities. The recovery costs of the various activities have not taken into account changes in interest and other price fluctuations. Sourcing of timber and other construction materials is assumed to be from local areas and locally available materials.

Table 3: Summary table of Reconstruction and Recovery needs (NPRs millions)

SN	Major Recovery Activities	Short	Medium		Long			Reconstruction	Recovery	Total
		2015/16	2016/17	2017/18	2018/19	2019/20	2020-25			
1	Forestry related infrastructure	900	700	600	300	0	0	2400	100	2500
1.1	Temporary shelter to district offices and service centre	100	0	0	0	0	0	100	0	100
1.2	Furniture and forestry equipment	100	0	0	0	0	0	100	0	100
1.3	Repair/retrofit and reconstruction of offices (GON + LFUG)	700	700	600	200	0	0	2200	0	2200
1.4	Risk assessment and management of GON and LFUGs	0	0	0	100	0	0	0	100	100
2	Restoration forestry, watershed, biodiversity, NTFP	3040	2280	2280	2280	2280	3040	2800	12400	15200
2.1	Forest management [(i) detailed impact assessment; ii) preparation of management plans; iii) plan implementation; iv) surveillance; v) monitoring; vi) technology development etc.])	440	330	330	330	330	440	880	1320	2200
2.2	Forest restoration [i) rubble removal; ii) afforestation reforestation (18,000 ha); iii) grazing control and plantation protection; iv) salvage felling and clearing etc.]	480	360	360	360	360	480	1920	480	2400
2.3	Watershed Management and Landslide Risk Mitigation [(i) hazard mapping; ii) prepare WS plans; iii) landslide treatment (bioengineering, gabions, masonry); iv) sustainable soil management])	1120	840	840	840	840	1120	0	5600	5600
2.4	Biodiversity Conservation and PA management [(i) habitat restoration plan; ii) habitat management (7000 ha); iii) anti-poaching and illicit activities; iv) conservation outreach; v) human-wildlife conflicts etc.])	460	345	345	345	345	460	0	2300	2300
2.5	Resumption of Community Based Forest Management livelihood support capacity development [(i) 2300 OP revision; ii) direct support to 1650 LFUGs; iii) livelihood improvement plan support to 20000 HHs; iv) NTFP promotion; v) capacity development of LFUGs and staffs	440	330	330	330	330	440	0	2200	2200
2.6	Gender and Social Inclusion [(i) empowerment; ii) training; iii) education; iv) livelihood support])	100	75	75	75	75	100	0	500	500
3	Environment restoration	1876.9	2721.2	1648.9	750	500	0	1573	5924	7497

3.1	Repair and install ICS and biogas units/replacement	471.9	629.2	471.9	0	0		1573		1573
3.2	Promotion of environment friendly technology	20	30	0	0	0	0	0	50	50
3.3	Comprehensive environment assessment and monitoring	5	5	0	0	0	0	0	10	10
3.4	Air, water and noise quality monitoring stations	15	75	75	100	100	0	0	365	365
3.5	Subsidies and incentives for promotion of green recovery	300	300	200	100	100	0	0	1000	1000
3.6	Debris and rubble management, improvement of landfill	500	500	0	0	0	0	0	1000	1000
3.7	Technical capacity enhancement of DOE	50	75	50	50	50	0	0	275	275
3.8	Solid waste management technology	500	750	500	500	250	0	0	2500	2500
3.9	Prepare environmental safety guidelines (waste management hazardous/toxic waste management etc.)	15	10	5	0	0	0	0	30	30
3.10	Promote research on new emerging technologies for environment protection and safe disposal of waste	0	347	347	0	0	0	0	694	694
Total		5,816.9	5,701.2	4,528.9	3,330	2,780	3,040	6,773	18,424	25,197

Implementation Arrangements

The reconstruction and recovery programme for the sector will be implemented following a phased approach in the short, medium and long term. The recovery and reconstruction programme for the forestry sector will be coordinated by MoFSC and for the environment sector will be coordinated by MoSTE.

The MoFSC's and respective departments such as Department of Forests, National Park and Wildlife Conservation, Soil Conservation and Watershed Management will be responsible for coordinating recovery of the forestry, biodiversity and watershed management sub-sector, in close collaboration with local community groups. Likewise, MoSTE's Department of Environment will be responsible to coordinate waste management and pollution issues while DHM will coordinate all activities related to issues related to environmental hazards such as GLOF. AEPC will coordinate the recovery activities related to environmentally friendly technologies (ICS and bio-gas installations).

As a cross-cutting sector, each ministry will coordinate closely with other lead ministries and sectors for developing detail plans of implementation of each sector. Both Ministries will also participate actively in any future national recovery coordination body, and work with other sectors to ensure green principles and resilient practices are adopted in order to build resilience to future disasters and promote sustainable development. The recovery strategy will: (i) be clearly aligned with the Government of Nepal's existing plans and environmental conditions specified in the international treaties and accords; (ii) ensure promotion of landscape and basin level approach, strategy and activity planning, to recognize the integrated nature of the environmental / natural resources issues; (iii) will continue to build and expand strategy of forestry for prosperity, low carbon growth, avoiding deforestation and deforestation. In addition, MoSTE will also lead a Rapid Environmental Assessment (REA) of recent Earthquake to among others identify, map and prioritize environmental impacts, hazards and risks resulting from the earthquake itself, and from subsequent recovery/reconstruction and ensuring that negative environmental impacts can be reduced while measures to build back better in a more resilient and environmentally sensitive way is integrated across sectors. This REA report will build on and validate the PDNA findings.

A Post Disaster Recovery and Reconstruction Management Coordination Committee (DRRMCC) will be formed under the Secretary of the respective ministry to coordinate implementation management. Respective departmental projects will be aligned, coordinated and implemented through the Implementation Working Group chaired by Director General of the departments. This committee will manage the overall planning and decision process including putting in place and effective monitoring and evaluation system. All recovery and reconstruction work at district level will be coordinated through the District Disaster Relief Committees. The field level implementation will be executed through district offices and through mobilizing local forestry groups based and multi-stakeholder institutions such as District Forestry Sector Coordination Committee (DFSCC) and Agriculture Environment and Forest Committee.

Many donors, civil society organizations, and private sector will also be involved in recovery and reconstruction, and the MoFSC and the MoSTE should involve them and collaborate closely with them. These include UNDP, FAO, the World Bank, SDC, DFID, FINNIDA, DANNIDA, EU, IFAD, ADB, USAID, WWF, and many others.

Annexes

Annex 1: Comparison of the forestry situation on EQ affected districts with at the national context

SN	Items	National Total (ha)	EQ hit 31 districts Total (ha)	Proportion to national data (%)
1	Forest Area	5828000	2393535	41.07%
2	Government Managed Forest	2908172	1400032	48.1%
3	Community Forestry			
3a	Number	18133	11554	63.71%
3b	Area	1700047	830586	48.85%
3c	HHs	2237195	1236486	55.2 %
4	Pro-poor Leasehold Forestry			
4a	Number	7419	5062	68.23%
4b	Area	42835	25644	59.87%
5	Protected Areas			
5a	Number	20	7	35.00%
5b	Areas of Protected Areas	3418562	1598800	46.77%
6	Buffer Zone Area			
6a	Number	12	3	25.00%
6b	Area	560270	152500	27.22%
7	Ramsar Sites			
7a	Number	9	2	22.22%
7b	Area	34455	8800	25.54%

Excluded BZ and Ramsar Sites of Chitwan NP as it not affected protected areas!

Annex 2: Baseline forestry information in all 31 earthquake hit district

SN	Category	District	Total Area (ha)	Total HHs in District	Forest Area (ha)	Number of CFUG	CF Area (ha)	CFUG HHs	Number of LHF	LHF Area (ha)	LHF HHs	Gov. Managed Forest
1	Most Hit	Gorkha	361470	66506	171525	464	23364	52795	273	951	2303	147179
2	Most Hit	Dhading	192487	73851	92854	672	28079	68409	466	1817	4138	62958
3	Most Hit	Nuwakot	112100	59215	35995	361	24703	33960	0	0	0	11286
4	Most Hit	Rasuwa	151931	9778	62251	76	3220	5481	0	0	0	59031
5	Most Hit	Kathmandu	41202	436344	14118	172	6141	20372	0	0	0	7937
6	Most Hit	Lalitpur	39284	109797	22732	197	10750	14589	0	0	0	11685
7	Most Hit	Bhaktapur	11900	68557	2137	62	1937	9192	0	0	0	191
8	Most Hit	Kabhrepalancho k	140486	80720	73801	529	23535	45562	454	2839	4545	47427
9	Most Hit	Sindhupalchok	254200	66688	109820	509	29241	49768	410	1997	3591	78582
10	Most Hit	Dolakha	214287	45688	101500	414	45125	45234	200	976	2057	55397
11	Most Hit	Ramechhap	156432	43910	88111	418	33067	47791	461	2711	3986	52333
12	Most Hit	Okhaldhunga	107403	32502	38285	336	28032	50212	206	1309	2200	8944
13	Most Hit	Sindhuli	249100	57581	154407	443	73904	42333	455	2882	4091	77621
14	Most Hit	Makwanpur	242600	86127	133987	687	69110	63641	496	2334	3437	62543
		Sub Total	2274882	1237264	1101523	5340	400208	549339	3421	17817	30348	683113
1	Hit with heavy lost	Solukhumbhu	339776	23785	105330	196	32368	18980	2	NA	NA	72895
2	Hit with heavy lost	Khotang	159102	42664	80929	338	39695	42484	245	878	2643	42941
3	Hit with heavy lost	Chitwan	218000	132462	44936	71	18943	34779	394	1669	2558	13848
4	Hit with heavy lost	Tanahun	154600	78309	78111	586	393651	56955	515	2045	3592	40342
5	Hit with heavy lost	Lamjung	170782	42079	84317	320	20190	25413	163	628	1354	63731
		Sub Total	1042260	319299	393623	1511	504847	178611	1319	5220	10147	233758
1	Hit district	Kaski	201700	125673	70510	483	17736	44518	0	0	0	52770
2	Hit district	Parbat	53686	35719	19997	371	12963	43852	0	0	0	7034
3	Hit district	Baglung	182486	61522	98046	387	16051	40681	4	7	29	61996
4	Hit district	Syangza	101349	68881	33683.8	461	13727	52327	8	82	82	19875

5	Hit district	Palpa	136595	59291	71172	624	33958	53853	39	450	478	36827
6	Hit district	Gulmi	107918	64921	40663.3	414	16106	57876	7	71	71	24486
		Sub Total	783734	416007	334072	2740	110540	293107	58	610	660	202988
1	Slightly affected district	Bhojpur	150700	39419	75787	500	38553	49651	203	786	1648	36445
2	Slightly affected district	Sankhuwasabha	348640	34624	176170	280	30688	25191	0	NA		46473
3	Slightly affected district	Dhankuta	89525.4	37637	38519.2	370	29867	43826	0	NA	0	8619
4	Slightly affected district	Arghakhanchi	119300	46385	67023	425	28958	4605	0	NA	0	38065
5	Slightly affected district	Myagdi	229706	27762	84452.6	292	22877	33855*	0	NA	0	53089
6	Slightly affected district	Nawalparasi	219510	128793	122365	167	21907	58301	121	1212.	1328	97482
		Sub Total	1157381	314620	564317	2034	172850	215429	324	1998.	2976	280173
		Grand Total	5258257	2287190	2393535	11554	1188446	1236486	5062	25644.4	44131	1400032

LHF: Leasehold Forest for poor people

HH: households

CFUG: Community Forestry User Groups

Pvt. Forest: Private Forest

Govt.: Government

NA: Data not available

Note: the total household in Myagdi is smaller than the CFUG due to the duplication of some households in 2 or more CFUGs

Annex 3: Methodology for estimation of forest loss (FAO Rome)

Methodology

A systematic sampling was done to assess the damage on forests due to the earthquake. Systematic grid of 769 clusters was established, at the distance of 3.5 kilometer, throughout the six most affected districts namely Gorkha, Dhading, Nuwakot, Rasuwa, Sindhupalchowk and Dolakha. Each cluster consisted of six sub-plots with 200 metres between plots in east-west and 50 metres in north-south directions following loosely the design of recent Forest Resource Assessment of Nepal (FRA, 2014). Visual assessment of changes between pre and post earthquake satellite images from the Google Crisis Response (Google, 2015) was conducted using Collect Earth tool (Open Foris, 2015). Each sub plot was assessed for the availability of imagery, the existence of **visible damage**, the cause of the damage (if any) and the land use types damaged. The cloud free very high resolution imageries were only used for the analysis. Altogether 76 percent of the 4612 subplots contained cloud free post-quake imagery. The availability of the cloud free imagery varied from 47 percent in Dolakha to 98 percent in Sindhupalchowk.

The problem of the image displacement on the post-earthquake images were resolved case by case by approximating the plot's actual location on the new image. The damaged area was computed for both forest and non-forest areas using the proportion of the damaged plots to the total number of assessed cloud free plots.

Result

Altogether 64 subplots were found damaged due to the earthquake, of which 30 subplots lies inside forests. In total, 24,000 hectare (1.9%) area was damaged due to earthquake in six districts. The results showed the damages in 2.2% forest area (i.e. 18,000 ha) in six priority districts. The most common type of forest damage was landslide with 90 percent of damage being caused by them. Seven percent of damage was caused by soil liquefaction and three percent by floods.

Annex 4: Calculating value of forests and forest products (method employed)

The ministry of forests and soil conservation had conducted an extensive study on the **Economic Valuation of Ecological Goods and Services** provided by the forests. The study was designed to calculate and evaluate ecological goods and services in economic terms of various forest ecosystems representing different ecological zones and further strengthen the contribution made by forestry sector to national economy. The study was made in six different forest types namely Shrub land of *Siraha (Bishnupur)* and *Kathmandu (Thankot)*, Terai Hardwood Forest of Bara (*Amlekhgunj*), Sal Forest of *Chitawan* (Buffer-Zone of Royal Chitwan National Park), Pine forest of Kabhrepalanchowk and the Sub-Temperate Forest of *Bhaktapur (Nagarkot)*. Sub-temperate forests are mainly dominated by Schima-Castanopsis forests.

Goods considered were: timber, firewood, fodder, leaf-litter, grass, medicinal plants and tubers etc. On the services side, soil and water conservation, habitats of wildlife species, recreation, carbon sink and oxygen release etc were considered. Stratified random sampling was conducted for the forest inventory to access the goods and services. The size of the sample plot was 20x25 m². The sum up of the Direct Use Value (DUV) and Indirect Use Value (IUV) sums up to make the total economic value. DUV are those which are derived from the direct use or interaction with a protected area resources and services; IUV relates to indirect support and protection provided to economic activity and property by the tropical forest's natural functions, or regulatory 'environmental' services. Following valuation methods are considered for assessing DUV and IUV of forest ecosystems of the selected sites, they are: i) Market Price, ii) Market Price of Substitutes, iii) Benefits Transfer and iv) Total Net Stock. Nine percent of market price of timbers. Total of average cost of collections, transport cost from forest to the market and taxes on timbers is about 9% of market price of timbers. Hence, economic values of all types of timbers are estimated by multiplying market price of timbers by a factor of 0.91. Economic values of all types of fodder, fuelwood and Khair (*Acacia catechu*) are estimated by multiplying market price of fodder grasses by a factor of 0.40, 0.95 and 0.75 respectively. Per unit area (hectare) total economic value of the selected ecosystem was estimated as follows at the cost of 2005 AD.

Table 1 : Summary of the per hectare use value of the selected sites (at the rate of 2005 AD)

SN	Sample Area	Direct Value /ha (in NPR)	Indirect Value/ha (in NPR)	Total Use Value/ha (in NPR)	Remark
1.	Shrub land in Mid Hills of Kathmandu, Thankot	198,051	254,271	452,322	
2.	Sub-temperate Forest in Mid Hills of Bhaktapur	902,732	1,080,880	1,983,612	
3.	Pine forest in Mid Hills of Kabhrepalanchowk District	223,378	242,185	465,563	
4.	Shrub land in the Terai Plain of Siraha District	643,665	116,932	760,597	
5.	Terai Hard Wood Forest in Siwalik of Bara District	1,424,440	95,638	1,520,078	
6.	Sal Forest in Terai Plain including Buffer Zone of RCNP	2,781,168	190,212	2,971,380	

Annex 5: Environmentally Friendly Technologies

A. Biogas

Damaged Domestic Biogas List

Biogas				
	Damage cost (USD)	Loss (USD)	Cost of Recovery and Reconstruction (in USD)	Remarks
Severely Affected Districts				
Rasuwa	38,274.60	0	38,274.60	Average cost of recover and reconstruction is taken as USD 260.00
Gorkha	360,796.80	0	360,796.80	
Nuwakot	31,012.60	0	231,012.60	
Dhading	444,498.60	0	444,498.60	
Sindhupalchok	99,372.00	0	99,372.00	
Dolakha	91,673.40	0	91,673.40	
Ramechhap	83,811.00	0	83,811.00	
Subtotal	1,349,439.00	-	1,349,439.00	
Crisis Hit Districts				
Kavrepalanchok	69,751.00	0	569,751.00	Average cost of recover and reconstruction is taken as USD 260.00
Sindhuli	93,147.20	0	493,147.20	
Okhaldhunga	6,052.40	0	16,052.40	
Makwanpur	1,305,322.20	0	1,305,322.20	
Lalitpur	497,733.60	0	497,733.60	
Bhaktapur	43,953.00	0	43,953.00	
Kathmandu	72,017.40	0	72,017.40	
Subtotal	2,997,976.80	-	2,997,976.80	
Total	4,347,416	-	4,347,416	

Carbon emission calculation

Annual CO₂ emission reduction from 16,721 biogas use is 50.16 metric ton CO₂e

Assumptions for CO₂ emission reduction

1. Fuelwood save from biogas use
2. GHG emission reduction
3. Forest conservation
4. Reduction in indoor air pollution
5. Agriculture production improvement

B. Improved Cooking Stove (ICS)

Improved Cooking Stove				
Districts	Damage cost (USD)	Loss (USD)	Cost of Recovery and Reconstruction(in USD)	Remarks
Severely Affected Districts				
Rasuwa	205,340	-	205,340	The cost varies district-wise.
Gorkha	577,677	-	577,677	
Nawakot	1,240,296	-	1,240,296	
Dhading	1,492,324	-	1,492,324	
Sindhupalchok	1,446,847	-	1,446,847	
Dolakha	1,208,006	-	1,208,006	
Ramechhap	1,141,537	-	1,141,537	
Subtotal	7,312,026	-	7,312,026	
Crisis Hit Districts				
Kavrepalanchok	1,242,135	-	1,242,135	The cost varies district-wise.
Sindhuli	683,350	-	683,350	
Okhaldhunga	771,847	-	771,847	
Makawanpur	1,082,898	-	1,082,898	
Lalitpur	104,262	-	104,262	
Bhaktapur	60,464	-	60,464	
Kathmandu	128,142	-	128,142	
Subtotal	4,073,097	-	4,073,097	
Grand Total	11,385,122	-	11,385,122	

Carbon emission calculation

Based on Muller et. al 2011, it can be assumed 1-3 ton of CO₂ per ICS (Reference 1, page 3)

From a total of 146,767 ICSs, a total of 224 metric tons of CO₂ emission can be reduced per year.

Here it is assumed that 1.53 tons of CO₂ is saved per ICS per year

Reference

1. <http://www.sei-international.org/mediamanager/documents/Publications/Climate/sei-wp-2013-01-cookstoves-carbon-markets.pdf>

Annex 6: Recommendations to PDNA sectors to reduce adverse environmental impacts and promote resilient recovery and reconstruction

NA sector	PDNA sector focal agency	Issues	Recommendation
Housing and settlements	MoUD and MoFALD	Site selection for settlements and buildings needs to ensure safety and minimize safety risks and environmental impacts to reduce risk of future disaster.	Undertake land use planning using water catchments as a unit, integrating technical disaster risk assessment (for landslides, floods and other disasters) and environmental assessment; promote zoning in planning, avoiding environmentally sensitive areas and taking into account communities’ natural resource needs.
		Health, safety, and environment (HSE) measures must be in place during construction.	Require construction personnel to follow HSE practices. Avoid environmentally sensitive sites during construction.
		Sourcing of building materials (e.g., timber, stone, gravel, river rock, and clay) must not further degrade the environment or increase human risk and vulnerability.	Source materials with minimum environmental impact, locally if possible (e.g. sustainably harvested poles and timber from community forests; avoid extraction on steep slopes especially if there is landslide risk). Ensure quarry sites meet national environmental standards. (See industry section for brick manufacture).
		Resource efficiency should be maximized where possible.	Recycling of construction debris for building materials, as well as the use of technologies and approaches that increase efficient use of water, energy and land.
		Disaster debris and solid waste from construction activities and new settlements must be disposed of properly.	Develop solid waste management plans for all settlements and housing construction projects.
		Compliance with upgraded building codes is needed to ensure resilient infrastructure.	At policy level, government should revise building codes to incorporate heightened standards for resilience issues, such as disaster risk, reuse of materials, renewable energy, and energy efficiency. Building code enforcement is critical, and must be incorporated into design and construction.
Health /nutrition	MoHP	Unsustainable fuel wood collection puts pressure on limited forest resources and wood burning can lead to negative health impacts.	Shelter reconstruction should include the use of appropriate, renewable energy technologies, such as improved cook stoves with chimneys, biogas, solar power, micro hydro. Refer to UNHCR Global Safe Energy Strategy.

NA sector	PDNA sector focal agency	Issues	Recommendation
		Improper disposal of hazardous medical waste can increase health and environmental risk.	New and reconstructed medical centers should safely dispose of medical waste and comply with the Solid Waste Management Act and international best practice for safe disposal.
		Reconstruction of health facilities should follow the environmentally sustainable practices described in the Housing and Settlements section above.	Apply the recommendations for constructing Housing and Settlements listed above.
Education	MOE	Reconstruction of schools should follow the environmentally sustainable construction practices described under the Housing and Settlements section above.	Apply the recommendations for constructing Housing and Settlements listed above.
		Low awareness on DRR and environmental issues among many students/youth increases individual risk.	Mainstream DRR in curricula of education institutions and link with sustainable natural resource management to raise disaster risk management awareness including green approaches
Transport	MoFALD, MoPIT	Poor road design and construction leads to unsafe and environmentally unsustainable roadways.	Design of new and reconstructed roads should reflect international best practice and include consideration of the broader transportation network to minimize human and environmental risks and vulnerabilities, such as landslides.
		Lack of enforcement of rules and regulations regarding the design, construction, and operation of roads.	Government, donors, contractors, NGOs and communities have sufficient capacity and incentive to monitor and enforce road design and construction.
		Lack of planning of local road networks leads to poor site selection, especially of district and rural roads.	Ensure implementation of environment management plan and other environmental obligations made in approved environmental impact assessment/initial environmental examination (EIA/IEE) report. Follow road design and construction regulations including stabilization of slopes, and use of bioengineering as appropriate. Road designs should also

NA sector	PDNA sector focal agency	Issues	Recommendation
			be designed for an increase in the number of extreme climatic events (e.g. heavy rain).
		Reconstruction of existing walking trails and establishment of new walking trails negatively impacts environmentally sensitive areas.	Trail design should avoid protected areas completely, and other environmentally important and vulnerable areas as much as possible; allow for more extreme climatic events in designs, including side drains
		Unsustainable extraction of road construction materials and management of spoils negatively impacts communities and the environment.	Environmental managements plans (EMP) and Health, Safety, and Environment (HS&E) plans must be developed, implemented and enforced by road contractors. Review and revise existing environmental legal and regulatory framework including public roads act and LSGF act and develop SEA framework
Water and Sanitation	MoUD/DoWSS, MoHP	Risk of water contamination by untreated wastewater.	Include water pollution control devices as part of sanitation design. Include appropriate water and sanitation infrastructure with shelter and building construction. Construct latrines using appropriate technology and environmentally friendly local building materials
		Unsustainable extraction of surface water resources.	Prior to the selection of a water source, conduct an assessment of the sustainability of the water resource. Design water and sanitation infrastructure within a framework of Integrated Water Resources Management (IWRM). Include water resource efficiency measures as part of building design, including rain tanks and groundwater recharge ponds.
		Unsustainable extraction of groundwater resources / aquifers.	Conduct an assessment of the capacity of groundwater resources and design water systems appropriately. Include water resource efficiency measures as part of building design, such as rain tanks and groundwater recharge ponds.
		Proper socialization of water and sanitation technologies in order to avoid waste and lack of use.	Include training and socialization with the introduction of any new water and sanitation intervention. Construct latrines using environmentally friendly local building materials. Use

NA sector	PDNA sector focal agency	Issues	Recommendation
			the rebuilding phase as an opportunity to improve sewerage systems.
		Conflicts over water use for newly established or restored systems.	As part of water resource development, project proponents should identify the local conflict zones and work with communities to resolve conflict.
Electricity (and other energy)	MoEn	Vulnerability of hydropower to future disasters.	Undertake strategic environmental assessment of hydro projects in single river basins; produce risk maps of floods, landslides and other hazards.
		Siltation and debris management related to hydropower.	New and reconstructed hydro projects should include the implementation of sound environmental management plans and consideration of IWRM.
		Transmission and distribution line construction and rehabilitation.	The design, construction, and rehabilitation of transmission and distribution lines should minimize damage to communities and natural resources.
		Design and construction of micro-hydro must consider environmental sustainability and safety.	Reconstructed and newly installed micro hydropower should be done efficiently to restore local power and in ways that minimize downstream environmental impacts.
		Pressure on forests related to firewood collection.	Reduce demand by distributing and promoting clean cookstoves and other forms of alternative energy. Establish plantations to reduce impacts on forests.
		Promotion of renewable energy and proper disposal of solar batteries.	A system should be established for safe collection and disposal of batteries. Promote community solar systems in schools, public buildings, water pumps, etc.
Community Infrastructure	MoFALD	See other relevant sectors (education, transport, buildings)	
Commerce, Industry and Supplies	MoInd, MoCS	Risk of environmental contamination from hazardous materials associated with commerce and industry, as a result of earthquake damage	Conduct inventory of hazardous materials sites, underground storage tanks and conduct rapid assessment of release of hazardous materials. Perform remedial activities where needed. Owners of industrial facilities should assess contamination risk and report on status to government.

NA sector	PDNA sector focal agency	Issues	Recommendation
		Brick kilns were already heavily polluting before the earthquake; now they are damaged yet there is a huge demand for bricks, so there is a risk they will operate before they are repaired and cause serious air pollution	Avoid production with broken chimneys; follow environmental standards for brick kilns; promote more environmentally friendly methodologies such as VSBK (see Department of Environment’s brick kiln report)
		Risk of increased pollution from cement factories as demand for cement will rise for reconstruction	Ensure that operators of cement factories comply with environmental standards.
		Large demand for construction materials leads to illegal and damaging extraction of sand, gravel etc.	Limit extraction and quarry sites to those approved by GoN and where environmental, health and safety measures are in place.
		Inadequate storage of petroleum and other hazardous products have resulted in leakages	Conduct an inventory of hazardous materials infrastructure and review for post-disaster impacts.
		Improper disposal of tents, tarpaulins and plastic (bottles & bags)	Collect, reuse, and safely dispose of tents, tarpaulins, and other plastics so that they do not end up in rivers, roadsides, etc.
		Disruption of supply chains for manufactured goods may make people more dependent on forest products.	Work to re-establish supply chains; watch for over-harvesting of natural resources and seek alternatives
Agriculture and Livestock	MoAD, Molrr	Resettlement programs potentially disrupt traditional agricultural systems, especially for areas where holdings are small and geographically dispersed.	Resettlement in small clusters nearer to customary farming lands and provide necessary capacity-building, extension, and training for livelihood restoration.
		Food aid programs potentially disrupt sustainable rural	Continue local food production systems and promote cash for work to integrate communities into recovery process.

NA sector	PDNA sector focal agency	Issues	Recommendation
		agricultural production systems previously in place.	
		Risk of that seeds and animal breeds distributed under the relief and rehabilitation program are not suited to agro-climatic zones	Distribute only tested and verified varieties and breeds that are recommended by MOAD. Avoid untested, non-verified and not recommended seeds and breeds
		Risk that decreased production and increased food insecurity results in high pressure on forest resources.	Evaluate and improve the food supply chain to increase supplies at local markets in order to reduce harvesting of forest resources as a last resort.
		Increased extraction of timber and other forest products by earthquake-affected agro based industries due to lack of raw material supply.	Build capacity and diversify the agro based industries to other products
		Threats to local agrobiodiversity loss due to change in eating habits caused by external food aid	Identify at-risk local crops, collect and store seeds, and promote in situ conservation
		Risk of under-cropping of agriculture lands and consequent alien species invasion	Promote labor technologies and settle land tenure issues; develop early detection systems for spread of invasive alien plant species and take action to contain
		Risk that decreased supply of farmyard manure due to livestock deaths and damaged animal sheds will result in increased use of chemical fertilizers, with consequent environmental impacts.	Increased use of chemical fertilizers may damage soil fertility and cause water pollution. Promote integrated soil management practices including agroforestry and organic farming. Fertilizer should be supplied in a balanced form.
		Poor and marginalized communities are more vulnerable, resulting in encroachment of forests	Promote targeted programs for enhancing livelihood, shelter and basic needs

NA sector	PDNA sector focal agency	Issues	Recommendation
		Use of agriculture biomass for energy because alternatives (e.g. improved cook stoves (ICS), biogas) are no longer available could result in reduced availability of manure and increased CO2 emission	Rehabilitate and promote ICS and biogas units connected to toilets
		Damaged seed storage structures result in loss of seed for planting and for food, resulting in increased forest pressure	Rehabilitate seed storage structures and distribute seed containers for short storage
Irrigation	Molrr	Damaged and or leaking intakes and distribution channels result in decreased crop yields, and hence increased forest pressure for livelihoods	Assess and rehabilitate irrigation schemes, considering possible impacts to freshwater biodiversity if water is taken from different sources
Financial sector	NRB, MoF	The financial sector finances many activities that have adverse environmental impacts in Nepal; it has an opportunity to promote better practices	Raise awareness in the sector about the impacts its investments can have, including during recovery and reconstruction. Promote social and environmental corporate responsibility including sound environmental management preparation, implementation and monitoring, with environmental impact assessment/initial environmental examination (EIA/IEE)
Employment, Livelihoods and Social Protection	MoFALD, MoLE	Damage to agricultural lands and irrigation facilities may affect agricultural production and thereby livelihoods, and loss of employment options will mean affected populations rely heavily on forest and other natural resource based sources. This will be in addition to those populations who traditionally depended on forest	Promotion of alternative livelihood options while restoring agricultural lands and facilities; promoting sustainable harvest practices while also identifying safe areas through forest and ecosystem function mapping to identify and exclude vulnerable ecosystems; Opportunities to promote jobs that enhance environment in recovery programs such as green jobs (ecosystem restoration activities) or cash for work in cleaning up streams and local environments

NA sector	PDNA sector focal agency	Issues	Recommendation
		and natural resources for their livelihood increasing pressure on these resources.	
		Damage to forest and natural resource areas such as community forests from where affected populations met some of their livelihood needs transfer pressures to natural forest areas	Identify areas away from ecologically sensitive and biodiversity rich areas while community assets such as CFs are restored; integrate these issues into local land use planning
		Post-disaster livelihood activities may impact environment, e.g. resulting in pollution and generation of waste.	incorporate environmental concerns into livelihood promotion options including through a quick environmental impact assessment; consider opportunities to promote green and climate resilient livelihoods
		Longer term livelihoods programs may not be sustainable	Integrate ecosystem management as part of these programs to secure sustainable livelihoods
		Inadequate and inconsistent enforcement of environment-related policies may result in environmental damage and reduce future resilience	Increase government and citizen groups' capacity for monitoring; increase penalties for non-compliance, commensurate with the value of damage; ensure impartial monitoring in large projects (not only monitoring by developer); tackle corruption; reward good practices (e.g. good corporate environmental responsibility); ensure compliance with the provisions of environmental audits
Governance	MoF, NPC	Lack of information about activities and developments that affect the environment adversely means that local communities cannot participate in decision-making	Promote effective implementation of the Right to Information Act

NA sector	PDNA sector focal agency	Issues	Recommendation
		lack of sensitivity about the environment among civil society/citizens results in continuation of environmentally damaging practices	encourage younger generation to take action on environmental issues; promote opportunities for citizen recourse on environmental impacts
		Lack of essential institutional mechanism at regional and district levels, and dormant Environmental Protection Council and Climate Change Council	Amend the Environment Protection Act Regulations by including the powers and functions of the Environment Protection Council and to make it mandatory for it to meet at least once in every six months; Climate Change Council must meet at least once in every six months and take necessary policy decisions and issue directives; Establish at least one regional directorate in the most hard hit development regions
Disaster risk management		People and natural systems are at risk from new disasters like landslides, avalanches, GLOFs and drying of water sources as a result of the earthquake	Enhance capacity of DDRC and increase community awareness based past experience; develop early warning systems
		Increased risk of flash floods due to obstruction of river flow causing potential threats downstream	Identify flood prone areas and restrict human settlement
		Drying of water sources caused by earthquake	Follow appropriate cropping patterns, tap other water sources
		Increased risk of landslide due to water recharged in conservation (water harvest) ponds	Mapping of potential landslide/avalanche sites and adopt bioengineering
		Lack of awareness about DRR preparedness	Massive educational program and time to time drill and role play simulation by real life experienced persons (victims); promote community based DRR

NA sector	PDNA sector focal agency	Issues	Recommendation
		Risk of increase in disease, with transfer between people, livestock and wildlife	Undertake disease surveillance and act upon early signs of problems
		DRR not yet analyzed long term environmental perspectives	Mainstream climate change and DRR in sectoral and local planning processes. Promote linkages between downstream and upstream communities
		Disaster risk reduction measures sometimes rely solely on engineered infrastructure and ignore ecosystem services and processes, transferring the problem elsewhere or creating worse problems rather than reducing risk	Promote ecosystem-based DRR, using ecosystem services (green infrastructure) as much as possible to reduce disaster risk (can be done in combination with hard infrastructure); maintain ecosystems in a healthy state in order to be able to do this (see suggestions on http://green-recovery.org/wordpress/wp-content/uploads/2010/11/Module-9-Content-Paper.pdf)
		Disaster risk reduction is often based on historical climate data and does not take into account the increase in frequency and severity of extreme weather events due to climate change	Consider multiple climate future scenarios and allow for more extreme weather events when planning long-term measures, because of increasing climate variability
Gender, elderly, disabled and children's welfare	MoWCSW	Risk of overharvesting of natural resources used by women if they have no alternatives, e.g. firewood if alternative energy installations are damaged; and increased women's work load	Promote alternative energy (e.g. improved cook stoves, metal stoves, solar power) to relieve pressure on firewood; give high priority to restoring water supplies to reduce women's work and improve health
		Sanitation facilities are inadequate for women, elderly, disabled and children after the earthquake; they are more at risk of gender based violence and attack by wild animals if they have to use the forest	Build accessible latrines and promote their use for these groups; reduce open defecation and consequent contamination of soil and water, and disease risk. Build girl toilets in schools as a high priority.

NA sector	PDNA sector focal agency	Issues	Recommendation
		Rural women will be particularly dependent on natural resources after the earthquake, and their environment and natural resource issues need to be adequately supported during recovery	Take into account women's needs and risks in their collection and use of natural resources (e.g. water, firewood, fodder) when restoring natural resource based systems (e.g. availability of resources; risks of human-wildlife conflict, gender based violence while harvesting resources, etc.)
		Women's capacity for participating in forest management decision making will have been affected by the earthquake	Understand women's challenges including time availability, post-earthquake trauma, in helping to re-establish community forest management; make allowances for women's needs and try to promote their participation in key decision making that will affect their future

EMPLOYMENT AND LIVELIHOODS

Summary

The 25 April and 12 May earthquakes affected the livelihoods of about 2.287 million households, and 5.6 million workers across 31 districts and resulted in the loss of 94 million work days and NPR 17 billion of personal income in FY 2015/16. The agriculture sector appears to be most severely affected; it is estimated that 49.9 per cent of all work days lost occurred in agriculture, followed by Tourism and Commerce & Industry with 31.1 per cent and 20 per cent respectively. Although the personal income loss is equivalent to only 2 per cent of the total disaster effect, it is important to highlight that annual labour earnings in Nepal are extremely low. Even a minor income loss has therefore serious implications for poverty in the country.

Despite the heavy losses suffered, the reconstruction and recovery phase is an opportunity for job creation and employment growth. It is estimated that large-scale housing reconstruction may generate up to 352 million workdays over the next five years.

Enabling households and workers to recover their productive and income-generating activities and increasing the resilience of livelihoods to future shocks must be a key component of the reconstruction and recovery process. A comprehensive *Working out of Disaster, Building Resilient Livelihoods Strategy* is proposed, consisting of a package of interrelated downstream and upstream activities to bridge the continuum from immediate income generation to medium- and long-term employment recovery. The estimated budget for the employment and livelihoods recovery needs amounts to NPR 12.5 billion or US\$125 million.

Pre-disaster Context and Baseline

Labour market overview: Prior to the earthquakes, Nepal was confronted with a number of long-term, structural economic and labour market challenges.

¹ Since emerging in 2006 from a ten-year conflict, Nepal has struggled with the difficult transition from war to peace, from autocracy to democracy, and from an exclusionary and centralized state to a more inclusive and federal one. Economic growth has, however, not been high enough to create enough quality jobs for a growing, youthful population.

As a consequence, an increasing number of Nepali are pursuing employment opportunities in the informal economy and abroad. Looking at all sectors, it is estimated that more than 96.2 per cent of workers are informally employed.² An increasing number of Nepali seek employment outside the country. Remittance inflows to Nepal reached US\$5.87 billion during the first eight months of the fiscal year 2013/14, representing 29.1 per cent of GDP.³ Compared to only US\$771 million in 2003, remittance flows have

¹ See Sijapati, B. (2014) *Enhancing Employment-centric Growth in Nepal*. ILO, Kathmandu. Islam, R. (2014) *Nepal: Addressing the Employment Challenge through the Sectoral Pattern of Growth*. ILO, Kathmandu.

² Central Bureau of Statistics (CBS) (2009) *Report on the Nepal Labour Force Survey 2008*. CBS, Kathmandu.

³ Ministry of Finance (MoF) (2014) *Economic Survey*. MoF, Kathmandu.

increased by 661.0 per cent over a ten year period.

Due in part to the rapid growth in remittances inflows, poverty rates in Nepal have declined since the 1990s, despite slow growth and the intervening years of the conflict. Data from the National Living Standards Survey (NLSS) reveals that the poverty rate has fallen from 41.8 per cent in 1995/96 to 30.8 per cent in 2003/04, before dropping to 25.2 per cent in 2010/11. According to the 2008 Labour Force Survey (LFS), the labour force participation rate for men was 87.5 per cent in 2008, while it reached 80.1 per cent for women, far higher than witnessed in other countries in the region.⁴ Although the total work volume carried out by children has declined over the past decade, child labour remains a concern in Nepal: 33.9 per cent of children aged 5-14 were economically active in 2008, compared to 40.9 per cent in 1998/99.⁵ There are considerable differences between urban and rural areas: Outside of Kathmandu valley, workers are more likely to be women due to the out migration of men. Moreover, economically-active individuals in the rural districts hit by the earthquake are more likely to be uneducated: 66 per cent of them have no education compared to 31 per cent in Kathmandu valley.

In light of these significant long-term and structural challenges, job creation and employment have been prioritized by the Government of Nepal as reflected by the last two Three Year Plans (2007- 2010 and 2010-13). In February 2015, the Government of Nepal adopted the National Employment Policy, outlining a comprehensive and coordinated commitment to making employment a key development objective and improving implementation of related activities.

Agricultural: Most Nepali are dependent on agriculture for a living. Although agriculture contributes to around 34.0 per cent of GDP, the majority of workers in agriculture are subsistence farmers and generate a modest personal income. A district-wise breakdown reveals that the population (10 years and above) engaged in agriculture varies from 5% in Kathmandu to 61% in Solukhumbu. It is estimated that a farmer spends around 182 days per annum on direct agriculture related activities, which includes land preparation, tilling, sowing, weeding, and harvesting.

The agricultural sector is highly dominated by women, largely due to a “feminization of agriculture” as more and more men migrate to urban centres and abroad. According to the 2008 LFS, 84.3 per cent of working women are employed in agriculture, compared to only 62.1 per cent for men. The great majority of working children, 82.1 per cent, are engaged in agricultural activities and predominately support the subsistence farming activities of their households.

Commerce & Industry: Although the majority of the Nepali population continue to depend on agriculture for a living, Nepal’s labour market contributions to the economy have shifted over the past decade and are increasingly driven by the non-agricultural sector. In the period from 2001/02 to 2013/14 the contribution of services to GDP has increased from 45.1 to 52.2 per cent. At the same time the GDP contribution of Industry has declined from 17.1 to 14.4 per cent. As seen in many other low-income countries, Nepal could be argued to be a case of “premature deindustrialization”.

⁴ Nepal’s rate of female labour force participation stands in stark contrast to the figures witnessed in Bangladesh (36.0 per cent in 2010), India (27.2 per cent in 2012), Sri Lanka (32.9 per cent in 2012), and Pakistan (24.4 per cent in 2011). See: ILO (2014) Nepal Labour Market Update. ILO, Kathmandu

⁵ Central Bureau of Statistics (CBS) (2008) National Labour Force Survey. CBS, Kathmandu

According to the Department of Industries (DOI), a limited number of registered small, medium and large enterprises (5,274) provided employment to 458,000 people in 2013. However, only a fifth of all enterprises in Nepal are formally registered and hence the majority of non-farm employment opportunities are generated by informally-operating household based and micro-enterprises. According to the 2011 NLSS, 35.0 per cent of households operate a non-farm enterprise in trade (36 per cent), manufacturing (35 per cent), services (17 per cent) and other type of industries (the remaining 12 per cent). In urban areas non-farm enterprises are primarily engaged in the trade and services such as operating petty shops and tea stalls, while manufacturing, such as producing handicrafts and weaving is dominant in rural areas. The wealth of a household appears to determine the kind of business activities conducted: Households from the poorest consumption quintile have a disproportionately higher share of manufacturing enterprises while those from the richest quintile are primarily engaged in trade and services.

Tourism: Despite a modest contribution of 3.9% to GDP, tourism is increasingly recognised as an important contributor to job creation in Nepal. Reliable data on the total employment generated by the tourist sector remain however scant: whilst the Economic Survey 2013 states that 178,000 jobs are directly created by tourism; the World Travel & Tourism Council (WTTC) estimates that 504,000 jobs are directly supported by the tourism sector in 2013, along with an additional 608,000 indirect jobs.⁶

Tourist activity in Nepal stimulates employment among a number of formal businesses including international and domestic airlines, hotels, homestays and travel agencies which multiply income generating opportunities in the informal economy through value chains with, e.g. porters, minibus/taxi operators as well as vendors that sell handicrafts and other goods to tourists.

According to the Ministry of Tourism, Culture and Civil Aviation, employment in tourism is marked by a number of gender disparities. About four out of five (80 per cent) workers in tourism are male. Likewise the proportion of male workers is higher than female workers in all types of tourist businesses, except in home stays which employ more women (57 per cent). Stark discrepancies also exist in employment status: the proportion of women was higher among the self-employed (26 per cent) than among employees (19 per cent).

Migration and over-seas employment: An increasing number of Nepali seek employment overseas. Over the past 5 years, the number of persons seeking foreign employment has increased steadily. According to the Department of Foreign Employment (DOFE), in 2013/14, 521,878 Nepali received official approval⁷ to seek employment abroad representing an increase of 177.0 per cent compared to 294,094 in 2009/10. The IOM estimates that a total of 4.06 million Nepali are abroad in 2015.⁸

Records of the DOFE reveal that overseas employment is male dominated; about 95.0 per cent of all

⁶ World Travel and Tourism Council (2014) Travel & Tourism: Economic Impact 2014 Nepal online: <http://www.wttc.org/-/media/files/reports/economic%20impact%20research/country%20reports/nepal2014.pdf> (accessed on 05 June 2015).

⁷ Unless otherwise specified, the data is retrieved from the Department of Foreign Employment (DOFE) and reflects the number of labour permits issued for employment abroad. It does not include migrants working in India, nor does it capture those that have left Nepal through irregular channels.

⁸ IOM estimates based on NPHS 2011

labour permits were granted to men. The actual number of female overseas workers is however likely to be somewhat higher as data from the 2011 NPHC documents a female absentee population of 12.0 per cent. This omission can be partly explained through irregular overseas migration and undocumented border migration to India, which is not captured by the DOFE and accounts for approximately 37.6 per cent of total migration in Nepal.⁹ The increase in labour migration has been accompanied by various problems, including labour exploitation sometimes amounting to forced labour and trafficking. Many Nepalese migrant workers pay high fees to recruitment agencies, taking on loans from families and friends which place them in a state of indebtedness, which in turn can compel them to continue work in abusive, exploitative, and unsafe working environments in order to repay the loans. Many of them face severely exploitative conditions that can additionally include withholding of passports, restriction on movements, and non-payment of wages.

Despite many challenging work conditions, Nepali overseas workers contribute significantly to household incomes in Nepal and continue to fuel their home economy with one of the highest global remittance flows. According to DOFE statistics, a professional Nepali worker in the Gulf Countries earns an average monthly income of US\$ 868 compared to only US\$ 320 at home, however, most migrant workers are unskilled and earn far less. In 2013, Nepal ranked third¹⁰ among the countries receiving the highest proportion of remittance in terms of GDP. During the first eight months of FY 2013/14 remittances amounted to US\$ 5.87 billion representing 29.1 per cent of GDP.

The 2011 Nepal Living Standards Survey (NLSS) however reveals that there is a striking difference between the per capita remittance received by an individual in the poorest and the richest consumption quintile. In per capita terms, the poorest consumption quintile receives one-twelfth of what the richest quintile receives.¹¹

Disaster Effects and Impact

In line with the PDNA Vol B methodology, the disaster effects on Employment and Livelihoods has been estimated based upon sectoral output losses in the productive sectors. A complementary analysis was done by the World Bank that took additional secondary sources into consideration as well as 75, instead of 31 districts. Due to difference in data and scope, the World Bank study derives a higher estimate of lost work days and income (see Annex XX). However, for the purpose of internal consistency within the PDNA, the following analysis is exclusively based upon sectoral output losses in the productive sectors; namely, Agriculture, Commerce, Industry and Tourism.

The earthquakes on 25 April and 12 May 2015 have affected the livelihoods of 2.287 million households and 5.6 million workers of which 51% are women, across 31 provinces. This resulted in the loss of 94 million work days and NPR 17 billion (US\$171 million) of personal income in FY 2015/16 (Table XX).¹²

⁹ Central Bureau of Statistics (2012). National Population and Housing Census 2011. CBS, Kathmandu.

¹⁰ Together with Moldavia and after Tajikistan (52 percent) and Kyrgyz Republic (31 percent). See World Bank (2014) Press release online: <http://www.worldbank.org/en/news/press-release/2014/04/11/remittances-developing-countries-deportations-migrant-workers-wb> (accessed 05 June 2015).

¹¹ NLSS, 2011, p.78

¹² The effect of the disaster on civil servants and public employees such as teachers has not been taken into account,

Analysing geographical coverage, the highest losses are expected to occur in Kathmandu (12 million work days lost, NPR 2,195 million personal income loss), followed by Sindhupalchowk (8.5 million work days lost, NPR 1,540 million personal income loss) and Nuwakot (7.2 million work days lost, 1,311 million personal income loss). The lowest losses are expected to occur in Rasuwa (995,447 work days lost and NPR 179.8 million personal income loss).

Table 2: Employment and Livelihoods Sector: Work days lost and Income lost per District

DISTRICT	LOST WORK DAYS	LOSSES IN PERSONAL INCOME (in millions)	
		NPR	USD
Bhaktapur	3,288,619	594.0	5.9
Dhading	6,466,268	1,167.9	11.7
Dolkha	6,011,318	1,085.7	10.9
Gorkha	6,859,487	1,238.9	12.4
Kathmandu	12,153,573	2,195.1	22.0
Kavrepalanchowk	5,855,575	1,057.6	10.6
Lalitpur	3,399,321	614.0	6.1
Makawanpur	2,410,099	435.3	4.4
Nuwakot	7,260,420	1,311.3	13.1
Okhaldhunga	1,400,633	253.0	2.5
Ramechhap	2,909,959	525.6	5.3
Rasuwa	995,447	179.8	1.8
Sindhuli	2,201,064	397.5	4.0
Sindhupalchowk	8,528,389	1,540.4	15.4
Sub - total (14 districts)	69,740,172	12,596	126.0
Other (17 districts)	25,074,666	4,529	45
Total (31 districts)	94,814,838	17,125.1	171.3

*Notes: 2010 NPR values inflated to 2015 NPR values by multiplying by 1.41, based on the national CPI series.
NPR to USD exchange rate used is NPR 100 per dollar.

Earthquake effect in Agriculture: Agriculture and livestock rearing are the main economic activities in the 31 affected districts. Damage to standing crop and livestock are reported to be modest; however, the risk of livestock mortality and sickness has risen due to inadequate feed and shelter. Additional damages to stored crops (for own consumption and market sale), seeds (for planting), and basic farming tools are reported to be moderate to high. While the use of irrigation is limited, a significant portion of the irrigation infrastructure has been damaged. Labour and other inputs (seeds, tools) may fall critically short for the planting of paddy, maize, millet, and potato, especially in the months of June to September.

It is estimated that approximately 1.46 million agricultural households have been affected by the earthquakes. 46 million work days are expected to be lost resulting in a personal income loss of NPR 4,603 million over the next 12 months. This will in particular affect women who make up 60.0 per cent of the agricultural labour force and account for 28 million work days lost. The comparatively low income loss in this sector, despite the over 40 million work days lost is due to low annual labour earnings in Nepal (NPR 11,200 for poor self-employed to NPR 31,900 for non-poor¹³).

as it is reported that wages continue to be paid. Given the large share of informal employment in Nepal, no further distinction was drawn between temporarily or permanent job losses.

¹³ WB estimates based on NLSS 2010-11

Earthquake effect in Commerce and Industry: Non-farm household based and microenterprises in the industry and commerce sector represent an important segment of Nepal's economy. Most microenterprises in the rural affected areas are informally operating and are agro or forest based, comprising mainly of food processing, artisanal work and handicrafts, and carpentry and metalwork. It is estimated that about 50% of all household based and microenterprises located in the 31 districts have sustained complete or partial damage to premises, machinery, tools and equipment. Out of these, approximately 74,500 home-based work places have been permanently destroyed. An even greater share of household based and microenterprises is likely to be indirectly affected by the earthquake through damaged road networks and reduced electricity supply, resulting in limited access to markets and interruptions in the supply chain (see Industry & Commerce Sector pp. XX-XX).

A large number of workers has left major urban economic centres in the country (Kathmandu is the largest, accounting for one-third of the country's economic activity) to provide relief and recovery support to their families and communities in the villages. Workers who have left for their settlements will experience significant personal income losses.¹⁴ Remaining workers in urban centres will also suffer significant personal income losses due a steep decline in consumer and labour demand in the short term. It is estimated that at least 860,000 workers in commerce and industry, of which approximately 33.9 per cent are women, have been affected by the earthquakes. 7 million work days are expected to be lost in the commerce sector and 10 million in the industry sector, resulting in a personal income loss of NPR 2,667 million and NPR 3,654 million respectively over the next 12 months.

Earthquake effect in Tourism: The destruction of and damage to cultural heritage sites will likely discourage cultural tourism in the short and medium term. Ecotourism and adventure travel have also been affected due to the loss of tourism infrastructure and services in affected mountainous areas. Nepal has two high tourism periods over the year and the earthquakes hit in the middle of the first. The impending rainy season is a low tourism period. The second high tourism period is after the rainy season, between September and November. The tourism industry is expected to recover somewhat for the September-November season and substantially by the next April-June season, although full recovery is expected to take longer.

It is estimated that in the 31 districts, at least 84,000 workers in the tourism sector out of which 52.0 per cent are women, have been affected by the earthquakes. 29 million work days are expected to be lost over the next 24 months, resulting in a personal income loss of NPR 6,200 million. As women tend to occupy less skilled jobs such as housekeeping and waitressing, they are often the first to be laid off, while managerial positions primarily held by men are maintained. It is thus expected that women will account for 15 million lost work days in the tourism sector.

¹⁴ It is not possible to identify temporary workers separately from permanent workers.

Table 3: Employment and Livelihoods Sector: Work days lost and income loss per Sector

SECTOR	LOST WORK DAYS			LOSSES IN PERSONAL INCOME (in millions)	
	Total	Women	Men	NPR	USD
Agriculture	46,431,436	28,137,450	18,293,986	4,603.3	46.0
Commerce	7,898,324	2,796,371.97	5,101,952	2,667.1	26.7
Industry	10,822,634	4,270,250.29	6,552,384	3,654.5	36.5
Tourism	29,662,443	15,424,470.46	14,237,973	6,200.2	62.0
Total	94,814,838	50,628,543	44,186,295	17,125	171

*Notes: 2010 NPR values inflated to 2015 NPR values by multiplying by 1.41, based on the national CPI series.
NPR to USD exchange rate used is NPR 100 per dollar.

Whilst a quantitative analysis of *work days lost* and *personal income loss* provides important information on the disaster effect on employment and livelihoods, it should be noted that income levels in Nepal are extremely low and that many Nepali, especially in the rural areas, do not regularly participate in the cash economy. A cautious interpretation of the above numbers is, therefore, needed as many poor households did not have a high income prior to the earthquake and even small income losses may translate into a significant increase in poverty (see the **Human Development Impact Sector pp. XX-XX**).

Conducting an analysis on the impact of a disaster on the well-being of households and workers in contexts where economic activity is primarily undertaken through the informal sector, subsistence farming, and unpaid family work is a challenging task, and in this regard, this PDNA provides an indicative, rather than exact quantification of the impact of the earthquakes on 25 April and 12 May. The following analysis of the disaster's impact on employment and livelihoods, therefore, outlines the *anticipated* impact in the short term (FY 2015/16), medium term (FY2016/17 – 2017/18), and long-term (FY2018/19 – 2019/20). The actual impact of the disaster will vary according to the pace and effectiveness of the reconstruction and recovery process.

Short-term impact (FY 2015/16) It is unlikely that small agricultural holder households and home-based enterprises, notably in rural areas, will be able to reconstruct and fully repair their dwellings and places of work before the onset of the monsoon. The subsequent coping strategies of households will depend on their location and sector of work.

For households dependent on agriculture, the loss of income and livelihoods is likely to result in the distress sale of assets along with the own consumption of livestock. This will in particular affect women who tend to own and control smaller livestock, particularly goats, pigs and chickens, which are most likely to be sold first. As noted in the Agriculture & Livestock **Sector (pp.XX-XX)**, the damage to stored grains, seeds and tools would hinder the resumption of agricultural activity, resulting in the failure to plant the monsoon crops. Some rural households will therefore be unable to sustain their subsistence existence in the short term and instead need to purchase products they would otherwise have produced themselves. A surge in child labour may occur, as younger household members might be forced to interrupt their education and take up income generating activities to support their families. The risk of increased Child Labour is especially high in districts where a large number of schools and class rooms have been destroyed, such as Dhading, Dolakha, Gorkha, Kathmandu, Kavre, Nuwakot and Sindhupalchok **(See Education Sector pp. XX – XX)**.

Due to the destruction of dwellings, household and micro enterprises are facing prolonged business interruptions until workplaces are repaired and equipment, tools and machinery replenished. In

comparison, the number of affected-workers in larger enterprises is expected to be smaller, though many of them are absent from their jobs having returned to rural districts. Qualitative observations suggest that large enterprises are making an effort to keep their workers on the pay roll, whilst small to medium sized enterprises are more likely to have stopped paying wages.

In the aftermath of the earthquake, the inflow of tourists is expected to remain low for many months to come, which will have a prolonged impact on enterprises and workers dependent on this once- rapidly growing sector. The impending monsoon period is normally the low season for tourist arrivals; therefore, the impact on workers in this sector will depend on whether tourists return for the main season between October and November 2015. Projections made in this report (see Tourism Sector pp. XX- XX), however, suggest that a deficit in arrivals and spending is likely to continue over 2016-17.

Overall, unless support measures outlined in this report are provided, households will have to seek alternative sources of income, which is likely to precipitate greater internal and external migration in the coming months. As migration is primarily a male phenomenon in Nepal, women will typically stay at home to attend to child care and household duties. The overall workload for women in extended economic activities is therefore expected to increase significantly.

The immediate response of households to the earthquake resulted in many people leaving their residence to return to their villages to assist with relief efforts. Based on NCELL data, figures provided by flowminder.org and World Pop indicate that approximately 340,000 persons left their homes in the Kathmandu Valley (Kathmandu, Bhaktapur and Lalitpur districts) after the 25 April earthquake and had temporarily relocated to other districts as of 27 May 2015.¹⁵

The short-term impact on overseas migration is constrained by the lack of precise figures on the number persons leaving Nepal for foreign employment after the earthquake. However, some sources estimate that the number in May 2015 has been reduced by 20-25% and is likely to stay at this level for 1-2 months before it gradually increases.¹⁶ How the migration flows from Nepal will develop over the next few month depends on several factors including: (a) how quickly District Administration Offices respond to passport applications, including the extent to which ID and other personal documents have been destroyed/lost; (b) access to resources to finance migration; and (c) the availability of local employment opportunities and wage developments that can offer an alternative to employment abroad. Cross-border migration to India might increase further as it does not require a long preparatory process or high costs associated with recruitment and travel. Typically, migration outflows from Nepal are relatively low in the months before Dashain (the national festival in late September/early October) and picks up after that. It is likely that this pattern will be seen also this year. In general, remittances are expected to be higher in the short term as Nepalese migrant workers are likely to send higher amounts of remittances back home. Remittances to the 31 affected districts are expected to amount to NPR 3.718 billion in 2015.

¹⁵ Flowminder (2015) Nepal Population Estimates as of 27th May 2015 online: https://data.hdx.rwlab.org/dataset/population-movements-after-the-nepal-earthquake-v-2-up-to-27-may-2015/resource_download/3a626e22-c94c-42f8-b207-612f41ae8b36 (Accessed 05 June 2015).

¹⁶ According to interviews with Mr. Kamal Tamang, National Association of Foreign Employment Agencies.

According to a rapid assessment conducted by the Centre for the Study of Labour and Mobility in four severely-affected sites (Kathmandu valley, Dhading, Kavrepalanchowk, and Sindhupalchowk), a large number of external migrants did try to return but were unable to due to the following factors: i) not receiving permission from the employer; ii) not having the money to buy a ticket at the time; and iii) being told by families not to return since the migrant's earnings had become more important in the post-disaster situation. The assessment also revealed that, in the short run, there is a preference for migrating within the country rather than abroad. However, in the long run, foreign employment is likely to increase.

Increased migration later in the year implies that a downward pressure on wages in the local labour market is unlikely to occur. Nonetheless, there may be increase pressure on households to send previously inactive members out to work, including children and the elderly. Special consideration should be given to women who may struggle to access employment opportunities, as they are likely to dedicate more time to childcare and other caring responsibilities while social infrastructure such as health centres and schools remain destroyed and/or damaged.

The construction sector, though initially disrupted, will experience a surge in demand for workers to carry out the demolition, clearing, site preparation and reconstruction of destroyed and damaged buildings and other physical infrastructure. The main challenge will be meeting the demand for skilled workers in construction, which represent some 40% of the needed workforce (see Community Infrastructure Sector pp. XX – XX and Housing Sector pp. XX-XX). The industry relies heavily on Indian sources for skilled construction workers, and their availability is far less certain. The housing component alone may need 17,500 masons who are often part-time workers, or migrating between Nepal, India and the Middle East. This sector of the labour market will have to be augmented by a rapid input of skills training. The increased demand for construction workers, especially skilled ones, will create new employment opportunities, while pushing up wages in such occupations as masonry. Finally, in the short- term it is also possible that hunger, sickness, despair and distress may play a toll on affected people's lives and abilities to work and cope.

Medium-term impact (FY2016/17 – 2017/18) Over the medium term, employment and livelihoods will continue to be impacted by the destruction of buildings and infrastructure, while migration will remain one of the key coping mechanisms for households in Nepal.

Agricultural production will continue to be negatively impacted if households are unable to access inputs and reengage in farming activities. Similarly, micro-enterprises will require a restoration of workplaces and access to inputs in order return to and maintain their economic activities. Even if economic activity is restored, there is likely to be a negative impact on productivity, unless households are able to access productive inputs and benefit from improved infrastructure and other facilities. Tourist arrivals will remain subdued over the medium term if restoration of cultural sites, trekking routes and other relevant infrastructure is slow paced.

Housing reconstruction is likely to generate 322 million workdays¹⁷ of employment over the next five years (see Housing Sector pp. XX). Most of this will occur in rural areas, reconstructing mud/stone structures, and utilizing significant amounts of salvaged materials. Assuming that the majority of reconstruction will

¹⁷ ILO estimate based upon information from the Housing Sector Assessment.

occur in the first three years, it is estimated that the labour demand will peak at 0.54 million workers which is a significant number compared to the current estimates of one million workers already involved in the housing sector.¹⁸ However, as noted elsewhere in the report, a significant quantum of the unskilled work will be undertaken by existing family members currently outside the sector, so this may not be a major problem.

The main concern is the skilled workforce, which constitutes around 46% of the needed workforce. The industry relies heavily on Indian sources for skilled construction workers, and their availability is far less certain. The housing component alone may need 25,000 masons who are often part time workers, or migrating between Nepal, India and the Middle East. This sector of the labour market will definitely have to be augmented by a rapid training. The recommendation of this report therefore includes a significant training element to upgrade the skills of local craftsmen in combination with the introduction of improved earthquake resisting technologies.

Prior to the 25 April and 12 May earthquakes, the number of labour migrants from Nepal had been increasing every year; the number of labour permits issued between 2008/09 and 2013/14 increased by a staggering 137 per cent. Thus, the likely medium-term scenario for the affected districts is that migration will continue to increase, which would result in a corresponding increase in remittances to these districts.

Long-term impacts (FY2018/19 – 2019/20) The long-term impact of the earthquake on employment and livelihoods will depend on both macroeconomic factors, such as the ability for Nepal to grow more robustly and attract investment, and constraints at the micro level, including the pace and extent of the restoration of dwellings and infrastructure. The changes in labour demand, which will eventuate over the short and medium term, may further induce structural changes to the economy and labour market. In this regard, the Nepali economy was already distorted by the significant inflows of remittances, which had resulted in a service-led growth path. At the same time, manufacturing had stagnated and the share of workers in this sector stood at just 6.6 per cent according to the 2008 LFS.

The likely increase in migration of workers and inflows of remittances, along with sustained demand for construction workers following the earthquake, is unlikely to result in a more sustainable path of structural transformation. For this reason, it is critical that suppliers of manufactured goods are supported to take advantage of the increased demand in the construction sector. Otherwise, the reconstruction efforts will contribute to greater imports of such goods, mainly from China and India, and thus, a subdued impact on job creation in manufacturing.

Recovery Needs and Strategy

Enabling households and workers to recover their productive and income-generating activities whilst also increasing their livelihoods' resilience towards future shocks must be a key component of the reconstruction and recovery process. This challenge can only be met through a joint effort of authorities at national and district level, the private sector, including financial service providers, workers' and employers' organizations, civil society organizations and international agencies in order to address immediate, short-term and medium to long-term recovery priorities.

¹⁸ ILO (2013) Updating Research on Informal Sector of the Construction Industry in Nepal. ILO, Kathmandu

Recognizing that recovery paths in the different productive sectors may differ, and that of Kathmandu may be faster than other affected districts, this section attempts to focus mostly on ensuring a strong employment and livelihoods recovery for the largest number of poor people, with a focus on areas where the immediate earthquake effects have been largest on income and earnings – agriculture and micro enterprises. In addition to the recommendations and activities proposed below, the Social Protection Sector (see pp. XX-XX) provides complementary recovery needs.

In order to guide prospective interventions, a comprehensive, **“Working out of Disaster, Building Resilient Livelihoods” Strategy** is proposed. The strategy consists of a package of interrelated downstream and upstream activities to bridge the continuum from immediate income generation activities to medium- and long-term employment recovery. It requires a comprehensive institutional framework, which builds on existing policies and programs, including the National Employment Policy in March 2015, and instills decent work values.

Three key considerations around gender appropriate strategies were also made: firstly, that the informal sector and all types of work need to be counted; secondly, a recognition of micro enterprises where many women are engaged; and thirdly, recognition of women’s contribution as migrants and remittance providers in the country’s path to recovery (while seeking to improve protection against their trafficking and exploitation as migrant workers).

Recommendations and Priorities for Recovery

It will be critical that the policy environment for recovery be supportive for opportunities for affected people to rebuild their livelihoods. As such several policies and mechanism related to construction employment opportunities, skills development, overseas employment, and financial support to microenterprises and small farmers will be key to the success of the activities proposed. In addition, there will also be a need for people in Kathmandu or those moving back and building in Kathmandu to be incentivized to build according to the building codes. The below policy recommendations are suggestions that will allow and support building back of people’s livelihoods in all the affected districts.

Relief, Reconstruction and Recovery

- *Mainstream* labour intensive and climate resilient reconstruction in earthquake affected areas.
- *Restore* access to markets to revive supply chains and to stabilise the local economy.
- *Establish* employment/skills services coordination mechanism/arrangements.
- *Integrate* concerns, issues and responses to address child labour, particularly its worst forms, with special consideration of vulnerabilities of the children and youth, drawing on guidance provided in the Child Protection Minimum Standard 19: Economic Recovery and Child Protection, and gender considerations.
- *Monitor* delivery of relief goods during the monsoon season and ensure that the provision of humanitarian aid does not distort local markets.
- *Procure* goods and services locally, whenever possible during relief and reconstruction process.

Remittance flows and Nepali Diaspora

- *Extend* the waiver of remittance transfer fees in the affected districts
- *Implement* the Working Procedure for Domestic Workers - 2015 approved by the Cabinet as part of the promotion of safe and legal mechanisms for domestic work for women migrants.
- *Engage* Nepali diaspora and facilitate their investment (e.g. bonds) in the recovery

Poor and vulnerable households

- *Improve* access to homes and workplaces for the poor, particularly in urban areas, to promote sustainable livelihoods.
- *Provide* soft loans/zero collateral loans to enable micro entrepreneurs and small holder households to replenish their assets and to re-start their livelihoods.
- *Target* workers engaged in the informal economy to ensure that the most vulnerable households receive livelihoods support.
- *Promote* partnerships with community level organizations.

Gender and inequalities

- *Target* female workers in agriculture and ensure access to extension services and farm inputs.
- *Reduce* the feminization of agriculture by providing skills development for women in entrepreneurship and masonry skills.
- *Ensure* the participation and benefit of women and Dalit communities in labour intensive and cash for work programmes.
- *Provide* access to soft-credit or non-collateral loans for women whose homestays are less likely to be insured and have limited resources base for reconstructing their hotels.

Specific Recovery Needs/Activities

1. Short-term (FY2015/16): Providing income opportunities and attending immediate livelihood recovery needs The short-term phase (FY2015) aims to attend immediate needs of people and institutions in disaster-affected areas. The main focus in this phase is to help people to restore their livelihoods. It will mainly target individuals and micro, small and medium size enterprises. The below is a list of suggested activities:

a. Creating emergency employment opportunities through labour-intensive infrastructure and rehabilitation activities in disaster-affected areas/cash for work Labour-intensive infrastructure rehabilitation not only provides income for people engaged in the rehabilitation work but also provide an access to social service facilities. Debris and landslide clearance activities will accelerate following recovery and reconstruction activities as well as economic activities by re-establishing strategic roads. Under the labour intensive infrastructure activities, workers will be provided with short-term, OJT training on basic skills required for rehabilitation and construction work. There will also be need to recognise that some people, will not be in a situation to avail such services, due to family situation such as having young children to care for or being a female-headed household with an absent spouse.

b. Providing rapid skills development training for the rehabilitation and construction of housing and other infrastructure Construction of housing is one of the most urgent issues. The lack of skilled workers poses a major risk in delaying the process. Most of the work will be carried out by householders themselves who have not involved in construction before Short-term, intensive skills development training on constructing housing will be therefore provided to for householders who are expected to engage in building their houses, as well as jobseekers who wish to enter the housing construction sector. In addition coordination of the skills provision across skills providers, skills types and trainees will be critical to ensure opportunities are maximized. Furthermore skills related to entrepreneurship as well as safe migration will also be needed.

c. Establishing employment services Demands and supplies in the post-earthquake labour market are rapidly changing. In this context, functional employment services are indispensable in order to match jobseekers and potential employers, especially in the context of reconstruction efforts. The centres can also match potential workers with training. Special attention will be given to returning migrant workers

(e.g. through matching job seekers with labour needed for public works for infrastructure recovery). These centres will need to be institutionalized at the District level in the form of Employment information and facilitation centres. Crucial to this will be recognizing and working with both men and women, as well as opportunities which are appropriate to their needs.

d. Supporting the recovery of micro and small enterprises Enterprise development training will be provided to help disaster-affected micro and small businesses survive and even prosper in what is currently a very difficult business environment. Specific attention should be given to informal micro entrepreneurs, preparing for a gradual transition into the formal economy. Stimulating entrepreneurship will include improving access to microfinance by working with microfinance institutions and facilitating partnerships with national banks.

e. Preventing child labour Mainstreaming of child labour issues and concerns in programme activities is critical, with a focus on: community-based mechanisms to ensure no child labour is involved; integration in training and monitoring/evaluation; mechanism for referring children identified in child labour or vulnerability for rehabilitation; and awareness raising of families and concerned functionaries, including officials of the districts, municipalities and VDCs, and teachers.

2. Mid-term (FY2016/17 – 2017/18): Promoting employment recovery through building capacities of people and institutions

The post-earthquake labour market is expected to evolve dramatically because of emerging needs for reconstruction activities in various sectors. In order for a recovery process to provide sustainable job opportunities for disaster-affected people, preparing them with usable skills is crucial. Enterprise development and support for SMEs and micro enterprises will be another focus to sustain job-rich recovery. The mid-term strategy therefore consists of the following activities:

a. Establishing a labour market information system A labour market information system enables both a more accurate identification of labour supply and demand trends, while providing the basis for a more effective assessment of shocks to the Nepalese labour market in the wake of such disasters.

b. Further strengthening employment service centres The emergency employment centres established during the short-term phase can be further strengthened to continue providing the matching services for jobseekers and employers.

c. Expanding migrant resource centres and skills training for migrants Establishing migrant resource centres at the district level that provides information on safe migration, pre-departure training and financial education to migrant workers and their family members are crucial in ensuring safe and productive migration behaviours. Enhancing the skill level of prospective migrant workers so that they can apply for better paid, higher skilled positions, thereby increasing the remittances to the affected districts is crucial. Focusing on offering women skills outside of the domestic work sector needs to be part of the strategy.

d. Providing skills development training for under-skilled and vulnerable workers During the second phase of the recovery process, jobseekers will be equipped with skills demanded in the evolving labour market. For instance, in the construction sector, DRR (disaster risk reduction) related skills such as retrofitting and building earthquake resilient infrastructure will be most likely on high demand in the coming years. Skills training based on actual demands in the labour market should be offered to low-skilled jobseekers. It is indispensable to ensure that certificates issued at the completion of skills development training are accredited by the national TVET institution. Training-of-trainers programmes should be enhanced. The coordination of these additional skills being provided will need to be a priority further skills are provided.

e. Continue labour-intensive infrastructure and rehabilitation activities in disaster-affected areas. The creation of employment opportunities would need to continue during this period, but likely to be of a smaller scale. Labour intensive reconstruction could gradually expand into Employment intensive investment programmes (EIIP) contributing through community contractors to local development

especially in rural areas in the medium term to long term.

4. **Long-term (FY2018/19 – 2019/20): Sustaining job-rich recovery and promoting resilient livelihoods**

In years 3-5 of the recovery, there will be a need for continuation of the earlier years support to ensure affected people are able to sustain their recovery and livelihoods. This will include ensuring that the longer term systems built up in the earlier years are continued, and the support these systems provide to people in sustaining their employment and livelihoods is continued.

Programme of activities	Resource required (in NPR in millions)					Total (NPR in millions)	Total (USD in millions)
	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20		
All programme activities	5,927	3,216	3,216	33	33	12,548	125.48
Awareness and sensitizing measures to mainstream occupational safety standards and non-discriminatory practices during reconstruction and recovery - 14 districts	2					2	0.02
Skills training programs-focused on disaster resilient skills development for rebuilding (masons, carpenters, contractors), entrepreneurship, financial literacy, including to migrants	2,514					2,514	25.14
Cash for work and labour-based programs focused on rebuilding public and private assets pertaining to livelihoods	3,393					3,393	33.93
Establish employment information/facilitation centres districts (including on migration) - 14 districts	14					14	0.14
Mainstream child labour issues and concerns in all programme activities	3					3	0.03
Skills provision coordination mechanism – 14 districts	1					1	0.01
Establishment of Labour Management Information System		200	200			400	4.00
Employment facilitation services – 31 districts		31	31			62	0.62
Migrant resource centres – 31 districts		31	31			62	0.62
Skills training programs		1,257	1,257			2,514	25.14
Establishment of skills provision coordination mechanism - 31 districts		31	31			62	0.62
Labour based programmes through community contracting		1,697	1,697			3,393	33.93
Labour management information system				1	1	2	0.02
Employment facilitation services-31 districts				31	31	62	0.62
Migrant resource centres – 31 districts				31	31	62	0.62
Skills provision coordination mechanism-31 districts				1	1	2	0.02

Assessment Methodology

In line with the PDNA Vol B guidelines, the analysis of the disaster effects on employment and livelihoods sector is based upon a cross-cutting analysis and takes into consideration the estimated sectoral output losses in other PDNA sectors, in particular the productive sectors (Agriculture, Commerce, Industry, and Tourism). Through comparing the estimated reduction in sectoral GDP in FY2015/16 – 2016/17 with the sectoral GDP contribution in FY 2013/14, the employment and livelihoods effect is calculated and expressed in “work days lost” and “income loss”.

Secondary data sources such as the 2011 National Population and Housing Census (NPHC), the 2010-11 Nepal Living Standards Survey (NLSS) and the 2008 Nepal Labour Force Survey (NLFS) were used to construct the baseline scenario, including a basic employment and earnings profile before the April/May earthquakes. Complementarity qualitative insights, gathered during field visits and consultations with key stakeholders, informed the impact analysis of the earthquakes in the short, medium and long-term. Under the authority and overall guidance of the Ministry of Employment and Labour (MOLE) and the National Planning Commission (NPC), the Employment and Livelihoods Sector Assessment Team was co- led by the World Bank and the International Labour Organization (ILO) with the support of the Asian Development Bank (ADB), International Centre for integrated Mountain Development (ICIMOD), International Organization for Migration (IOM), Swiss Development Cooperation (SDC), United Nations Development Programme (UNDP), and World Food Programme (WFP). Contributions were also made from the Ministry of Federal Affairs and Local Development.

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Appendix

Technical Note: Predicting annual labor earnings and work days lost due to the April/May earthquakes in Nepal

In this note, we discuss the approach used to predict annual total labour earnings lost and annual work days lost in primary job over the twelve-month period after the April/May earthquakes. Both net income from self-employment activities and earnings from wage employment are referred to as labour earnings. We follow a four-step process.

Step 1: Establishing the pre-earthquake labour market picture

We use data from the 2010-11 Nepal Living Standards Survey (NLSS) and the 2011 National Population and Housing Census. These two sources provide individual and household labour market and other socioeconomic data relevant for the exercise. The data are viewed to be credible for arriving at population and representative sample estimates.

To simplify the prediction analysis, the government's classification of Nepal's districts into the five levels of disaster severity was reduced into three levels: (1) affected or declared crisis hit, (2) hit with heavy losses or hit, and (3) slightly affected or not directly affected. We refer to these three levels as severely affected, moderately affected, and slightly affected. We combine slightly affected and not directly affected areas together as we assume that not directly affected areas will also see modest employment and earnings losses in the short term due to adverse changes in product and factor prices and labour quantities across Nepal's economy.

Although classified as severely-affected, we treat Bhaktapur, Kathmandu, and Lalitpur districts as different from other severely affected districts because of their distinct economic structure. We refer to these three districts as Kathmandu valley.

Using the 2010-11 NLSS, we disaggregate economically active individuals age 15+ by our four earthquake affected statuses (Kathmandu valley, other severely affected, moderately affected, and slightly affected) and primary type of employment (self-employed in agriculture, self-employed in non-agriculture, and wage-employed). We do not distinguish between agriculture and non-agriculture in wage employment due to a negligible percentage of workers who are wage-employed in agriculture.

We additionally disaggregate these individuals by whether they belong to poor households, near-poor households, or other non-poor households. Near-poor households are defined as those whose per capita consumption expenditure level lies between the poverty line and twice the poverty line. Other non-poor households are defined as those above twice the poverty line. The disaggregation by baseline consumption welfare allows us to account for variation in labour earnings by household welfare status

(thus, reducing the extent of over- and under-estimation of labour earnings and work days across workers). It also allows us to apply different assumptions on earthquake effects by household welfare status if seen as warranted.

The disaggregations by earthquake affected status, primary type of employment, and household welfare status provide 36 types of workers. For each type of worker, we estimate at baseline the

- (1) number of workers,
- (2) average annual individual total labour earnings, and
- (3) average monthly work days in primary employment.

10% of workers did not report their primary type of employment, and hence earnings data are unavailable for them. Average labour earnings are imputed for these workers by assigning the average labour earnings for workers who reported primary type of employment, disaggregated by earthquake affected and household welfare statuses.

Importantly, all estimated baseline statistics for these 36 types of workers are representative.

Step 2: Understand how the earthquakes affected labour earnings and work days

A reliable picture of the effects of the earthquakes in the weeks following the disaster is difficult to construct due to data limitations in multiple economic sectors. These data limitations can bias estimates of labour earnings and work days lost. However, qualitative information gathered from the field and typically small, non-representative surveys conducted by various agencies engaged in relief and recovery activities allow us to outline various key pathways through which the earthquakes affect labour earnings and work days along three dimensions:

- (1) the scale of the effect on labour earnings and work days in the short term (rated as small, medium, and large),
- (2) the degree of the effect on labour earnings and work days in the short term (rated as low, medium, and high), and
- (3) The recovery over time in labour earnings and work days (rated as strong, moderate, and weak).

Step 3: Converting the qualitative pathways descriptions into numerical assumptions on effects

We make two critical assumptions to predict labour earnings and work days lost: (1) the shares of workers affected and (2) the labour earnings and work days recovery paths over a twelve-month period after the earthquakes. The underlying assumptions are identical for both labour earnings and work days lost. The assumptions are motivated by our pathways descriptions, which are based on written inputs from other relevant PDNA clusters. The assumptions have also been discussed and agreed with the relevant PDNA clusters.

Shares of workers affected: The earthquakes caused extensive destruction and damage to private homes. If productive inputs and assets were stored at home, the loss of these inputs and assets directly affects labour earnings. In addition, regardless of whether the place of work was at home or elsewhere, the loss of a home displaces workers, exposes them to conditions that can impair their work capacity, and diverts workers away from their income-generating activities to relief, recovery, and reconstruction activities for their families, friends, and, where damage and destruction is extensive, their communities.

Thus, we assume that the share of workers affected in each of the four earthquake affected statuses (Kathmandu valley, other severely affected areas, moderately affected areas, and slightly affected areas) is equal to the average share of private homes *fully* damaged in the districts in each respective earthquake affected status, obtained from official sources.¹⁹

Labour earnings and work days recovery paths: We assume that labour earnings recover over time. We construct labour earnings recovery paths over a twelve-month post-earthquake period (specifically with respect to the speed and extent of recovery) that vary across severely affected, moderately affected, and slightly affected areas. Although Kathmandu valley is classified as severely affected, we consider its' economic "bounce-back" potential to be generally similar to that of slightly affected areas. Hence, we set a labour earnings recovery path for Kathmandu which matches the path for slightly affected areas.

We also set a weaker labour earnings recovery path for agriculture than non-agriculture for severely affected (excluding Kathmandu valley) and moderately affected areas. Families in these areas largely depend on agriculture and livestock rearing for labour earnings. While the direct, immediate earthquake effects on agriculture and livestock rearing were limited, present conditions and developments (for example, losses of seed, animal feed, and farming tools; diversion of labour to other pressing consumptive needs; rapidly shortening planting window) raise the spectre of large losses in agricultural output and hence labour earnings.

Work day recovery paths are set as identical to labour earnings recovery paths.

While recovery may not be full in the first twelve-month period, which is reflected in the recovery paths we apply, we do not numerically establish longer recovery paths. This is because available discussions in written contributions from other relevant PDNA clusters as well as other inputs tend to provide a short-term picture of the predicted effects of the earthquakes, claims about longer term predicted effects are hard to make and defend, and longer-term predicted effects will depend on the extent and quality of relief, recovery, rehabilitation, and reconstruction activities (which are not explicitly incorporated into the prediction model).

Step 4: Predicting total labour earnings and work days lost

The last step entails arithmetically applying the numerical assumptions to baseline average labour earnings and work days by worker type.

Specifically, we perform the following calculation:

Annual total labour earnings lost = share of workers affected × the converse of the earnings recovery path over the first year × baseline average monthly total labour earnings, summed over all 36 worker types. And analogously for annual work days lost in primary job using baseline average monthly work days in primary job.

¹⁹ Precise definitions of fully and partially damaged dwellings were not provided. Partially damaged, in definition and application, likely spans a wide range of damage, which weakens its power as a proxy for household loss in employment and earnings.

Adjustments for price inflation, growth in real earnings, and growth in population: Predicted annual total labour earnings lost are adjusted for “wage” inflation since 2010 by using the national CPI series. In the four-year period from 2010 to 2014, there was an increase in consumer prices of 41%. Labour earnings lost are hence scaled by 1.41.

We do not scale annual total labour earnings lost for possible real growth in earnings since 2010/11. One assumption that can be made is that real labour earnings growth corresponds to the country’s GDP growth. Using GDP growth in constant prices over the four-year period 2010/11 to 2013/14, this assumption yields an additional scaling factor of 1.18.

We also do not scale labour earnings and work days lost for population growth since 2010/11. The estimated annual population growth rate is 1.2%. Assuming this annual population growth rate over the four-year period from 2010 to 2014, that this population growth rate applies to the population age 15+, and that the economically active share of the population age 15+ is constant over time yields an additional scaling factor of 1.05.

Predicted losses by district: In order to arrive at predicted losses by district, annual total labour earnings lost and annual work days lost in primary job by earthquake affected status are distributed across districts within a particular earthquake affected status in proportion to relative district population shares.

Predicted losses by tourism versus industry and commerce: The NLSS data do not allow a breakdown of non-agricultural workers into tourism versus industry and commerce. Using the number of workers in *hotels and accommodation* obtained from the 2011 National Population and Housing Census and scaling this number to an estimated half-a-million workers in the tourism industry in 2015 as suggested by the PDNA tourism cluster, we calculate the share of workers in the tourism industry among non-agricultural workers, separately by earthquake affected status. Annual total labour earnings lost and annual work days lost in primary job in non-agriculture are then allocated to tourism in proportion to the worker shares in tourism. Residual annual total labour earnings lost and annual work days lost in primary job in non-agriculture are assigned to industry and commerce.

Table XX. Total annual labor earnings and work days lost, by affected district				
Area	Affected status	Total annual labor earnings lost		Total annual days in primary job lost
		In 2015 NPR	In USD	
Nepal	--	27,545,731,200	275,457,312	148,131,900
<i>Earthquake affected districts</i>				
Bhaktapur	Crisis hit	516,879,600	5,168,800	1,023,900
Kathmandu	Crisis hit	2,288,947,700	22,889,500	4,534,300
Lalitpur	Crisis hit	854,704,900	8,547,000	1,693,100
Kavrepalanchowk	Crisis hit	2,748,252,000	27,482,500	16,490,600
Makawanpur	Crisis hit	3,118,806,000	31,188,100	18,714,000
Okhaldhunga	Crisis hit	957,474,900	9,574,700	5,745,200
Sindhuli	Crisis hit	2,285,811,100	22,858,100	13,715,700
Dhading	Crisis hit +	2,577,596,400	25,776,000	15,466,600
Dolakha	Crisis hit +	1,704,853,700	17,048,500	10,229,800
Gorkha	Crisis hit +	1,716,778,600	17,167,800	10,301,300
Nuwakot	Crisis hit +	1,838,471,400	18,384,700	11,031,500
Ramechhap	Crisis hit +	1,474,473,000	14,744,700	8,847,400
Rasuwa	Crisis hit +	364,981,200	3,649,800	2,190,000
Sindhupalchowk	Crisis hit +	1,716,523,600	17,165,200	10,299,800
Baglung	Hit	225,617,600	2,256,200	1,130,800
Gulmi	Hit	205,321,500	2,053,200	1,029,100
Kaski	Hit	333,615,200	3,336,200	1,672,100

Palpa	Hit	167,934,600	1,679,300	841,700
Parbat	Hit	82,158,700	821,600	411,800
Syangja	Hit	308,419,200	3,084,200	1,545,800
Chitwan	Hit with heavy losses	406,052,000	4,060,500	2,035,100
Khotang	Hit with heavy losses	217,706,400	2,177,100	1,091,100
Lamjung	Hit with heavy losses	144,658,400	1,446,600	725,000
Solukhumbu	Hit with heavy losses	87,894,400	878,900	440,500
Tanahun	Hit with heavy losses	295,592,200	2,955,900	1,481,500
Arghakhanchi	Slightly affected	13,687,600	136,900	82,200
Bhojpur	Slightly affected	15,217,700	152,200	91,400
Dhankuta	Slightly affected	11,177,300	111,800	67,100
Myagdi	Slightly affected	10,633,700	106,300	63,900
Nawalparasi	Slightly affected	30,956,200	309,600	186,000
Sankhuwasabha	Slightly affected	12,409,200	124,100	74,500

Notes: 2010 NPR values inflated to 2015 NPR values by multiplying by 1.41, based on the national CPI series. NPR to USD exchange rate used is NPR 100 per dollar.

Table XX Total annual labor earnings and work days in primary job lost, by agriculture, industry and commerce, and tourism						
Area	Total annual labor earnings lost (2015 NPR)			Total annual work days lost in primary job		
	Agriculture	Industry and commerce	Tourism	Agriculture	Industry and commerce	Tourism
	(1)	(2)	(3)	(4)	(5)	(6)
Slightly affected	371,393,800	8,008,500	526,804,600	3,355,800	31,300	2,056,800
Moderately affected	1,385,031,700	397,299,400	692,639,200	9,274,700	1,140,900	1,989,000
Other svly. affected	10,774,158,000	2,280,850,500	7,449,013,400	88,397,500	8,118,900	26,515,600
Kathmandu valley	78,278,100	1,087,453,600	2,494,800,500	695,600	1,990,100	4,565,600
Total	12,608,861,600	11,163,257,700	3,773,612,000	101,723,600	35,127,000	11,281,200

Notes: 2010 NPR values inflated to 2015 NPR values by multiplying by 1.41, based on the national CPI series. NPR to USD exchange rate used is NPR 100 per dollar.

GENDER EQUALITY AND SOCIAL INCLUSION

Summary

“It is the everyday inequities, and not just in time of a disaster, that create greater risk and reduce the life chances of women and girls”^{iv}

Disasters do not discriminate, they hit the young, the old and the rich and the poor alike. However, their impacts are felt differently by different social groups. Women, senior citizens, Lesbian, Gay, Bisexual, Transgender/Transsexual and Intersexed (LGBTI) people living with disabilities (PLWDs), children, Dalits and other ethnic and caste-based minorities have been disproportionately affected by the earthquake. The social constructs and widespread inequalities, exclusion and discrimination against these social groups have not only shaped who has died from the earthquake, but also their capacity to cope and respond effectively to the disaster. These social groups are overrepresented in the lowest wealth quintiles, and therefore have fewer resources for coping with disaster impacts. Their status in Nepali society will also determine their participation and benefit from the post-disaster recovery interventions and their general resilience to future disasters.

Women, who as over half of the population make the largest disadvantaged population, have been the most negatively affected across the key sectors of housing, agriculture, water and sanitation, and tourism. A high number of female-headed households (FHHs) have lost their homes, and yet only 19.17% of the women own the homes they live in. Limited house and land ownership among women and Dalits compounded by constrained access to economic resources means that these groups risk being marginalised by house reconstruction programmes. Another sector worth noting is agriculture, upon which a large proportion of Nepali women and other disadvantaged groups such as Dalits and Janajatis depend for their livelihoods. Loss of food stocks, potential reduced agricultural productivity and time poverty can set back the communities that depend on the sector and push them further into poverty. A combination of poor living conditions, disruptions in economic activities and loss of incomes can compel families to adopt negative coping strategies such as stress selling of assets, child labour, human trafficking, and early marriage, which would impact girls in particular. Added disruptions in policing, justice systems and loss of family protection also means that vulnerable groups are at heightened risk of violence, abuse and exploitation.

While women and vulnerable groups have been disproportionately impacted by the earthquakes, simply viewing them as victims only exacerbates their vulnerability. They have knowledge, relationships and practical skills that are critical to post-disaster recovery of Nepal. Although their quantifiable contribution in the national accounting framework often remains invisible, women make the largest contribution to the agricultural economy. However, their relative lack of opportunities, ownership, access to resources, combined with the lack of targeted attention the micro level of the recovery programmes, risks contributing to the poorest sectors remaining below the poverty line.

At the same time, equitable post-disaster recovery could help to reduce disadvantaged conditions experienced by women and vulnerable groups and increase their overall resilience. It is crucial that there is no discrimination based on sex, age, sexual orientation, gender, class, ethnicity or ability at any stages of recovery. It is also important to include the voice of different social groups in decision-making processes

that shape recovery activities. In addition, recovery and reconstruction should be reoriented towards vulnerable groups to strengthen the capacities and skills that they are already using to cope with the disaster. Women, as well as men, and vulnerable groups must have access to reconstruction and rehabilitation jobs, public works, investment funds and income-generating programmes to support their long-term economic recovery.

Pre-disaster Context and Baseline

Nepal ranks relatively low on the UNDP Human Development Index; 145th out of 187 countries, which places it within the least developed country index. The percentage of the population living below the poverty line has steadily fallen from 42 in 1996 to 23.8% in 2013.^v Nepal ranks 98 out 187 countries on the gender inequality index.^{vi} There is a significant education gap between women and men. In the 15-49 age group, over 40% of the women have never been to school, compared to 14% for men. Male literacy rate is 75.1% compared to female literacy rate of 57.4%. It is estimated that FHHs make 25.7% of all national households. Due to significant male emigration, women have crossed many 'traditional' boundaries of gender division of labour and socio-cultural norms. The share of women's paid employment in the non-agricultural sector has more than doubled, from just under 19.9% in 2009 to 44.8% in 2011. Children, particularly girls, face significant inequalities with some of the highest rates of child marriage in Asia.^{vii} Children also face the risk of dropping out of school to support household work or work as child labour. Dalits are another disadvantaged social group that has historically been victimised. They continue to be confined to the bottom of the social structure and excluded from national development mainstream due to the caste system. Old people, PLWD, LGBTI and people living with HIV are some of the social groups that face social inequalities and discrimination.

Although there has been some progress, women remain poorly represented in state mechanisms and decision-making processes at all levels (community, Village Development Committees (VDC), district and national). Participation and representation is the lowest amongst Dalit women and women of other ethnic and caste-based minorities. The share of women's representation in the Constituent Assembly (CA), the cabinet and in public life is less than the 33% required by the constitution. Similarly, women have limited access to and control over the household and economic assets. For example, only 19.17% of land, houses or both are registered in the name of a female member of the household.^{viii}

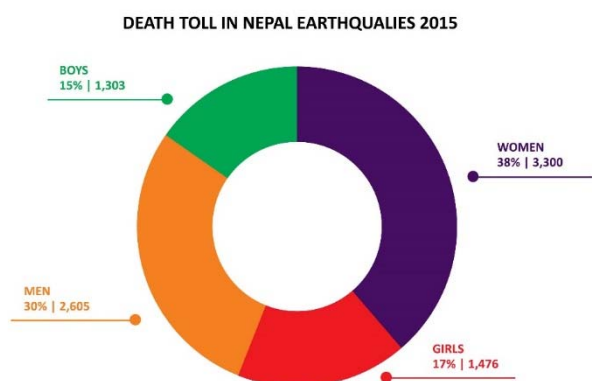
The national mechanism for promoting gender equality and women's empowerment is the Ministry of Women, Children and Social Welfare (MoWCSW). The Ministry is responsible for the formulation, implementation and monitoring of national policies and strategies, as well as providing support to other line ministries on gender mainstreaming in sectoral activities. This structure is reflected at the district level and the VDC at the village level through the MoWSW and Ministry of Federal Affairs and Local Development. Yet, the participation of women and disadvantaged groups remains low (16%) at the VDC council meetings. However, the participation of women in Ward Citizen Forums (WCFs) and Community Awareness Centres (CACs) is as high as 80%.²⁰ These play an important role of facilitating women's

²⁰ It is difficult to ascertain the level of participation and influence that women have in these fora

participation in the integrated planning process. The active engagement of the Nepalese civil society also helps in advocating for achievement of human rights and addressing social inequalities.

The Government of Nepal has been a leading global example in its adoption, institutionalization and practice of gender responsive budgeting (GRB) principles and their application to the Government’s planning and budgeting processes. A GRB Committee (GRBC provides guidance and monitoring support to the government’s budget allocation and expenditure from a gender-responsive perspective based on

set criteria. The GRB classification criteria include: women’s participation in the formulation and implementation of programmes; women’s capacity development; women’s share of the intended programme results; promoting employment and income generation for women; qualitative improvement of women's time use or reduced workload. The Government of Nepal recently took the forward-looking decision to constitute a GRBC in all sectoral ministries and in all District Development Committees (DDC).



Based on the Nepal 2011 national census, the 14 most affected districts include

approximately the following social groups:

Social Group	Population Size (based on % of total population)
Total affected population	5.7 million
Total population of affected women and girls (51.5%)	2.9 million
Total population of affected men and boys	2.8 million
Senior citizens (over 60 years)	0.163 million (women only)
Dalits (16.3%)	0.929 million
Female-headed households (26.6%)	0.123 million
No. of elderly households	0.104 million
No. of children out of school	1.399 million
People living with disabilities	0.322 million
Girls under the age of 14 years	0.794 million
Pregnant and lactating mothers	0.092 million

Disaster Effects and Impact

As of 11 June, the government of Nepal reported that a total of 8,786 people had died from the earthquakes of 25 April and 12 May 2015. Women and girls sustained higher levels of deaths (55%) in

comparison to men (45%)²¹ (see the chart below). The higher mortality levels have been attributed to a number of factors, including male migration to the capital and out of the country. This phenomenon could also explain the higher number of male deaths in Kathmandu, which has a higher male population than that of women. Furthermore, the higher number of female deaths also reflects traditional gender roles, as women and girls are more likely to be inside the house than men. It was also reported that women delayed their escape during the earthquake to rescue their children, older family members and valuables.²² Similarly, it is likely that more men and boys were injured than women and girls, as per the figure below, because they were able to escape deaths with injuries.

Studies across the globe have shown that women and girls tend to be disproportionately affected during emergencies in comparison with men and boys due to the gender roles prescribed to them.^{ix} This has implications on future disaster risk reduction policies. Therefore, disaster earthquake and disaster risk reduction awareness programmes, strategies, activities and messaging must take into account and tailor the approach for women, girls and men and boys.

Social Sector

All social groups have been hugely affected by loss of homes and shelter. For women, however, homes are often places for income generation. They have therefore also home-based economic resources and assets for their livelihoods and well-being. Some social groups may face difficulties in rebuilding their homes due to the fact they have limited resources to respond to the disaster. It is estimated that 123,937 households in the 14 affected districts are female-headed (26% of all affected households). However, it can be anticipated that this figure will increase due to households who have lost their husbands due to the earthquake. Likewise, an increase in single male households can also be expected due to a higher earthquake fatalities rates among women. Among the different marginalised groups, FHHs have sustained the largest damage and loss of approximately \$85.28 billion rupees in the 14 most affected districts (see table below). The Adivasi Janajatis households have suffered damage and loss of NPR 80.56 billion rupees, followed by senior citizens at NPR 75.01 billion, and the Dalits at NRP 53.16 billion rupees (See Annex A Table 1 for details on 14 severely affected districts).

Table X: Damage and loss sustained by different vulnerable social groups:

	Total Damage and Loss (NPR million)	Female HHHs	Senior citizen HHHs	Dalits HHHs	Janajati HHHs
Ownership rate		26%	23%	16%	25%
Total Effect per social group	326,169.00	85,279.21	75,018.87	53,165.55	80,563.74

Within FHHs, households headed by widows, divorced women, separated women and single (unmarried) women are at a greater risk of living in poverty. Furthermore, women living in their homes may not be the

²¹ Based on the data from the Nepal Disaster Risk Reduction Portal: <http://drrportal.gov.np/> as of 11 June 2015

²² Based in inputs from the Nepal Humanitarian Gender Task Force

house owners. Women's land and house ownership only stands at 19.17% due to discriminatory ownership rights. FHHs will therefore need targeted housing reconstruction interventions. Based on ownership patterns observed in the 2011 Census, it can be assumed that damage and losses incurred by women and marginalised groups are very high, especially considering that the housing quality of marginalised groups tends to be poor.

Considering the high levels of FHHs, it is recommended that at least 25%-30% of the house reconstruction and rehabilitation funds should be allocated to them. Care should be taken that this assistance reaches single women, divorced women and widows who are the poorest groups within the FHHs, PLWDs, older people, and ethnic/caste-based minorities. Furthermore, considering that only 19.17% of women own land and houses, access to new homes or home building finance should be made on condition of joint spouse ownership and full ownership to female heads and single women. Recovery should enforce the rights ordained by the Interim Constitution, National Shelter Policy, which requires the state to avail land and housing to people from economically weak sections as well as those residing in unsafe settlements.

The earthquake has had a disastrous effect on education as almost 1.4 million children are out school (699,100 girls and 699,937 boys) in the 14 most affected districts. Toilets in public schools have also been damaged and inadequate access to safe, hygienic and private sanitation facilities can be a source of shame, physical discomfort and insecurity for school going adolescent girls.

There is already a lower enrolment of girls in schools in comparison with boys; this gap may increase because there is an added risk of girls being pulled out of school to help with household work. Another imminent risk to girls in school is child and early marriage, which is still common in Nepal. Okhaldhunga, Dhading, Gorkha and Rasuwa have the highest risk of early marriage for girls as more than 70% marry before the age of 19. Parents could resort to marrying their daughters young as a coping mechanism against the impacts of the disaster on household expenditure. For the family of the groom bringing a new member in family would mean adding working hands, particularly in the rural agricultural contexts.

Reconstruction of segregated and disability friendly school toilets should be prioritised, even where children are in temporary schools, to provide privacy for menstruating girls. Furthermore, sustained monitoring by the MOWCSA for the next 12 months of school attendance rates for boys and girls will be critical to monitor the potential of children dropping out of school to support household work, income generation through child labour and early marriage.

The UN estimates that there are approximately 1,408,189 females of reproductive age in the 14 districts and approximately 138,367 of the female population are or will be pregnant in the next 12 months. Of this figure, 18,600 will need obstetric care in the same period. It is also estimated that 10,327 babies are born every month in the 14 affected districts without access to basic healthcare²³. Damage sustained by local hospitals and health centres has limited women's access to sexual and reproductive health services. It was noted in Nuwakot, for example, that all 27 birthing centres have been destroyed. Urgent rehabilitation of damaged birthing centres is a priority to reduce the risk of obstetric complications for

²³ Based on information provided by UNFPA Nepal

pregnant women. The approaching monsoon rains, compounded by displaced people sleeping outdoors, could promote an increase of vector borne diseases such as malaria, which may affect children and pregnant mothers disproportionately. Additionally, the potential disease outbreaks could add an additional work burden to women who are normally caretakers of the sick.

The impact of the disaster on the mental health of the affected population is not well documented. However, interviews with women and children showed that they are in constant fear of collapsing buildings and of another big earthquake. In Kavre, women reported that they are afraid to let their children out of sight, the main reason being that children are constantly wondering into condemned homes as they don't understand the danger the damaged house presents. In Kavre, women reported that they sleep holding their children fearing separation should another earthquake occur in the middle of the night. There is need for monitoring the mental health of the affected communities who may not be able to access social workers. Efforts should also be made to provide confidential counselling for men, who may not seek psycho-social support due to pride related to a notion of masculinity.

The earthquake has also led to changes in food consumption patterns ahead of the monsoon, which will have implications on the nutritional status of individuals. Protein consumption is reported to have decreased in 10 out of 18 surveyed VDCs in Gorkha, Sindhupalchok, Nuwakot, Dhading, Rasuwa and Dolakha, where people are eating less meat, milk, and eggs due to loss of livestock and market disruption.^x This situation may be worse for Dalit communities, whose food sufficiency level is the lowest among all major caste and ethnic groups. Malnutrition among Dalit children is as high as 33.9%.^{xi} The combination of cultural norms (women and girls eat last in the family) and the impact of the disaster on food security and nutrition could be detrimental to women, particularly pregnant and lactating mothers. Sustained support on food supplements and nutrition for children and pregnant women is essential. Lessons from the impact of Haiyan Typhoon suggests that there is usually spike in child mortality, especially babies, as families divert money from paying for healthcare and food, to restoring their homes and livelihoods. Targeted nutrition programmes for Dalit children, pregnant and lactating mothers and senior citizens are also important. The continuing food distribution programmes should provide for older people who have specific food requirements.

Infrastructure

Destruction of critical infrastructure such as water sources, roads, electricity community buildings can have a profound effect on women's and men's ability to engage in economic activities. They can also impede access to social capital and increase household work burden. Disruption in water supply and electricity has had a disproportionate negative effect on women and girls who are traditionally responsible for 75% of all household water management and for collecting firewood. For example women in Dhading, Lamjung, and Gorkha are spending as much as three hours collecting water²⁴. This has increased the work load of women and girls considerably (see Page X on time poverty). The earthquake has also resulted in an estimated loss of more than 180,000 household toilets.^{xii} The destruction of toilets compounded by lack of water and poor living conditions, which do not offer privacy for women and girls, have had a serious impact on the personal and menstrual hygiene of women and adolescent girls. Collapse

²⁴ Based on data from the PDNA water supply and sanitation field visit report by the Finish Embassy.

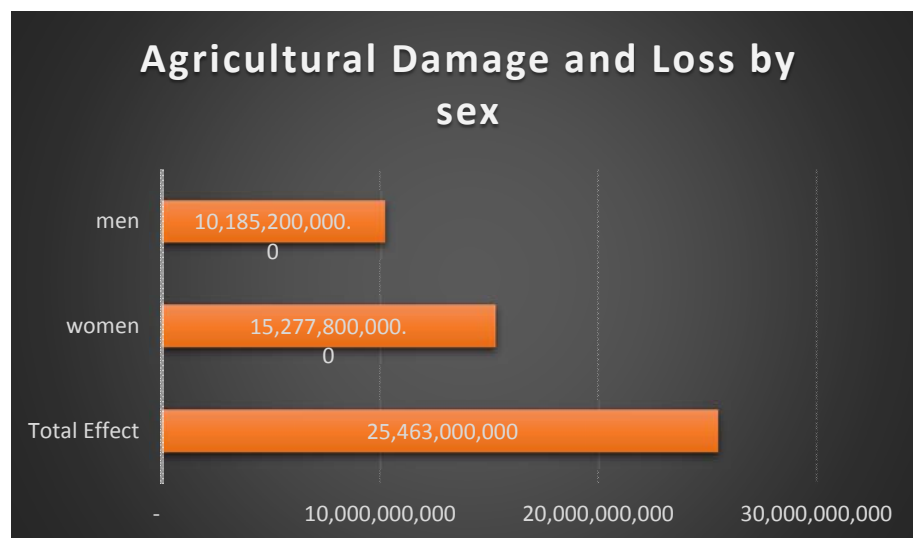
of women cooperative buildings and possibilities of displacement of members to new places may create disruptions to future women development programs.

It is imperative that both men and women should equally participate benefit from reconstruction programmes around infrastructure, such as rehabilitation of rural roads, community building rehabilitation, irrigation systems etc. A percentage of the funds should also be targeted towards disadvantaged Dalit communities and other ethnic minorities. In readiness for the monsoon, water purification awareness programmes targeting women and school children in most water affected areas should be implemented. Furthermore, rehabilitation of water supply is urgently needed before the monsoon season begins to ease the burden of work for women but also as a disease prevention measure. Construction of public and private toilets with proper lighting should be part of the housing programme to alleviate the problems that women and girls are facing regarding privacy.

Productive Sectors

Due to significant male emigration, women have crossed all 'traditional' boundaries of gender division of labour and socio-cultural norms. The impact on the productive sectors has therefore meant that women have also suffered a significant loss, especially in the agricultural sector. Agriculture is highly dominated by women, largely due to feminisation of agriculture as more and more men migrate to cities and beyond. The agricultural labour is comprised of 60% women and 40% men. Moreover, women represent an even larger share in the livestock sector than men. As a consequence, the disaster has had disproportional effect on women (see the table below²⁵). Women have lost approximately NPR 15 billion compared to men who have lost NPR 10 billion. The loss of seed stocks will mean that women will struggle to find good seeds for planting, which could affect the yields. In addition, the combination of loss of home, food stocks and disruptions in essential services will mean that women will face an increased work burden in household and agricultural work. Further, the expected increase in animal diseases due to lack of fodder and adequate shelter, combined with potential distress sale of assets will affect women the most. Women own and control smaller livestock, particularly goats, pigs and chickens, which are most likely to be sold first thereby eroding their resilience. Although women provide most of the labour, their lack of ownership also means that they have no collateral for accessing inputs on credit.

²⁵ The calculation uses women's contribution to the sector as proxy of the damage and loss they have suffered as a result of the earthquake, the table above shows that women suffered 60% of the effect. This figure is probably higher taking into account for women's even higher contribution to livestock sector.



Long-term training of female extension workers is needed to ensure that women, who contribute the most to the sector and are excluded from extension service, are able to access extension services. Currently only 31% of women farmers receive extension in comparison with 69% of men. The number of women professionals in

the agriculture and natural resource management sectors is very low both in the government and private sector, which means there are very few professional women who could help ensure gender-responsive provision of necessary information and services to rural farmer women. With regard to resettlement, land ownership certificates will be issued jointly in the name of both husband and wife, while providing land to Dalits and landless ethnic minorities, to ensure equal access.

Beyond agriculture, manufacturing, commerce, and personal and community services engage the employed population of the country. However, women’s economic activity is traditionally low in non-agriculture sectors. Non-farm household-based and micro-enterprises in the industry and commerce sector represent an important segment of Nepal’s economy. Most micro-enterprises in the rural affected areas are agro or forest-based, comprising mainly of food processing, artisanal work and handicrafts, and carpentry and metalwork. Damage to premises have affected assets that women and men use for the livelihoods, such as looms and tools for metal works. The damage is further compounded by a reduced demand for crafts due to the depressed tourist numbers and disruptions in transport and marketing. Overall, it is expected that men have suffered the most as they are more engaged in this sector. It is estimated that about 50% of all household-based and micro-enterprises located in the 31 districts have sustained complete or partial damage to premises, machinery, tools and equipment, which will affect their ability to engage in economic activities.

Based on the NLSS 2011, more women than men are engaged in the tourism sector. Analysis of the hotel and restaurant survey indicates that 52% of the people employed in this sector are women. However, despite this high number, women tend to occupy the less skilled jobs, such as housekeeping and waitressing. The tourism sector analysis (see Page xxxxxx) shows that tourist numbers are down by 90%, some of the hotels and homestays have been extensively damaged, all of which have an implication on income and job losses. The tourism sector estimates that 200,000 people have lost their jobs. Women, who often occupy less skilled jobs, are often the first to be laid off, while managerial positions held by men are maintained. We can therefore assume that a proportion of this figure is women. According to the Tourism Survey 2014, 57% of homestay owners are women. Women therefore have incurred the largest loss within the homestay accommodation. Men on the other hand have been most affected in the trekking sector and tour operations. The table below shows that women engaged in the accommodation

sub-sector²⁶ have lost approximately US\$36 million. Men on the other hand will bear a higher loss of about US\$143 million.

Type of Establishment	Total Damage (US\$)	% of women self-employed in the sector	Damage and loss incurred by women
Hotels and other accommodation	162,945,250	17%	26,885,966
Homestays	17,200,000	57%	9,804,000
Total	180,145,250	20%	36,689,966

Recovery efforts should focus on facilitating access to soft credits and low interest rates for female owners of hospitality establishments. This is particularly needed for female-owned homestays, who may struggle more than their male counterparts in recovery. Skills development and direct access to external markets is needed for women entrepreneurs to reduce their reliance on local tourist markets and to enhance their resilience against future disasters.

Employment and Livelihoods:

An analysis of the impact on employment and livelihoods indicates that more women than men (50.63 million and 44.19 million work days respectively) lost a high number of work days in commerce, tourism and agriculture, except for industry (see the tourism chapter for more details). This is more pronounced in the agriculture sector which employs more women than men. The high loss of work days also corresponds to a high time poverty being experienced by women. Women's dependence on the sector compounded by limited access to economic resources means that they will struggle the most to recover from the disaster.

Taking into account women's large contribution to the Nepali labour force and the constraints they face in accessing economic resources, efforts should be made to ensure that recovery programmes do not contribute to greater inequalities. Targeted investment in women should be an integral part of the agricultural recovery strategy. This should include the provision of extension services and farm inputs. Skills development for women in entrepreneurship, masonry skills, accompanied by market development will be important in reducing women's dependence on agriculture and build their resilience against future disasters. There should be affirmative action in ensuring the participation of and benefits to women and Dalit communities in cash-for-work programmes, such as building of community infrastructure, rural road rehabilitation etc. At least 40% of the labour force should be women. Soft-credit or non-collateral loans should be made accessible to women and men whose homestays are less likely to be insured and who have limited resources base for reconstructing their hotels.

Given the gender disparities in time use and the unequal distribution of unpaid work between women and men, analysis of disaster impact on time use for women and men is critical. Disasters tend to increase

²⁶ It was not possible to calculate loss on the whole tourism sector due to lack data on male and female ownership in restaurants.

the time allocated to productive, reproductive and community work for women, more than for men. A quick time-use survey in Sindhulpachowk and Kavre indicated that women are allocating an additional four to five hours per day in debris clearance, salvaging of household items buried under the rubble and salvaging home construction materials for reconstructing new home (see Annex C). Women also indicated that they are going to sleep later than normal at around 10:00pm instead of 8:00pm. Men are also allocating similar hours for home rebuilding. Caring for children is also said to have increased due to children being out of school, and it is done concurrently with other chores. Women also indicated that the constant need to check on children, out of concern for their safety, is limiting their mobility beyond their homes. Fetching time of water has increased up to three hours, which has also increased the work load of women considerably than for men. The approaching planting season, compounded by the absence of working males, will also put an additional work burden on women and girls. The table below²⁷ shows the economic quantification of emergency and rehabilitation tasks that women are now engaging in as a result of the earthquake. This is the time women would have used for income generating activities, socialising and resting under normal circumstances.

Table: Time-use change/increase

Type of Task	Time allocated for recovery activities/day	No. of days the activity is likely to continue	Total No. of hours allocated to recovery tasks	Average wage/hr for the task	Total value of missed income per woman	No. of affected households	Total economic impact (NPR)
Salvaging building material	3	60	180	18.7	3,366.00	416,136	1,400,713,776
Fetching water	2	120	240	18.7	4,488.00	83,277	373,747,176
Childcare	7	120	840	18.7	15,708.00	416,136	6,536,664,288
Total	12						8,311,125,240

Protection and Social Inclusion

Although all interviewed district officers recognised the need to give special attention to the needs of women and girls, PLWD, Dalits, older people and excluded ethnic and caste-based minorities, they all indicated that this was not strictly adhered during the distribution of relief items. In essence, community cohesiveness preferred at the expense of the needs of marginalised social groups. Such deliberate oversight on the needs of vulnerable groups during a critical humanitarian phase indicates that the vulnerable groups could also become marginalised during the recovery phase. There is also a potential increase of sexual and gender based violence (SGBV), human trafficking, early marriage and child labour as families strive to cope with the disaster as a result of break down in security. Although there was assessment on these areas, specific needs of some social groups may have been overlooked. One such

²⁷ Although childcare is done concurrently with other household chores, it is calculated separately and wholly because of the intensity of constant oversight over children and because under normal circumstances a nanny or relative would take care of the children.

group is newly widowed males who suddenly may have to take the sole responsibility of parenting, childcare and household hold work. In addition, very little is also know on how people living with HIV/AIDS and LGBTI have been affected and may require further investigation to ensure that their needs are not overlooked during recovery.

Sexual and Gender-based Violence: Nepal has significantly high levels of violence against women and girls. It is estimated that one in five women have been the victims of physical violence and more than one in ten reported experiencing sexual violence.^{xiii} Domestic violence, marital rape, dowry-related violence and trafficking of women and girls for sexual and non-sexual labour exploitation are particular problems. A variety of factors construct and reinforce both the violence and the failure to report it. These include gaps in legislation and weak implementation of laws. Furthermore, women’s lack of autonomy, high economic dependence, men’s perceived entitlement to sex, lack of education and knowledge of sexuality, marriage practices, lack of family and legal support to women and husband’s use of alcohol are all noted to contribute to the risk of violence.^{xiv}

Global studies in other disasters have shown that women and girls are likely to face elevated levels of violence after disasters. Increased stress and feelings of powerlessness due to bereavement, loss of property and loss of livelihood, mental health problems such as post-traumatic stress disorder, the scarcity of basic provisions and other factors leading to hegemonic masculinity crises contribute to higher levels of violence. For example, in Kavre the Women and Children Officer reported one rape and three attempted rape cases within one week in contrast with 26 cases per year or about two cases a month. Furthermore, reports of SGBV received through safe spaces show that there is concern for young girls’ safety after the death of parents and other relatives who would normally look after them. Interviews²⁸ with the affected women in both Kavre and Sindhupalchowk indicated that FHHs are very worried for their safety, because they are now sleeping under unsecured tarpaulins. In addition, poor lighting, lack of segregated toilets and wash facilities in temporary shelters can contribute to an increase in sexual violence against women and girls. Reports from the shelter cluster indicate that overcrowding is one of the challenges facing communities staying in shelters and camps.

Recovery needs

- a) Training to the police and the judiciary on gender sensitivity to treat SGBV cases seriously and mobilisation of community and engagement of men and boys;
- b) Establishment of sexual and gender-based surveillance, monitoring and reporting mechanisms in temporary IDP camps and in the affected communities, and sharing of information to enable stakeholders to take appropriate measures;
- c) Establishment and strengthening of referral systems to support women and girls who are victims of violence;
- d) Provision of information on where women and girls can get support and information on services and focal points and through the strengthening of government and local actors who provide these services;

²⁸ Based on PDNA field assessment done in Kavre, Sindhupalchowk and Nuwkot

- e) Providing confidential counselling sessions for women at risk, where they can talk about domestic violence, sexual, physical and mental abuse and other personal problems;
- f) Medium to long term: review and reform the legal process for reporting and responding to rape and gender-based violence in order to make it more accessible to women and girls.
- g) Training of health care providers on psycho-social support

Human Trafficking of Women and Children: According to International Labour Organisation, 12,000 women and children are trafficked to the Middle East and India every year, mainly for exploitation in brothels or as forced labour and other forms of servitude. Girls aged over 14 to 16 years are more likely to enter sex trafficking through a route of fraudulent marriage. The risk in being trafficked is even more heightened for girls in districts with high levels of child marriage. Some of the severely affected districts, particularly Sindhupalchowk, Nuwakot Dhading, and Kavre are historically known for high rates of trafficking of women and children^{xv} and hence may face elevated levels of human trafficking. There are cases of 64 children being trafficked from Dolakha and Dhading districts, after the earthquakes, and other 11 from between the ages of 10 and 12 from Dolakha to Kathmandu and this seem to be increasing.^{xvi} The move by the government to ban the travel of children under age of 16 without parents or approved guardians could deter human traffickers who authorities fear are targeting vulnerable families. For example, reports indicate that in Dolakha, Sindhupalchowk and Nuwakot traffickers are entering temporary shelters disguised as relief workers.²⁹ Sustained surveillance in the coming 12 -24 months will be needed. The situation could worsen as traffickers target newly orphaned children and vulnerable families.

Child Protection: Children in the most affected districts could be facing an added risk of child trafficking, child labour, early and forced marriage and violence (including SGBV) as a result of the disaster. As already mentioned above, there is a heightened risk of human trafficking for children who have lost their parents. Data is not available in all the 14 districts; however, in Sindhupalchowk, it was reported that 89 children had lost their mothers. Increased child marriage is also a real risk, considering the already high current 41% rate of child marriage by the age of 18; and 1 in 10 girls being married before the age of 15.^{xvii} Dalit women marrying age is below 16 years. There is concern that the underlying vulnerability that girls face in terms of early marriage could be exacerbated as families marry off their daughters at an early age as an economic survival strategy to reduce their economic burden. Similarly, families may force their children to support household income and household work. Of particular concern are girls who may be asked to drop out of school to help with household work (see Page 9 on time poverty). Overall, incidence of child labour is 42%. This is much higher among 10-14 year olds than among 5-9 year olds (61% as opposed to 21%). Females have higher incidence than males. According to the NLSS III, 53% of these children are attending school but not working, 38% are attending school while working, 4% are working only, and the remaining children are idle. Another dimension of the disaster impact is the loss of birth certificates for children and the registration of babies whose parents died before they were registered.

²⁹ Based on information gathered from the gender Equality Bulletin No. 1- Response to the Nepal Earthquake –20 May 2015

In response to the issues discussed above, the government has taken the following measures to strengthen child protection. These include a ban on inter-country adoption for the next three months starting from April 26 2015, no new registrations of new child welfare homes, and a ban on transfer of children from one district to another without approval from the District Child Welfare Board of the government. However, more measures are still needed.

Integrated Recovery needs for Human Trafficking and Child Protection:

Short to medium term

- a) Awareness and sensitisation messages on risks associated with child and early marriage, internal migration, forced migration and human trafficking through the media and mobilisation of parents, teachers, community leaders;
- b) Registration of children who have lost their birth certificates are able to obtain a new one;
- c) Strengthening community-based child protection mechanisms to ensure child protection cases are identified, reported, documented and responded to;
- d) Monitoring through local authorities³⁰ on the situation of boy and girls, including those living with disabilities, school attendance, child marriage, child labour, trafficking and GBV;
- e) Provision capacity building for national, district and VDC-level authorities and police on child protection in emergencies;
- f) Establishment of alert systems, counselling and community safety nets, paying particular attention to the most vulnerable and marginalized groups of children who are at risk of trafficking, violence, abuse and exploitation;
- g) Establishment of child-friendly community awareness programs and reporting mechanisms including “listening posts” and other channels by which communities and children can report concerns, targeting high risk areas and marginalised children at risk of violence, abuse and exploitation;
- h) Provision of livelihood options to reduce the risk of forced migration and human trafficking for women and parents who are desperate to find livelihood alternative opportunities.

Long term

- i) Strengthening the Civil Registration and Vital Statistics System to ensure that it is resilient to future shocks and disasters, ensuring that children are able to easily replace lost birth certificates;
- j) Supporting relevant government agencies³¹ to review and enhance the implementation of the National Master Plan on Child Labour;
- k) Strengthening the National Child Protection System and child protection services through capacity building, inter-institutional networking, and strategic partnerships at the national and sub-national level;
- l) Undertaking a comprehensive review of existing child protection systems and their appropriateness to respond in the context of humanitarian situations to inform the development of strategies for child protection in emergencies;

³⁰ e.g. Women and Children Office, District Child Welfare Board, municipalities, Police, Women and children service centres

³¹ Ministry of Labour; Ministry of Women, Children and Social Welfare, Nepal Police and other justice counter parts.

- m) Establishment of systems of accreditation for social workers and development a common social work curriculum including specific content on child protection and child case management in emergencies;
- n) Enacting the Children's Bill ensuring that it includes, inter alia, legal prohibition of all forms of violence against children and legal provision for the establishment of child protection committees at the village level.

Disability: About 2% (1.94%; 513,321) of the total Nepali population reported to have some kind of disability. Physical disability constitutes 36.3% of the population with disability followed by blindness/low vision (18.5%), deaf/hard to hearing (15.4%), speech problem (11.5%), multiple disability (7.5), mental disability (6%), intellectual disability (2.9%) and deaf-blind (1.8%). Within the 14 most affected communities, it can be deduced that 322,110.78 have physical disability, 163,043 of which are women and girls. However, although there is no data available, it can be assumed that this figure has increased due to injuries sustained in the earthquake.

Disasters make the situation worse for PLWD with regard to access to essential services. Presence of debris as a result of the earthquake will create challenges for people with physical disability to move around, but also in accessing relief items. Access to temporary shelters, toilets, etc., could be another challenge which needs to be addressed in the design of community shelters. Furthermore, there will be a great needs in the next 12 months for physiotherapy services for people who are recovering from their injuries. Effort should be made to reach women with injuries who may not be seek these services or family members may not see the need to support them in seeking medical help.

Many PLWD are taken care of by their household members who are often female. Disasters can lead to loss of caretakers and or additional burden on the caretakers. In addition, women with disabilities often experience multiple discriminations and are more exposed to GBV.

Recovery Needs:

- a) People who have become disabled because of the disaster may find difficult to accept this new reality and may need peer counselling. Connecting them with PLWD for counselling would be essential;
- b) Provision of information on government services available to PLWD, and expedition of disability registration to enable access to government social protection schemes;
- c) Establishment of integrated mobile teams in the most affected areas to ensure that PLWD who have lost their social benefit documents are able to obtain new ones;
- d) Design and reconstruction of homes and shelters need to take into account of the accessibility for people with disabilities;
- e) Relocation of PLWD have to ensure that PLWD are resettled in areas where they can easily access essential services such as schools, health facilities etc.

Senior Citizens: Senior female citizens were identified as the most vulnerable social groups that will struggle the most in coping with the disaster, followed by children. In the aftermath of a disaster, senior citizens face additional challenges in accessing livelihood opportunities. They also have restricted mobility

in accessing post disaster recovery activities. Furthermore, the increased number of orphans will create a new burden for the surviving elderly guardians in providing care for their children.

Recovery Needs:

- a) Ensuring senior citizens, especially women, have access to information, aid (including medical care and emotional support especially with possible loss to social networks and isolation from a familiar environment);
- b) In case of relocation and resettlement, senior citizens should be resettled in areas that have easy access to essential services;
- c) Consultations with the elderly and design/development of housing structures that support mobility of the elderly;
- d) Establishment of integrated mobile teams in the most affected areas to ensure that senior citizens who have lost their social benefit documents are able to obtain new ones;
- e) Provision of social protection support to the elderly who have the additional burden of caring for children who have lost their parents;
- f) Housing rebuilding support for old people who may not be able to take the responsibility or have the manpower support to repair or reconstruct their shelters or houses. Designs of shelter and houses should also take into account the needs of senior citizens.

Caste Designation and Ethnicity: According to the Disadvantaged Group Mapping data, 38% of the VDCs in all earthquake affected districts have 'high' to 'very high' concentration of disadvantaged groups. This is particularly so due to the high prevalence of Adivasi Janajatis ethnic groups and Dalits and those in the bottom income quintiles in the affected districts (See Table 3). Furthermore, 42% of Dalits live under the poverty line, 80% of which are Dalit women^{xviii}. They face multiple forms of discrimination and exclusion, which has affected how they have experienced the disaster but will also affect their ability to recover from the disaster. As a result of the earthquake, Dalits have faced discrimination and exclusion in the rescue and relief efforts as the services are reachable to the headquarters. Dalits on the other hand live in a different settlements away from the dominant habitants. Their social status means that Dalits are some of the worse affected social groups.

Recovery Needs:

- a) It is important to consider the issues and concerns of 'minorities within minorities' across all sectors being considered in the recovery framework. Recovery efforts should consider the multi-dimensionality of discrimination and exclusion of the Dalits and ethnic minorities;
- b) To avoid urban bias in post disaster recovery efforts, recovery funds should be earmarked to support Dalits and other minority groups;
- c) Targeting of livelihood restoration programmes such as cash for work as well reconstruction programmes at the Dalits, particularly Dalit women;
- d) Promoting the participation of Dalits in the design, implementing and monitoring of recovery programmes and activities.

Governance

Gender inequality and other social inequalities are a governance failure. Limited participation of women in politics and insignificant numbers of women in the professional and civil service categories compared to men reflects the exclusion of women from decision-making and control over resources. The share of women's representation in CA is 29.41% and as of January 2015, and Nepal only has 16.8% of women in the civil service overall. Participation and representation of women is the lowest amongst Dalit and indigenous women. Low representation of women in decision-making processes has an implication on women's ability to influence how and where the reconstruction and rehabilitation resources are allocated and utilised. Furthermore, women's limited voice also means that women may not be able to benefit equally from the resources made available for post-disaster recovery. Various women development groups, committees, women-led cooperatives and watch groups are operate at local level. Women's cooperatives and mothers' groups are important means for income generation, social awareness and collective action especially and safety nets for women. It also acts a platform for women to influence community decision making process.

Access to courts and functioning of family protection units have been compromised by the earthquake. District courts are prioritising serious crimes, which means cases of SGBV would not be a priority. All of the above could impact women's access to justice, especially if they have to travel away from home. Another areas of concern are the loss of citizen identity cards, particularly for women and men under social protection, such as people with disabilities and senior citizens.

Institutional participation/representation of discriminated social groups through DDRC in all recovery programme is essential to ensure they benefit equally from the recovery programmes but also to ensure that the programme do not further marginalise them. Furthermore, measures to support and promote attainment of ownership rights and tenure rights are essential to ensure that post-disaster recovery programmes do not re-enforce the inequalities faced by women and vulnerable social groups. Similarly, mechanism to support certification and registration of women, which could facilitate ownership of land and homes and women and children who have lost their spouses and their parents respectively should be in place. Monitoring mechanism to ensure issues measures mentioned above are addressed should also be established.

Recovery Needs and Strategy

Mains Activities	Budget Requirement (NPR)
1. Integrated protection and support of women and girls, children, PLWD, Disability and Senior Citizens and issues around human trafficking	121,400,000
2. Support to Sexual and Gender Based Violence	93,100,000
3. Support for Child protection	45,750,000
4. Support for people living with disabilities	87,000,000
5. Support to senior citizens	30,000,000
6. Documentation and registration of vulnerable groups	58,000,000
7. Governance and accountability	164,260,000
8. Construction and Rehabilitation	486,000,000
Total	1,085,510,000

National plans, policies, institutions and budgets reflect how governments translate commitments to gender equality into results for women. The post-disaster recovery presents an opportunity to start redressing inequalities and at the very least not perpetuate unequal access to power and resources through the allocation of recovery financial and human resources. It is recommended, therefore, that budget allocation under the government's institutionalized gender responsive budgeting framework should be increased in addition to the specific recovery needs identified in this sector. Post-disaster recovery strategies and resources must strive to safeguard, restore, and promote economic engagement of disadvantaged groups, such as women and caste-based groups. These efforts must also seek to redress inequalities and at the very least not perpetuate unequal access to power and resources. Women's economic recovery under the post-disaster recovery programmes must therefore be protected and accorded the same status and importance as that of men.

Implementation Arrangements

The implementation of the above strategy will be led by the MOWCSA, however, for effective implementation, collaboration with the Ministry of Labour and Employment (MOLE) is key for child labour awareness, prevention and monitoring; MOLE for public works and cash for work programmes; Ministry of Education for school drop-out rates and child marriage; work with the police district departments in monitoring human trafficking of young women and children; the Ministry of Federal Affairs and Local development in identifying and supporting vulnerable households through social protection.

With regarding to addressing gender equality and social inclusion issues social, productive and infrastructure sectors, the MOWCSA will collaborate with the relevant ministries to provide technical support in addressing these issues. For effective delivery of the recovery programmes, collaboration with the Ministry of Finance, the National Planning Commission, development partners, and international and local civil society organisations will be key.

Assessment Methodology

Most of the data provided was gathered from other sector reports presented in this report. Furthermore impact data was also gathered humanitarian needs assessment done by the Nepal Humanitarian Clusters. A desk review was also conducted to collect baseline data related to the sectors to enable to analyse what has changed after the disaster. The Gender and Social Inclusion team also undertook a field assessment in Nuwako, Kavre, Sindhulpachowk and in Kathmandu to verify information gathered around child protection, SGBV, human trafficking and how other social groups such as people with disability, ethnic minorities were affected.

Annexes

Annex A: Calculation on Damage and Loss for Different social groups

Table X: Damages and Losses Sustained by Female Headed and Elderly Headed Households

	District	Female-Headed HH (%)	Elderly HHH (%)	Damages (NPR Million)			Losses (NPR Million)		
				Total	FHHH	Elderly HHH	Total	FHHH	Elderly HHH
1	Sindhupalchok	24.0	24.4	33,233	7,992	8,109	2,840	683	693
2	Kathmandu	27.8	12.2	45,744	12,715	5,581	5,401	1,501	659
3	Nuwakot	21.3	24.9	30,158	6,423	7,509	2,500	532	623
4	Dhading	27.8	23.9	21,686	6,034	5,183	1,788	497	427
5	Rasuwa	22.5	20.6	3,370	758	694	280	63	58
6	Gorkha	37.2	26.7	29,698	11,049	7,929	2,302	857	615
7	Bhaktapur	22.2	16.8	13,814	3,065	2,321	1,478	328	248
8	Kavrepalanchok	21.3	24.0	25,176	5,355	6,042	2,067	440	496
9	Lalitpur	23.9	17.0	12,634	3,023	2,148	1,418	339	241
10	Dolakha	34.4	26.3	25,001	8,601	6,575	2,217	763	583
11	Ramechhap	28.1	29.1	12,737	3,575	3,706	1,034	290	301
12	Makwanpur	22.6	17.5	9,004	2,030	1,576	665	150	116
13	Okhaldhunga	28.4	26.4	4,647	1,319	1,227	380	108	100
14	Sindhuli	24.6	19.5	9,136	2,245	1,781	731	180	143

Annex B: Calculation for time use

Time calculation is based in time use survey, which was collected in Sindhupalchowk and Kavre. It also uses PDNA data collected on water supply and sanitation from Gorkha, Dhading and Lamjung by the Embassy of Finland. The time use calculation does not look at time-use changes, but rather it focuses on new activities being conducted by women as a result of the earthquake. However, it's useful to be cognisant of the fact that women are adding two to three hours per day in addition to their normal working days by resting less and going to bed at 10:00pm instead of 8:00pm.

1. **Rebuilding:** As a result of the earthquake, women are allocating two- five hours in the late afternoon to salvage building materials so that they can reused for constructing new shelters. It should be noted that men are equally allocating the same and sometimes even more hours salvaging building materials.
2. **Water:** For areas where there have been disruptions in water supply, women and girls are spending as much as three hours fetching water. However, this is largely a responsibility of women and girls and men have not been affected by the changes in water supply. The calculation is based on the number of households with no running water provided in the 2011 census data. In reality,

the number of affected households could be much higher as damage was also done to households with running water.

3. **Childcare:** This is another area that's wholly under the responsibility of women. Childcare had increased highly due to damage and destruction of schools where more than 1.3 million children are out of school. The calculation also assumes that each household in the affected districts has a child, who needs childcare. In reality this figure could be less as there might be senior citizen households that do not have small children. Childcare is done concurrently with other tasks as women have to keep a constant eye on small children to prevent them from wondering into damaged buildings. As a result of this constant care, the whole time allocated. Time allocation is based on the number of hours that children are normally supposed to be in school.

Type of Task	Time allocated before the disaster in hours	Time allocated for recovery activities/ day in hours	Time change in hours	Average wage/hr for the task
cooking	1.5	2.5	+1	
Salvaging building material	0	3	+3	18.7
Cleaning and laundry	2	unclear ³²	-	
Agriculture	3	3	-3	
Fetching water	1	2-4	+2	18.7
Childcare	6	15	+7	18.7
Sleeping and resting	10	8	-2	
Total		12		

REFERENCES

³² Varies, some indicated a decrease in laundry because they have less clothes to wear, which they lost under the rubble and others indicated an increase in house cleaning because it get so easily dirty under the taurpalin

SOCIAL PROTECTION

Summary

This summary describes the pre and post-disaster situation on demand, delivery and access to social protection services and lay out a strategy that will improve the post-disaster situation of those needing social protection.

The objective of social protection is to help households manage risks (including vulnerabilities across the different life-cycle stages) and cope with adverse events. Reflecting the constitutional provision of social protection as a right, Nepal's social protection system has broadened in terms of range of schemes. However, the baseline situation of the social protection system inadequately covers a range of risks and vulnerabilities.

Following the earthquake, households have faced negative income and consumption shocks, resulting in a greater need for social protection and insulation from vulnerabilities. Using welfare analysis, it is estimated that the earthquake would cause average household consumption in most affected districts to decline by 20 percent. The conditions of households that were already vulnerable prior to the earthquake are more likely to be exacerbated.

About 23.5 billion is needed to restore consumption of vulnerable groups (households with Person with Disability PWD, single women, children and elderly) in the most affected 14 districts to its pre-earthquake levels. This estimate increases to about Rs. 32.7 billion if vulnerable households in the 31 affected districts are covered. This further increases to Rs. 47.5 billion if all households in in the most affected 14 districts are covered. If all households in the affected 31 districts are covered the estimated welfare loss reaches to Rs. 63 billion.

The recovery strategy seeks to promote the adoption and expansion of social protection where it is absent and or where coverage and levels of benefits are low -in term of social assistance, social insurance and work-related measures. Initiatives that support steps in this direction include

in the short-term: the provision of cash injections through existing cash transfer programmes provide assistances to vulnerable of groups in affected districts and improve social protection service delivery;

in the medium-term: finalizing the draft National Framework for Social Protection (properly costed); further strengthening of administrative systems for efficient roll out of social protection service delivery with particular emphasis on quickly scalable disaster responsiveness, temporary social protection schemes; as well as enactment of the Unified Social Security Act; and

in the long-term: addressing the coverage gaps in the current social protection system and developing an integrated system for all social protection programmes, addressing different kinds of contingencies and risk management following the concept of minimum Social Protection benefits following the ILO Social Protection Floors Recommendation, 2012 (No. 202).

Pre-Disaster Context and Baseline

Nepal is in the process of establishing a comprehensive national social protection system based on social insurance principles and the concept of minimum social protection benefits as listed in Annex 1). The Interim Constitution of 2007 provides for a series of basic rights, such as the right to food sovereignty (Article 16), free education up to secondary level (Article 17), prevent children from economic exploitation and entering into any form of hazardous work (Article 22); the right to employment and social security (Article 18). Important clauses also address: the right to equality (Article 13), the right against untouchability and racial discrimination (Article 14), and the right to information (Article 27). The last two Three Year Plans (2007-10 and 2010-13) laid emphasis on inclusive development. The NPC has drafted a framework which utilises the Social Protection Floor approach in furthering the social protection system in Nepal. The current 13th Plan underscores the need to ensure a minimum social protection floor for all as articulated in the draft framework.

Formal sector social insurance

Social insurance systems currently cover only formal sector workers, such as teachers, civil servants, and the army and police. Any private enterprise with more than 10 employees may join the Employees Provident Fund on a voluntary basis, while all enterprises may join the retirement plan under the Citizen Investment Trust. However, there is no mandatory social insurance provision for the private sector.

In June 2011, the Government established the Social Security Fund (SSF) which has approximately one million declared members both from the public and private sectors. However, the SSF has not yet rolled out any benefit scheme to the members.

The Budget Speech of 2014-15 mentions that “the Unified Social Security Act will be enacted for the effective implementation of social security programme”. In accordance with the ILO Social Security (Minimum Standards) Convention, 1952 (No. 102), the following nine social security schemes are currently under consideration: medical care, sickness benefit, unemployment benefit, old-age benefit, employment injury benefit, family benefit, maternity benefit, invalidity benefit and survivors' benefit. It is currently planned that these nine branches of social security will be implemented in a phased manner, starting with the schemes for unemployment benefits, maternity benefits, medical care, sickness cash benefits, and employment injury benefits through the Social Security Fund.

Employment related social transfer programmes

In terms of its coverage and public expenditure, the labour market-based social protection system is by far the most underdeveloped area in Nepal. Food or cash for work programmes aiming at food security at the local level, through the construction of public infrastructure such as roads, schools or health centres, have been in place for many years. They have the common objective of improving rural infrastructure and generating employment for the poor which are self-targeted. An employment related social transfer programme, the Karnali Employment Programme, was introduced in 2006 as a labour market-based social protection programme. In addition, the Rural Community Infrastructure Works (RCIW) is under implementation from 1990 in food insecure areas of Western and Far Western Regions to provide benefits for poor communities.

Social assistance

The government runs a wide variety of social assistance programmes (see Table 1 in Annex 1). They include the universal old-age pension for all citizens above a certain age, the child protection grant for children under five among disadvantaged castes or living in particularly deprived regions, a disability allowance, education related social transfers such as caste-based stipends, school meals in government schools, cash transfers to the endangered ethnic communities, supports to the families of martyrs and victims of conflicts and a birthing grant to financially subsidize the cost of access to health facilities for women in remote areas.

The current portfolio of social assistance programmes are intended to address vulnerabilities across the lifecycle. However, significant overlaps and coverage gaps persist (World Bank, 2014; Khanal, 2013, Koehler *et al.* 2009). For example, the child grant, which is intended to help improve the nutrition of young children, is presently limited to households in the Karnali area and only Dalits in the rest of the country. In addition, the scheme is limited to two children per household, thus leaving a number of children in poor households with no coverage. The level of benefits provided under different social assistance schemes are small and not indexed to inflation. As a consequence, they have little impact in reducing poverty or other intended outcomes such as food security or improved child nutrition. In short, despite the existence of a wide range of programmes that seemingly address most of the life cycle contingencies, many of these programmes are likely inadequate in fully and efficiently addressing these contingencies.

Baseline profile of households in affected areas

Data from National Living Standard Survey 2010/11 and Population and Housing Census 2011 data was used to sketch a general profile of the households in the affected areas. The NLSS data does not allow district level estimates because the survey is designed to be representative at 14 analytical domains, where each domain includes multiple districts or specific areas of a district (urban areas, for example). For our present purposes, it is sufficient to select the analytical domains that correspond closely to the 14 most affected districts.³³

Labour income

Households in the mountainous districts rely predominantly on agriculture sector. Farm income is approximately 39 percent of total income in Mountains and agriculture is the primary sector of employment of 60 percent of household heads. Farm income constitutes a small proportion of total income in urban hills – 17 percent – and smaller still in Kathmandu valley – 1 percent. Corresponding to the income shares, the share of household heads employed in agriculture is 3 percent in Kathmandu valley and 34 percent in urban hills. The share of non-farm wage income is the highest in Kathmandu valley – 41 percent – and it forms roughly a quarter of total income in the other areas. Household heads are predominantly wage- or self-employed in non-agriculture sector in the urban areas.

³³ The relevant domains are mountain, rural western hills, rural central hills, urban areas of Kathmandu valley, and other urban areas in the hills.

Non-labour income

The primary source of non-labour income is housing rent. On average, almost two fifths of total income of households in Kathmandu valley comes from renting out the house. Housing rent is less important a source of income for households in the Mountain region or other rural areas.

Transfer income/other sources of income

Remittances constitute an important share of total income for households in all regions. From a high of 22 percent in rural Western hills to 10 percent in Kathmandu valley, remittances from internal or external migrants are important lifelines to households in the affected areas. Other sources of income, including returns on investment, private pension, and social insurance and social assistance programmes, form a relatively small share of 2 to 6 percent of total income in these areas.

Vulnerability profile

On average, the share of households with at least one PWD member, single woman, children aged 0-5 and elderly (aged 65 or older) is 8.3 percent, 10 percent, 21 percent and 41 percent respectively. However, there is a lot of variation across districts and across earthquake-affected areas. Table 1 shows the percent share of vulnerable households across earthquake-affected districts. The share of households with children in affected districts is relatively higher than overall average while the share of households with elderly is relatively lower in affected districts. About 60 percent of households have a household member from at least one vulnerable group.

Table 1: Vulnerability profile of households in affected areas				
District Categories	% of households with a disabled member	% of households with a single woman	% of households with children (aged 0-5)	% of households with an elderly (age 65 or above)
Crisis hit +	8.8%	9.0%	33.4%	27.5%
Crisis hit	6.4%	8.4%	35.3%	20.2%
Hit with heavy losses	10.6%	9.4%	37.3%	24.3%
Hit	9.5%	11.6%	35.4%	25.0%
Slightly affected	12.0%	10.9%	38.7%	24.6%
All Districts	8.26%	9.6%	20.7%	40.9%

Source: World Bank calculation based on Housing and Population Census 2011

Notes: a. This includes those who with the following: physical disability, blindness and low vision, deafness, speech problem, mental illness and intellectual disability; b. This includes widows, divorced and separated but excludes never married.

Framework of Analysis

A rapid welfare analysis was conducted by the team to measure the effects and impacts of the earthquake. Consumption is used as the proxy of welfare since the primary aim of social protection is to ensure that

household consumption do not fall below some minimum threshold. Baseline consumption levels is estimated from the Nepal Living Standards Survey (NLSS) 2010/11 and post-earthquake consumption is simulated using reasonable assumptions on the severity of earthquake and the size and direction of shocks on various income sources.

Households face negative income and consumption shocks due to the earthquake for a multiple of reasons. Many households have lost their primary bread winner while others have incurred catastrophic health expenditure in the medical cost of the injured. Household labour has been diverted from productive activities to caring for the injured, clearing the rubble, making alternative arrangement for shelter, and rebuilding the damaged houses. Along with their dwelling, many agricultural households have lost seeds, fertilizers, cattle, draft animal, and agricultural equipment, inputs that they rely on. Households with enterprise have lost places of business and physical assets. Homeowners who rented out part of the dwelling and whose house was damaged stand to lose the rent income, an issue particularly relevant in urban areas. In the aftermath of the earthquake, there has been a large outflow of migrants from Kathmandu and other urban areas. This includes those who have returned temporarily to help in relief and rebuilding and those who are considering never to return to areas of seismic risk. The time of migrants away from their economic activity have caused earnings loss.

To model the impact of the earthquake on household welfare, three sources of income are identified: labour, non-labour, and transfer income. Labour income constitutes income from agriculture sector, wage employment in non-agricultural sector, and income from enterprises. The largest share of non-labour income is rent from dwelling. Finally, private remittances from household members residing inside or outside the country dominate transfer income. Table 1 outlines our framework to analyze the effects and impact of earthquake on income and, consequently, consumption. The magnitude of income loss depends on the intensity of the earthquake in the district, source of labour income, if a household rents out part of the dwelling, and if it receives remittance from household members residing inside and outside the country.

Table 2: Framework for Analysis for Welfare Shock

Consumption			
↑			
Income			
↑			
Intensity of earthquake			
↑			
Labor income	Non labor income	Transfer income	
		Private	Public
Agriculture	Rents	Internal remittance	Social insurance
Salary/wage	Interests	External remittance	Social assistance
Own economic enterprise	Pensions		

Disaster Effects and Impact

In the model used to assess, it was assumed that the impact of the earthquake is more severe on agriculture sector. The earthquake occurred just before the main planting season. At a time when farmers

should have been busy making preparations for transplanting paddy, they lost household labour due to the death of family members, found themselves injured or caring for the injured, busy clearing the rubble. The loss of agricultural inputs may cause severe decline in agricultural productivity in the coming season. Some households have been displaced from their area of residence because the settlements have been deemed unsafe due to continuing risk of landslide. Such households have lost access to their plots of land for cultivation. To the extent that, households derive a significant share of total calorie from home-produced food, poor harvest will cause severe food deprivation. Net food buying households will suffer further due to a loss in their purchasing power.

In contrast, households that rely predominantly on non-agricultural sectors are likely to experience smaller shortfalls and a relatively faster recovery profile. The disruption to the income stream of salaried individuals employed in formal sector is likely relatively minor. Once the economy picks speed and the commerce resumes, wage employed individuals, especially in sectors like construction and tourism, are likely to see their income resume to the pre-crisis level faster.

International migration and remittances are expected to increase after the earthquake. Anecdotal evidence suggests that while some migrants living outside the country have returned to help affected family members, this is expected to be temporary. In the medium-term, external migration is expected to rise with earthquake-related employment losses. Meanwhile, month-on-month growth of international remittance has increased by 35-40% in May according to Nepal Remitter’s Association. There is empirical evidence that international remittances serve as consumption insurance and respond to domestic shocks counter-cyclically.

Households that let out part of their dwelling on rent and whose houses were damaged will see a severe decline in income. A substantial portion of the households in Kathmandu valley and other urban areas have dwelling on rent and it forms a sizable component of total income.

Finally, we also anticipate a general slowdown in economic activity due to closure or disruption of transportation networks and markets, depopulation of urban areas in the hills, loss in productivity due to psychological trauma, and impact on tourism and other sectors of the economy.

The severity of the earthquake varies across districts but is assumed to be the same within a district. We use the share of private houses damaged, a continuous variable, as the measure of the severity of earthquake. This statistic will be used as an indicator of the probability that a household incurred losses. For example, if 80 percent of dwellings in a district was damaged, either fully or partially, we assume that a household in the district had an 80 percent chance of being directly affected by the earthquake.

Table 4: Effect of earthquake on income of affected households	
Agricultural income	- 30%
Wage income from non-agriculture	- 10%
Enterprise income	- 10%
Housing rent	- 100%
Internal remittance	- 10%
External remittance	+ 10%
Economy wide effects	-5%
Probability of being affected =	

Share of dwelling in the district partially or fully destroyed
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*Source: Nepal Disk Reduction Portal

Total household consumption, expressed in 2010 prices in the NLSS 2010/11 data, was expressed in 2015 prices using CPI inflator available from World Development Indicator database. In addition, to account for secular increase in household welfare due to economic growth, household consumption was updated with the assumption of distribution neutral growth, i.e., total household consumption of all households increased uniformly by the GDP growth rate between 2010 and 2014.

Corresponding to the loss function detailed in Table 3, post-earthquake consumption is calculated in the following manner:

Post-earthquake consumption = 0.95*(Pre-earthquake consumption) if household is not directly affected
Post-earthquake consumption = 0.95*Pre-earthquake consumption*((share of agriculture income*0.7) + (share of non-agriculture wage income*0.9) + (share of enterprise income*0.9) + (share of internal remittance*0.9) + (share of external remittance*1.1)) if household is directly affected

where the probability of being affected is the proportion of dwelling in the district partially or fully destroyed.³⁴

Figure 1 (see Annex 1)), which shows the simulated shortfall in total household consumption by district, is consistent with many stylized facts.³⁵ First, household consumption is minimally affected in the east and the west of the country, away from the epicenters of the earthquake, other than through the secular economy-wide effect. Second, the shortfall is 20 percent or more in the most affected districts of Ramechhap, Dolakha, Sindhupalchowk, Kavrepalanchowk, Dhading, Nuwakot, and Rasuwa. Third, despite the proximity of Lalitpur, Bhaktapur, and Kathmandu districts to the epicenters, the districts fare better because of proportionately fewer damaged houses and low reliance on agricultural income.

While the results of the simulation presented here apply for all households, some households are more vulnerable than others. Loss of labour income is likely higher in households with elderly, disabled, and young children because of the need for extra care. The incidence of mental and physical health problems is likely to be higher among the elderly, disabled, and children. Female headed households may have access to weaker formal and informal safety net systems to fall back on. Households with young children may cope with the shock by withdrawing older siblings to look after the young ones, leading to the children missing school and potential dropping out. In what follows, the needs assessment under two scenarios— a) all households are targeted, and b) only the most vulnerable households are targeted. For present purposes, we define vulnerable household as one with an elderly (aged 65 or above), single woman (widowed, divorced, or separated), disabled, or with children 5 years old or younger.

All households

³⁴ Source: Nepal Disk Reduction Portal (<http://drrportal.gov.np>)

³⁵ This exercise is not possible for four districts – Manang, Mustang, Dolpa, and Humla – because they are not represented in NLSS 2010/11. We impute the lost income for the missing districts from contiguous districts with similar profile, i.e., Myagdi for Manang and Mustang and Mugu for Dolpa and Humla.

Table 5 shows the total welfare loss for all households in all districts, all households in the 31 affected districts, or all households in the 14 most severely affected districts. The estimated loss in welfare in the entire country due to the earthquake is over a billion dollars, a loss of approximately 7 percent. As expected, the proportion of loss is higher in the 31 affected districts and 14 most affected districts – 8.6 percent and 10.2 percent respectively – for a value of \$630 million and \$475 million.

Table 5: Estimated Welfare Loss			
All households	Value of loss	Proportion of loss	Number of affected households
All districts	\$1.01 billion	0.067	530445
31 affected districts	\$630 million	0.083	528149
14 most affected districts	\$475 million	0.100	485777

There is a strong correlation between the proportion of loss in welfare and the severity of the earthquake (Figure 2). Nuwakot, Dolakha, and Sindhupalchowk districts, each with severity index of more than 90 percent, experience a welfare loss of 20 percent or higher. The next cluster of districts, with severity between 60 to 80 percent, include Dhading, Ramechhap, Rasuwa, Gorkha, and Kavrepalanchowk and face a welfare loss of 15 to 20 percent. Dhading and Nuwakot districts fare worse than expected given the severity of the earthquake because among the most affected districts, their reliance on agricultural income is relatively high – 68 and 66 percent respectively.

Compared to the correlation between the proportion of loss and severity, the correlation between the level of loss and severity is weaker (Figure 3) because some hardest hit districts have lower baseline levels. Of the eight districts with severity of 60 percent or higher, five have average welfare loss less than what would be expected, evidenced by their position below the line of best fit. In contrast, loss levels in Kathmandu, Bhaktapur, and Lalitpur are far above the line of best fit as they start from a higher baseline level.

From the social protection perspective, the amount necessary to restore the welfare of households is the level of welfare loss. For this purpose, the relevant measure is the average welfare loss of directly affected households as the state cannot be expected to lessen the burden of households resulting from a general contraction of the economy.

Table 6 (Annex 5) breaks down the average loss for affected and unaffected households in each district. The necessary level of transfer in the districts in Kathmandu valley ranges from \$780 in Lalitpur to about \$1,500 in Kathmandu. In comparison, in districts like Sindhupalchowk, Dolakha, Ramechhap, Rasuwa, and Dhading, the necessary transfer amount to fully restore the lost household welfare of affected household ranges from \$400 - \$500 because of the lower baseline level of welfare in the districts.

Vulnerable households

The loss experienced by vulnerable households in the 31 affected and 14 most affected districts represents a slightly larger share of household welfare compared to the average. Vulnerable households experience a loss of 8.5 and 10.5 percent in 31 and 14 districts respectively, compared to 8.3 and 10 percent for all households.

Although vulnerable households do not appear to suffer disproportionately from the earthquake, there are reasons to think they have a slower path to recovery and are vulnerable to irreversible damages. First, if the earthquake resulted in disability among any of the household members, then the household's earning capacity may be temporarily or at worse, permanently affected. Secondly, able members may also reallocate a portion of their working hours as well as their monetary resources to care for disabled family members. This holds true for households with elderly members. Thirdly, children in these households are at risk of child labour, dropping out from school and higher rates of malnutrition. This may have irreversible damages on these children's human capital.

Vulnerable households	Value of loss	Proportion loss	Number of affected households
All districts	\$563 million	0.066	302888
31 affected districts	\$327 million	0.085	301473
14 most affected districts	\$235 million	0.105	276255

This analytical approach is subject to a number of limitations. First, this loss estimates do not account for an increasing need to consume more goods and services to address earthquake-related health problems and to rebuild damaged properties. Secondly, the model does not account for none-income transmission mechanisms that affect welfare. For example, it does not account for the possible impact of higher prices (induced by supply shocks) on welfare. This may be marginal because prices have not noticeably increase one month after the disaster. Lastly, the number of vulnerable households is fixed in the model. As such the loss and amount of social protection needed to restore welfare can be interpreted as lower bounds.

Cross-Sector Linkages

Malnutrition:

Malnutrition rates in children are among the highest in the world; 41 percent of children under 5 are stunted. Poor infant and child feeding practices are prevalent, with only 24.4 percent of children between 6 and 24 months being fed adequately and 13.4 percent of babies being born with low birth weights to mothers below 20 years of age. Almost half (48 percent) of pregnant women are anemic and chronic energy deficiency in women remains high, at 23.9 percent in the Far Western region and 19.3 percent in the Mid -Western region (World Bank, 2014).

Gender:

Women continue to experience greater vulnerability to poverty and score lower in other areas of human development because of gender-based discriminatory practices, unequal access to services like health and education, and inequitable control over resources such as property. In terms of employment, male dominant the formal sector employment and majority of the informal sector workers are female. Female workers account only for about 3.5 per cent of the non-agricultural formal sector, while the agricultural sector is fully female dominated. In the one hand, women in the informal sector have job insecurity, low wages, long working hours, no fringe benefits and no incentive earnings. On the other hand, its usually women who will be out of job in case of any loss of informal economy. Social protection measures applied in employment sector usually protect the workers in formal sectors and tend to exclude women working in informal sector. The situation makes women of earthquake-affected districts more vulnerable and inhibits their ability to recover the damage made by the earthquake.

Education:

The MoE provides four types of basic education (grades 1-8) scholarships for girls, Dalits, the disabled, and marginalized ethnic groups. These scholarships are aimed at enhancing gender equity and inclusion. The MoE also provides a secondary education (grades 9-10) scholarship for the same groups. The other scholarships are targeted at various categories: martyrs' children, the conflict-affected, freed Kamalaris (victims of bonded labour or domestic slavery as young girls), and students in model schools and feeder hostels. The secondary scholarship for Dalits is NPR 500 per year while for the disabled, it is NPR 1,700 per year. Similarly, the secondary scholarship for martyrs' children is NPR 18,000 per year while for the conflict-affected, it is NPR 14,000. The extent of overlap among the scholarships or the impact of each has not been fully analysed (World Bank, 2014).

Governance:

Strengthening the administrative systems of distributing social assistances to beneficiaries is an important issue. Therefore, policy decisions are needed either for relaxing or making alternative provisions for transferring social assistances to those who have lost documents due to damage of their own houses or loss of records due to damages of VDC buildings. Similarly important is improving accountability in the implementation of social protection programmes, introducing/strengthening downward accountability mechanism by mobilizing Ward Citizen Forums to play civic oversight functions.

People living with HIV/AIDS (PLHIV)

There are an estimated 78,000 affected people residing in the 14 hardest hit districts in Nepal. Out of the 53 Antiretroviral Therapy (ART) sites in the country, 16 are situated within these 14 districts. As of December 2014, there are 2,940 reported PLHIV (1,854 Male, 1,079 female and 7 transgender people) in these affected districts, of which 2,463 are receiving ART services from the 16 ART sites. After the earthquake, as per emergency relief response, ART has been ensured for a period of 2 months through the joint efforts of communities, government and partners. However, other essentials including shelter, food, nutrition, livelihood support, safe drinking water and hygiene also need to be ensured. There are 223 children, 113 male and 110 female, infected with HIV, residing in these districts, who are getting cash support through a Global Fund grant.

Child labour

The ILO Nepal Child Labour Report (ILO, 2012) provides for statistical data on working children aged 5-17 (40.4 per cent of total child population, in 2008) of which nearly 51 per cent (nearly 1.6 million) are child labourers.³⁶ Out of these child labourers nearly 20 per cent or 621,000 were found to be engaged in hazardous child labour, with girls dominating the number. As per the National Labour Force Survey Report,

³⁶ The child labour data is extrapolated from the National Labour Force Survey undertaken by the Central Bureau of Statistics in Nepal (2008)

2008 the labour force participation of under 14 children constitute nearly 34 per cent of all children among this age group.

On the basis of population projections from 2011 census data, a total of 30,980 children (male-16,050 and female 14,928) were already engaged in child labour in the 31 affected districts before the earthquake. The risk of more children ending up in the worst forms and hazardous forms of child labour in these districts is exacerbated by the post-disaster consequences. The field assessments conducted by Save the Children in Gorkha district post-disaster revealed child labour as the major child protection risk to be followed by sexual exploitation and child marriage.

Data from field observations suggest that many children have become orphans who will either be completely on their own or be left in the hands of the elderly carers, disabled carers, or adolescent siblings. The loss of family members along with the income and livelihoods will have serious implications for many children affected by the earthquake resulting in school drop outs, poor health conditions due to less food intake and involvement in precarious jobs as a means of negative coping strategy. With huge numbers of adult men being out of the country as migrant workers, there is also a danger of children at legal working age (15-17 years) being drawn into hazardous rehabilitation work, such as construction including in the supply chain. There is a further risk of children being exploited in forced and bonded.

This situation has worsened for children in the disaster affected districts with schools, institutions and social services (that would normally engage and care for these children) being damaged or destroyed and traffickers already at work in entrapping young adolescent girls and taking them across the border or to cities as reported in the media.

Therefore the loss of family members and their income and livelihoods is the most significant risk factor contributing to children becoming involved in child labour. Previous natural disaster situations, including the 2005 earthquake in Pakistan, have shown similar child protection risks that children face in the aftermath of such disasters.

Recovery Needs and strategy

Prioritization and sequencing

Short-term perspective (FY 2015/16)

a) Emergency cash transfers

1. **Objective** - Support vulnerable population groups (old aged, single women/widows, disabled, endangered ethnicities, children and persons having special needs, households that have suffered catastrophic economic losses) to recover from the devastating effects of the recent earthquakes using the existing institutional arrangements of the government's social assistance programme.

2. **Rationale** – Emergency cash transfers are valid and viable solutions in the aftermath of the 25 April and 12 May earthquakes. As food support is already been provided and markets are functioning in most quake-hit areas, families need some cash to manage other basic necessities. Emergency cash transfers under post-disaster situations also have an important role of injecting money to revitalize local economies and accelerate resumption of normal economic life. The quickest and politically most feasible

solution for a relatively large-scale emergency cash transfer response is to target assistance geographically with a clear sun-set clause, while at the same time focusing on the vulnerable who are most affected by the disaster.

3. **Mechanism** – A relatively speedy option is to use the existing government system of social assistance as a basis for emergency top-up cash transfers. It is suggested to provide a temporary benefit top-up for the following social assistance schemes - Senior citizen allowance, Single woman allowance (also benefitting widows), Full disability allowance, Partial disability allowance, Endangered ethnicity allowance – in the fourteen most affected districts. Assuming that VDCs need additional support to distribute cash under prevailing circumstances, funds may be channelled through DDF (help build VDC capacities both with human resources and improved logistics, make public audit mandatory as a means of ensuring social accountability).

4. The current crisis provides an opportunity to turn the administrative system by rolling out the MIS already developed by MOFALD in the earthquake affected 14 districts to facilitate digitization of beneficiary data. The introduction of an effective MIS would reduce human errors as well as undue discretionary power of officials at various levels. The establishment of a beneficiary registry which is unified across districts and accessible online could ensure timely updating of critical information such as registration of new beneficiaries, updating of vital event data, and verification of payments to individual beneficiaries.

Proposed intervention

a) Emergency top-ups

5. Two rounds of emergency top-ups, each NRs 3000 per beneficiary should be extended. Ideally, this emergency support should be delivered together with the next social assistance payments which will be due in June 2015; a second payment is foreseen for September 2015 (before Dashain). For detailed information on the costing of this intervention see Table 8 in Annex 6. or detailed information on the costing of this intervention see Table 8 in Annex 6.

b) Scaling up the child-grant in 11 earthquake affected districts

6. In addition to the top-ups, it is recommended to scale-up the child grant in the most affected districts. While the short-term emergency top-ups are implemented, the process of identification of all children under 5 years old in the 11 earthquake-affected districts will be initiated. It is expected to take couple of months to identify and register all children under the age of 5 years. This will allow the government to scale up and universalize the Child Grant to the 14 districts most severely affected by the earthquake. This intervention would have a triple effect: (i) It would signal to the population that the government is doing what is in its capacity to help them; (ii) It would serve as an immediate response to the economic needs of the affected population; (iii) it would at the same time maintain coherence in the system of social protection, while further contributing to the vision of a consolidated system under the planned social protection framework. For detailed information on the costing of this intervention see Table 9 in Annex 7.

c) School feeding programme

7. There is a need to address the issue of vulnerability of children affecting the nutritional status and/or potentially at risk to drop-out from the schools. To address the situation, it is suggested to introduce a mid day meal programme (school feeding programme) as an assistance for all children affected by earthquake, at least for a period of 6 months. This is expected to have the following positive effects: a) improved school enrolment; b) improved school attendance and retention through the day; c) socialization to overcome caste and gender prejudices; d) in-kind support to poor families.

d) Identification of Beneficiaries –

8. All eligible beneficiaries can be identified as per the government list of social assistance available in the VDCs and municipalities. Given the urgency, this is the best option for the identification of beneficiaries in the emergency phase. Targeting might require some three to four months for the identification of beneficiaries. This delay would not be helpful in the immediate recovery phase of a disaster that has affected a large number of the population. However, there is a need to address the issue of vulnerability of children affecting the nutritional status and/or potentially at risk to drop-out from the schools. So the new beneficiaries can be all children of the pre-primary (ECD) level and students who lost their parents up to secondary level due to earthquake can be identified as new beneficiaries. For these children assistances for mid-day meal can be introduced.

e) Child Friendly Local Governance

9. From a social accountability perspective it is very important that duty bearers are informed of the needs of children (45 percent of the population) and therefore they need to listen to the experiences and needs of children. Children are often portrayed as dependent and helpless victims. But experience from other emergencies reveal that children can make important contributions. In addition, childrens' participation in the relief recovery and rehabilitation is considered to be therapeutic for dealing with traumatic events. Harnessing the experiences and knowledge of children can also help to better coordinate interventions and, as a consequence, improve the reach and effectiveness of these interventions. For duty bearers to identify and understand local capacities, it is therefore important to engage with children. Equally important is to build the capacities of children, since their abilities to take action can enhance information delivery, assessments and consultation processes. Child Friendly Local Governance, therefore, provides an excellent platform to engage local bodies/LA (duty bearers) on how they can best support issues related to children, and why they need to involve children/child clubs (right holders) in the planning process. For detailed information on supply and demand side interventions and related costing, see Table 10 in Annex 8.

f) Strengthening social protection MIS Linking with Vital Registration

10. In order to realize gains in efficiency and effectiveness, significant investments are necessary for the modernization and upgrading of the current administrative systems for social protection, in particular cash transfer systems. The current crisis provides an opportunity to turn the administrative system into a paper-less one. The introduction of an effective MIS would reduce human errors as well as undue discretionary power of officials and decision-makers. The establishment of a comprehensive household registry with family folders which is unified across districts and accessible online could ensure timely updating of critical information such as registration of new beneficiaries, updating of vital event data, and verification of payments to individual beneficiaries. The MoFALD has already developed an MIS for cash transfers and is rolling out its use across 14 districts to facilitate digitization of beneficiary data. The roll-

out of this MIS across another 14 districts could similarly ensure better record keeping, transparency, and transfer delivery. The MIS of the SSF is also in need of strengthening for the design and delivery of the selected five social security schemes and furthering other labour market-based social protection schemes. In the context of Nepal, it is to be expected that establishing a robust MIS will have cross-sectoral external effects through strengthening policy implementation in other areas as well.

g) Costing of the MIS roll-out

11. Rolling out the MIS system in these districts needs both institutional capacity building and technology support. Thus some equipment and human resource support will be needed to make the MIS functional. Tentative cost for rolling out the MIS system in 14 districts would amount to around US \$ 275,000.

h) Strengthening the capacity of service providers

12. Implementation and monitoring of social assistance and social insurance programmes rely on the existing administrative structure at the local level, such as the VDCs for the MoFALD cash transfers, schools for the MoE scholarships and SSF for rolling out different social security schemes. The question is whether these bodies have adequate capacity both in terms of the number and the qualifications of the personnel involved and endowment of physical and informational infrastructure. Capacity constraints are a general weakness that reflects the overall challenge of the limited capacity in the social protection administration. This calls for significant investments in human and financial resources of the social protection administration. To supplement the existing M&E systems with specific focus on tracking potentially lasting impacts of the earthquakes among the affected households, it would be advisable to carry out waves of household surveys with a sample large enough to be representative at the district level, at least over the next few years.

Medium-term perspective (FY 2016/17 – FY 2017/18)

a) Finalization of the National Framework for Social Protection

13. As stated above, the National Planning Commission is currently preparing a properly costed National Framework for Social Protection (2012-2022), under an effort led by the National Steering Committee on Social Protection Framework. This is a crucial process, since one important effect of the completed Framework would be to provide a common strategy, such as the one based on a life-cycle approach. The document would provide the conceptual framework for building a nationally determined social protection floor on the basis of which policy and operational coherence and harmonization of different social protection provisions could be ensured, and adequate levels of social protection could be provided to all members of society throughout their life-cycle. The framework should also emphasise the value of social protection schemes for disaster preparedness. This would pave the way for more long-term interventions (see below).

b) Strengthening of the administrative systems for social protection service delivery through electronic payment systems

14. Electronic payment systems would help ensure payments to beneficiaries are processed on time, in the right amount, and generally in a more accessible manner. The MoFALD already started a branchless banking pilot in five districts in FY 2013-14. The use of biometrics by the banks to verify the identity of the individual beneficiaries helps ensure only the correct beneficiaries can receive the cash allowance. The scaling-up of this process across the programmes and the country, based on a proper review, could support efficiency gains by eliminating ghost and ineligible beneficiaries and assist in assuring coverage is expanded.

15. In the context of Building-Back-Better, the Single Window Service (SWS) could be introduced which is a one stop shop for the delivery of social protection programmes and employment services at local level. Families register in a single office at district level. They are taken charge of by a Social Worker that evaluate their needs. Based on the needs identified, the Social Worker proposes an integrated package of programmes and services (social assistance, skills and employment support) provided by the Government, the development partners, and NGOs. Thus, the SWS performs the following tasks on behalf of service providers: information desk, registration of the households, collection of information, vulnerability assessment and skill assessment, update of the database, enrolment of the families under the appropriate services and programmes, as well as collection of contributions. The SWS goes hand in hand with an integrated MIS. It facilitates flows of information between social protection/employment services, local government, line ministries and departments, and the coordinating institution. Data is entered at local level and transferred to an integrated MIS at national level. It manages a single database on beneficiaries: information on the beneficiaries are gathered on a database, and is being updated regularly by the service providers. It is a tool for monitoring and evaluation of the services programmes and their impact on beneficiaries. The estimated cost for the development of such a platform, including associated equipment costs, would be US \$5 million.

c) Enactment of the Unified Social Security Act

16. According to the Budget Speech of 2071/72 (2014-15) the Unified Social Security Act will be enacted for the effective implementation of social insurance programmes related to medical care, sickness benefit, unemployment benefit, old-age benefit, employment injury benefit, family benefit, maternity benefit, invalidity benefit and survivors' benefit. It is envisaged that these nine branches of social security will be implemented in a phased manner, starting with the schemes for unemployment benefits, maternity benefits, medical care, sickness cash benefits, and employment injury benefits through the Social Security Fund. Coverage of these schemes will be progressively extended to all workers and their families in Nepal.

17. Based on the upcoming Poor Household Identification Survey data from the Ministry of Cooperative and Poverty Alleviation of the 14 most affected districts, poor and vulnerable households will be provided with cash and other labour market-based social protection.

Long-term perspective (FY 2018/19 – 2019/20)

Addressing the coverage gaps in the current social protection system, and developing an integrated system across all social protection programmes addressing different kinds of contingencies and risk management

18. As the basic administrative systems such as monitoring, payment, and grievance handling systems are strengthened and rolled out throughout the country and as additional fiscal space is created through continued prudent fiscal management, Nepal will have an opportunity to address what is arguably the most important challenge in social protection: the limited poverty impact of the current mix of programmes. This calls for the extension of social protection measures to provide a basic income to all in need of such protection and comprehensive medical care.

19. It is suggested to follow the ILO Social Protection Floors Recommendation No. 202 which provides guidance on closing social security gaps and achieving universal coverage through the establishment and maintenance of comprehensive social security systems. The Recommendation sets forth an integrated and coherent approach to social protection across the life cycle, underscores the principle of universality of protection through nationally defined social protection floors, and embodies a commitment to their progressive realization in terms of benefits and people covered. It thereby aims at ensuring that all members of society enjoy at least a basic level of social security throughout their lives, ensuring their health and dignity. Poverty, vulnerability and social exclusion are established as priority areas of attention, with the clear objective of reducing poverty as soon as possible. The Recommendation calls for systems that are country-led, are aligned to national circumstances, are reviewed in the light of population needs, and include the participation of all stakeholders

20. Coverage gap will be extended across the country based on the approved properly-costed National Framework for Social Protection and the upcoming poor household identification survey data from the Ministry of Cooperative and Poverty Alleviation of the whole country.

21. Since Nepal has already recognized social protection as a human right and being a social and economic necessity in the presence of recurring natural and non-natural disasters, it should be an inherent component of the UN's post-disaster Building Back Better strategy.

Intervention	Quantity	Unit Description	Cost Per Unit (NPR) Unit Cost	Total (NPR)	Total (USD) Exchange rate: 1 USD = 100 NPR	Assumptions
Short-term						
Emergency top-up						
To all Existing Social Protection Beneficiaries	229657	Person	6,000	1,377,942,000	13,779,420	Covers top-up to all the cash transfer beneficiaries for two installments of 11 districts out of the 14 most affected, excluding valley districts
To Dalit Children below 5 years	30000	Person	6,000	180,000,000	1,800,000	Top-up to all the below-five years children for two months of the 11 districts out of the 14 most affected, excluding valley districts

Child-Friendly Local Governance (CFLG)	14	Districts	10,080,000	141,120,000	1,411,200	As per the estimates received from the MoFALD
Strengthening of the Management Information Systems (MIS) of MoFALD and SSF	14	Districts	2,142,860	30,000,040	300,000	As per the estimates received from the MoFALD and Training requirement of the SSF
School Feeding	500000	Districts	3,300	1,650,000,000	16,500,000	As per the estimates received from the MoE
Capacity Building Training for VDC, DDC, DEO and SSF	14	Districts	645,000	9,030,000	90,300	As per the estimates received from the MoFALD, MoE and SSF
Medium term						
Finalisation of SP Framework	1	Document	10,000,000	10,000,000	100,000	As per the ILO estimates
Electronic Payment system	75	Districts	6,666,666	499,999,950	5,000,000	As per the estimates received from the MoFALD
Enactment of Social Security Act	1	Document		NA	NA	
Targeted Social Assistance to the Poor and vulnerable households	250000	Households	10000	2,500,000,000		Based on the upcoming poor household identification survey data from the Ministry of Cooperative and Poverty Alleviation of the most affected 14 districts
Long-term						
Strengthening Social Protection Institutions for addressing coverage gaps	75	Districts		NA	NA	Will be estimated after the approval of properly-costed National Framework for Social Protection and based on the upcoming poor household identification survey data from the Ministry of Cooperative and Poverty Alleviation of the whole country.

Total				6,398,091,9 90	38,980,920	
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Annex 1

Table 1 List of Social Protection Programs Included in the Expenditure Analysisⁱ

	Program Description	Implementing Agency
Social Insurance		
Civil servants' pension & other benefits	Pension to civil servants and teachers, retirement gratuity, leave, medical benefits.	Ministry of Finance
Employee Provident Fund	Mandatory retirement savings scheme for public employees. Other formal sector workers can participate voluntarily. The fund collects 10% of salary which is matched by the employer.	Employee Provident Fund
Social Security Fund	Contributory schemes - unemployment, disability, maternity, medical, dependent and old-age benefits; meant to cover all formal sector workers; not yet operational; financed by 1% tax on income.	Social Security Fund, Ministry of Labor & Employment
Social Assistance		
Cash transfers	Old-age, single women, disability, and endangered ethnicity allowance	MoFALD
Public works	Rural Community Infrastructure Works & Karnali Employment Program	
Scholarships	Basic education Secondary education	Ministry of Education
Midday meals	Midday meals in Karnali and 23 selected districts; 11 supported by the World Food Program (WFP)	
Cash relief	Cash relief to conflict affected	Ministry of Peace & Reconstruction
Health care	Safe motherhood/Aama program – incentives for delivery at health institutions Emergency referral program for pregnant women and other target populations Senior Citizen Health Care Program Leprosy control	Ministry of Health
Social welfare	Old-age home and child welfare centers; social welfare program for disabled and senior citizens	
Subsidized food distribution	Transportation subsidy on essential food (such as rice, lentils) in 30 remote districts	
Labor Market Programs		
Youth Self-employment Program	Collateral-free loans for starting business	Youth Self-Employment Fund, Ministry of Finance
Enhanced Vocational Education & Training (EVENT)	Skills training	Ministry of Education

ⁱ Outside of the Red Book are Army/Police Welfare Funds, Citizens Investment Trust, and schemes for migrant labor run by the Foreign Employment Promotion Board. Also not included are social protection programs for which data was unavailable. For a detailed list of programs, refer to annex 1.

Annex 2

Figure 1: Simulated shortfall in annual household consumption (by district)

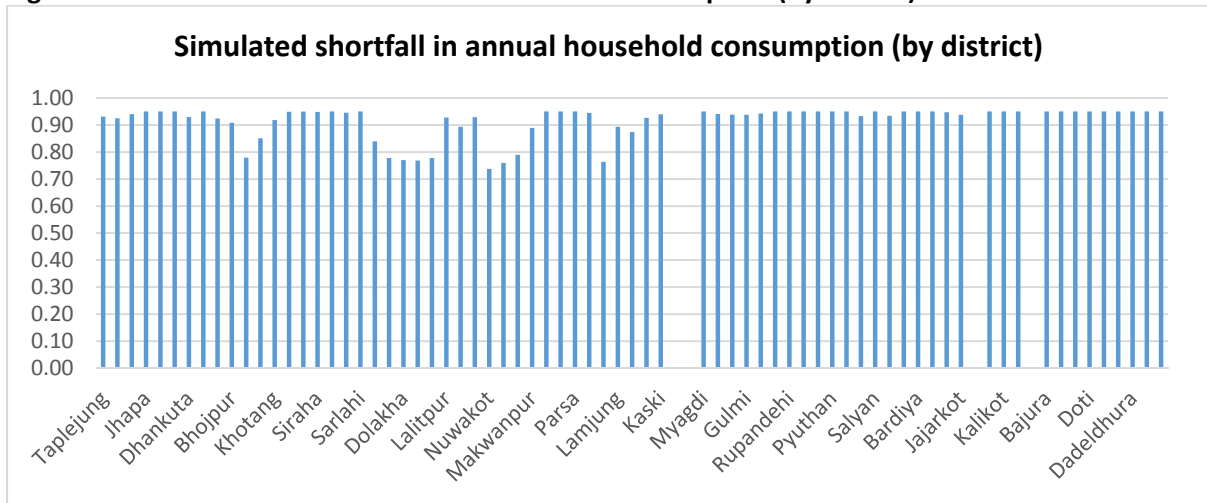
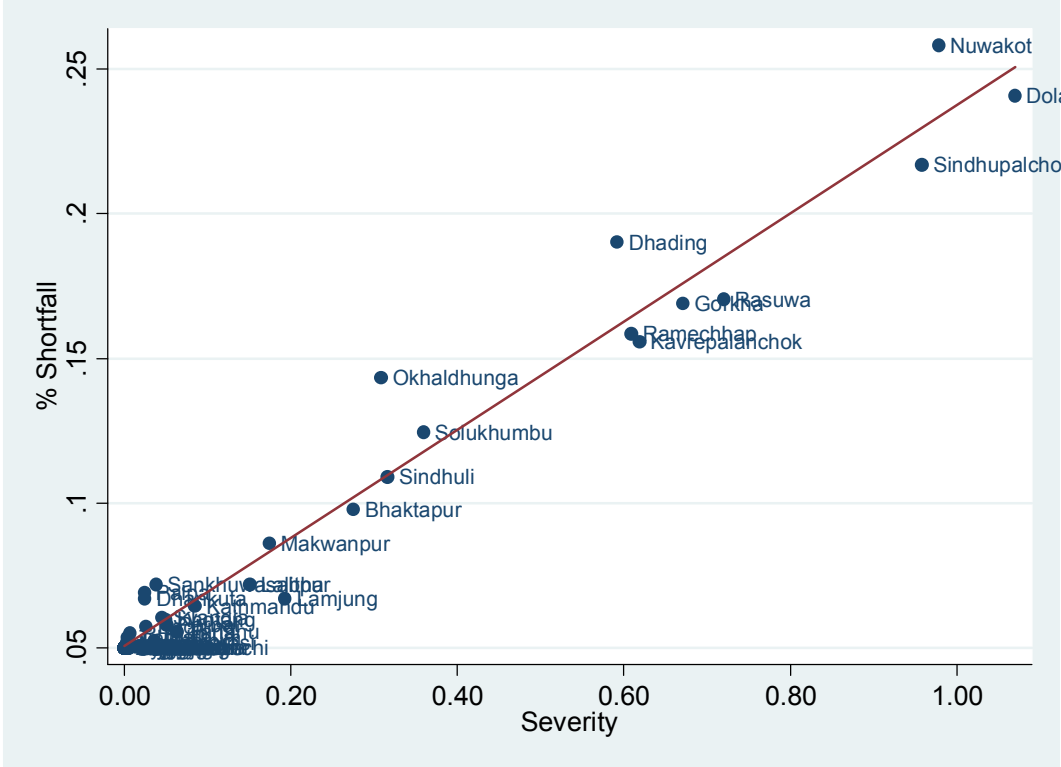
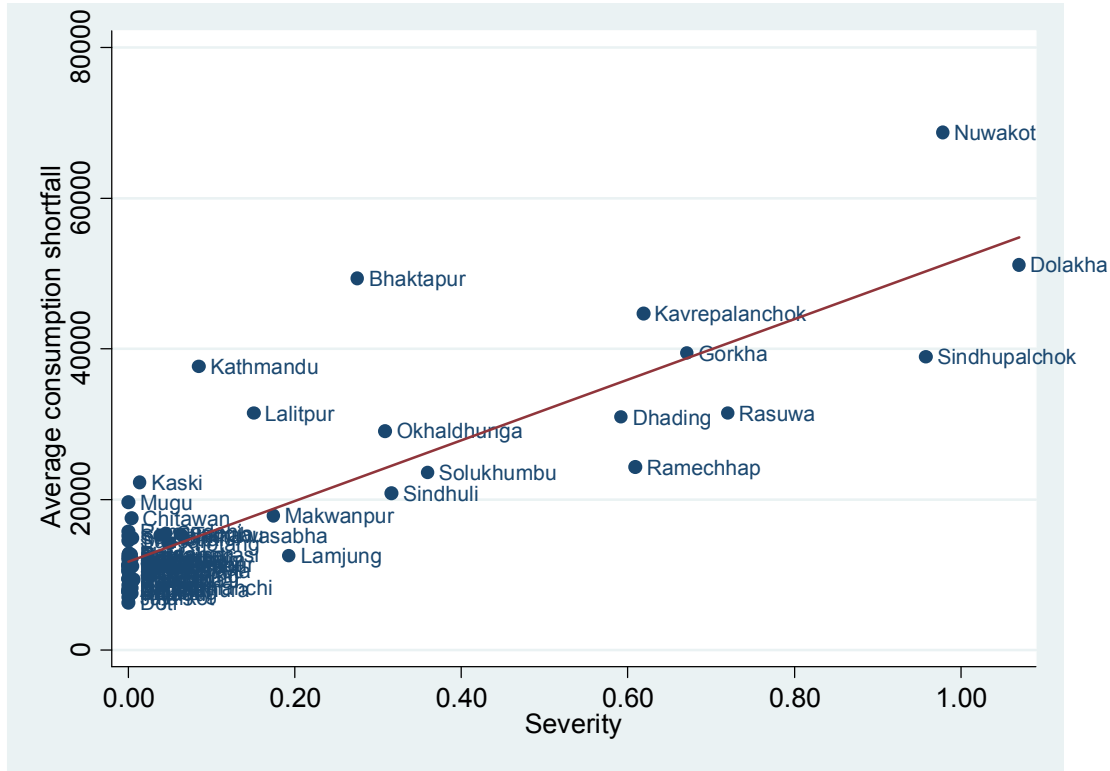


Figure 2: Proportion of consumption shortfall



Annex 4

Figure 3: Correlation between severity of shock and average welfare loss



Annex 5

Table 6: Average Welfare Loss (by Affected Status)		
District	Not directly affected	Directly affected
Taplejung	12554	
Panchthar	9167	25199
Ilam	11098	
Jhapa	12003	
Morang	11266	
Sunsari	14556	
Dhankuta	10649	50409
Terhathum	11580	
Sankhuwasabha	10749	49784
Bhojpur	8175	50600
Solukhumbu	9313	54623
Okhaldhunga	9332	53096
Khotang	10555	62713
Udayapur	12278	
Saptari	12209	
Siraha	10840	
Dhanusa	11172	
Mahottari	14852	
Sarlahi	15100	
Sindhuli	8866	42465
Ramechhap	9281	42629
Dolakha		51150
Sindhupalchok	7141	41647
Kavrepalanchok	15208	62378
Lalitpur	23382	78737
Bhaktapur	26628	93159
Kathmandu	26836	149451
Nuwakot		69622
Rasuwa	10852	39070
Dhading	8151	45987
Makwanpur	11656	49824
Rautahat	12637	
Bara	12858	
Parsa	12663	
Chitawan	17480	
Gorkha	7224	61378

Lamjung	8743	63340
Tanahu	11162	45697
Syangja	10893	72957
Kaski	21595	
Manang	7508	
Mustang	8734	
Myagdi	10064	14094
Parbat	8453	46058
Baglung	11294	154244
Gulmi	12668	35266
Palpa	15719	
Nawalparasi	11398	
Rupandehi	8229	
Kapilbastu	8578	
Arghakhanchi	9239	54398
Pyuthan	9363	
Rolpa	8246	
Rukum	9702	
Salyan	11952	
Dang	10581	
Banke	9530	
Bardiya	7761	
Surkhet	6985	
Dailekh	10323	
Jajarkot	9302	
Dolpa	19654	
Jumla	7648	
Kalikot	7633	
Mugu	8072	
Humla	6248	
Bajura	10451	
Bajhang	11253	
Achham	7980	
Doti	8552	
Kailali	9442	
Kanchanpur	11253	
Dadeldhura	7980	
Baitadi	8552	
Darchula	9442	

Annex 6

Table 8: Total Beneficiaries of Social Assistance programme, Cost per Beneficiary per Instalments NRs, and Total Cost in USD. 2015, pre earthquake

	District	Widows	Senior Citizen	Senior Citizen (Dalit)	Single Women	Fully Disabled	Disabled	Endangered Community	Dalit Children	Total beneficiaries
1	OkhalDhunga	2901	6600	0	1739	226	412	0	2434	14312
2	Dolakha	4765	9063	1581	16	139	113	190	1606	17473
3	Ramechhap	3630	9766	702	3480	669	465	1020	2453	22185
4	Sindhuli	7262	7744	1857	20	525	53	1885	3786	23132
5	Rashuwa	507	1993	130	654	182	53	0	122	3641
6	Dhading	7586	17284	3963	32	574	877	0	5107	35423
7	Nuwakot	3778	14226	1798	4715	427	442	0	4156	29542
8	Kavrepalanchowk	8825	15021	1271	50	495	400	66	2029	28157
9	Sindhupalchok	4731	13565	1779	4242	605	499	0	2265	27686
10	Makawanpur	7637	8953	942	225	282	258	76	1183	19556
11	Gorkha	8686	14035	3791	48	517	700	7	4766	32550
	Total Beneficiaries (11 districts)	60308	118250	17814	15221	4641	4272	3244	29907	253657

Cost of one instalment of NRs 3000 per beneficiary.

Benefit amount (NRs)	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Total cost (USD)	\$ 1,809,240	\$3,547,500	\$ 534,420	\$ 456,630	\$139,230	\$ 128,160	\$ 97,320	\$ 897,210	\$ 7,609,710	

*calculation based on administrative data from MOFAL (2015).

Exchange rate: USD1 = NRs 100

In summary:

- Cost of first top-up payment is around USD 7,5 million
- Cost of second top-up payment is around USD 7.5 million (could increase if added vulnerable children affected by the earthquake).

The benefit amounts are to be distributed through the existing delivery mechanism, so it is assumed that no additional administrative costs will arise. However, there will be a need for spot-checks and monitoring mechanism, which can be a stand-alone programme that will require supplementary funding.

Annex 7

Costing of the proposed intervention

For the data on the beneficiaries, the study uses the data from the census 2011. The population of children under 5 are projected in year 2015 by employing the medium-variant population projection model developed by the United Nations Department of Economic and Social Affairs, Population Division (UN DESA 2013).

Table 9: Total Population, Under 5 Population, Monthly Cost of Scaling Up Child Grant NRs and

	Districts	Total Population	U5 population as of 2011	U5 population as of 2015	Cost: Monthly PMT (NRs 200)	Cost: Monthly PMT (NRs 300)	Cost: Monthly PMT (NRs 500)
1	Sindhupalchok	287,798	23,524	22,171	4,434,288	6,651,432	11,085,719
2	Nuwakot	277,471	21,784	20,531	4,106,297	6,159,445	10,265,742
3	Dhading	336,067	30,082	28,352	5,670,475	8,505,712	14,176,187
4	Gorkha	271,061	23,204	21,870	4,373,968	6,560,951	10,934,919
5	Rasuwa	43,300	3,755	3,539	707,820	1,061,730	1,769,549
6	Kavrepalanchok	381,937	28,013	26,402	5,280,467	7,920,700	13,201,167
7	Dolakha	186,557	15,737	14,832	2,966,434	4,449,651	7,416,084
8	Sindhuli	296,192	30,927	29,149	5,829,758	8,744,636	14,574,394
9	Ramechhap	202,646	16,029	15,108	3,021,532	4,532,298	7,553,830
10	Makawanpur	420,477	38,209	36,012	7,202,419	10,803,628	18,006,047
11	Okhaldhunga	147,984	13,999	13,194	2,638,874	3,958,311	6,597,184
Total		2,851,490	245,264	231,162	46,232,329	69,348,494	115,580,823
Total Monthly Cost including 20% administrative cost and inclusion error, NRs					55,478,795	83,218,193	138,696,988
Total Monthly Cost including 20% administrative cost and inclusion error, USD					\$ 554,788	\$ 832,182	\$ 1,386,970

Annex 8

Table 10: Child Friendly Local Governance – Supply and Demand Side Measures

SN	Supply side	1 st year			2 nd year		
		NRS (million)	Quantity	Total	NRS (million)	Quantity	Total
1	Orientation for duty bearers (CFLG committee members, VDC secretaries) on the importance of addressing the needs of children in emergencies	0.1	14	1,4			
2	Develop profile and annual plans that have considered DDR and the needs of children	0.025	14	0.35			
3	Consultation with children (bel Bhelas) in all VDCs/municipalities to seek their views and understanding their needs to influence the local plans (using the same tools/methodology used for national consultation)	0.1	14	1.4			
4	Training to SM/WCF/CACs				0.05	14	0.7
5	Develop local materials on relevant disaster preparedness	0.05	14	0.7			
6	Organize campaign on birth registration and against child marriage/trafficking	0.025	14	0.35			
7	Child friendly infrastructure – children resource centre/library/safe place				0.15	14	2.1
	Demand side						
8	Building capacity of children/child clubs on basic health care, first aid, survival skills including life skills (how to cope with disasters)	0.1	14	1.4			
9	Build capacity of children/child clubs/networks to understand what is an emergency and the roles of different institutions				0.1	14	1.4
10	Mobilize child clubs to act as peer educators	0.02	14	0.28			
	Total			5.88			4.2

	Grand Total						10.08
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GOVERNANCE

Summary

The ability of the government to lead the post-earthquake recovery work has been severely affected by damage to government infrastructure, the loss and damage to equipment and materials in government offices, and the damage and loss of vital government records.

The Government of Nepal (GoN) urgently need to restore functionality to the 1711 buildings destroyed or damaged in the most affected districts as well as those damaged or destroyed at the central level (including the army buildings which makes the total 1109 buildings). Temporary accommodation will be needed to ensure the efficient resumption of administrative government services³⁷ and to ensure that the local governments can coordinate the recovery. The cost of damage to governance sector is estimated at NPRs 16,690 million (US\$ 166.9 million), with a reconstruction cost of NPRs 13,616 million (US\$136 million) and a recovery cost of NPRs 3,028 million (USD 30.28 million) based on the self-reported data and information provided to the Ministry of Federal Affairs and Local Development, Ministry of General Administration, Ministry of Home Affairs, Supreme Court, Office of the Attorney General, the Nepal Army and Financial Comptroller General. The Governance sector for the purpose of this PDNA covers: the rule of law, local government and non-service delivery national level institutions concentrating on administrative and rule of law related service delivery as well as civil society. The GoN will work to strengthen Governance systems more broadly in line with the Good Governance Act of 2006. This will include strengthening accountability processes; working collaboratively with civil society; strengthening citizen service centres; rule of law processes and ensuring the participation of the most vulnerable, affected populations in decision making processes.

To achieve this, the staffing and financial management capacities of the Government need to be augmented at the district, municipal and village level. To best serve recovery needs of the local population, the government will look to overcome one of the main challenges of delivering government services; namely the capacity and functioning of Local Bodies. To date these challenges includes strengthening accountability, ensuring staff are present in the current positions and trying to reduce the high turnover of staff.

Pre-Disaster Context and Baseline

The Governance sector of the PDNA³⁸ is subject to a number of relevant legislations³⁹ including the Natural Calamity Relief Act 1982 which mandates the Ministry of Home Affairs (MoHA) as the lead agency for immediate rescue and relief works as well as disaster preparedness activities. The enactment of the Local

³⁷ Development services are covered by different sector groups.

³⁸ This includes the Judiciary, Police, Financial Controller, National Human Rights Commission, Office of the Auditor General, Ministry of Home Affairs, Ministry of Federal Affairs and Local Development, National Planning Commission, Prime Minister's office and Ministry of General Administration.

³⁹ Local Self Governance Act 1999, the 2007 Interim Constitution, the 1999 Local Self-Governance Act, the 2006 Good Governance Act, and the 2007 Right to Information Act.

Self-Governance Act (LSGA) in 1999 expanded the mandates of local bodies, devolving the powers, responsibilities and resources required to allow local governments to meet the basic infrastructure needs of the locality. The Local Self-Governance Act (LSGA) was a landmark legislation in the devolution of power and resources in that it established an important foundation for the provision of socially inclusive services to the citizenry through grassroots democracy. The Act not only makes arrangements for ensuring that local bodies are accountable to their citizens, but also works towards active citizenship involvement in local democratic processes including integrated planning processes and social audits.

The fourteen-step planning process⁴⁰

The government planning process begins with the (1) directives on the budget ceiling for the coming year sent by the National Planning Commission (NPC) and the ministries. District Development Committee (DDC) officials (2) review the ceilings and organize (3) plan formulation workshops in the local bodies. These workshops discuss the policies, goals and resource availability, including estimates for each Village Development Committee (VDC). VDCs then convene (4) meetings on programs to be implemented at the ward/settlement level. The selection of programs occurs at settlement level (5) involving the villagers, user committees and other community level organizations. The Ward Committees meet (6) to discuss local grant requests. VDCs then meet (7) to prioritize programs, prepare resource estimates and select programs that can be funded with the VDC budget, those that would need external support are separated for further referral. The next step involves the Village Council (8). The Council approves the programs and submits them to the Ilaka (an Ilaka generally consists of 5-8 VDCs) level planning workshop (9). These workshops prioritize sectoral programs requested by VDCs and municipalities and are forwarded to DDCs. The sectoral committees at DDCs review the recommendations of the Ilakas (10), identify those that can be funded at the district level and those that would need central support and send their recommendations to the Integrated Plan Formulation Committee. This committee reviews the recommendation, prioritizes and submits a draft district development plan to DDC (11). DDC meeting discusses the draft plan along with the guidelines from NPC and other government agencies and identifies programs that can be implemented with local resources and those that need central government support. This draft plan is sent to DDC Council (12). DDC Council approves the final document (13). The plan and programs approved by the Council are sent to the NPC, Ministry of Federal Affairs and Local Development and sectoral ministries. (14) The approved programs are included in the Red Book, the official allocation register.

Specifically, the Local Body Resource Mobilisation and Management Operation Guidelines (LBRMMOG) approved by the Cabinet in 2012 includes a number of procedures to promote accountability and transparency at the local level. These include that local bodies (VDCs, municipalities and DDCs) are required:

- To publically display on notice boards and radio full details of all programmes or projects with cost estimates of NRPs 200 thousand and NRPs 500 thousand or above.
- To make public their income and expenditures on quarterly and annual basis.
- To audit completed projects before a final instalment is paid.
- To conduct social audits at least once a year.

⁴⁰ *A Guide to Government in Nepal: Structures, Functions, and Practices: The Asia Foundation (2012)*

This is in line with Nepal's 13th three-year plan that includes poverty alleviation, inclusive growth, social transformation, sustainable peace and good governance as their major objectives, along with an emphasis on devolution, decentralization and development of local governance.

The Good Governance Act (GGA) formalizes this good governance intent by transforming the system's administrative structures into service providers and facilitators with responsibility for upholding the rule of law, promoting human rights, ensuring government accountability and encouraging financially prudent and corruption-free public administration.

The powers relating to justice are exercised by courts and other judicial institutions in Nepal in accordance with the provision of the constitution and other legislations. There are three tiers of the courts which include; i) Supreme Court, ii) Appellate Court, and iii) District Court. There are altogether 16 Appellate courts, 75 districts courts and one Supreme Court as an apex court.

The assessment has paid close particularly close attention to local authorities in the 14 most affected districts. The administrative structure level of Nepal is currently divided into three levels: central, district, and local (municipalities and villages). In terms of Build Back Better, Nepal's new federal structure will have to be considered when making final decisions on reconstruction to ensure greater efficiencies and effectiveness. Overall the local government structure has limited capacities.

There are 75 districts across the country. Each district has a District Development Committee headed by the LDO, who reports to the Ministry of Federal Affairs and Local Development, and a District Administration office headed by the Chief District Officer, who reports to the Ministry of Home Affairs. The Chief District officer is responsible for law and order and security. As there are no elected local bodies in Nepal for more than 13 years, the DDCs are headed by Local Development Offices pending the elections, who are responsible for the coordination all line departments for development activities such as health, education, forestry, and environment.

In 2014, the Government announced the creation of 133⁴¹ new municipalities (prior to which there were only 58 municipalities) through a two-round process. Municipalities are cities that meet minimum criteria in terms of population and infrastructure. Each municipality has a different structure based upon the needs and available revenues. Many of the newest municipalities are not yet fully staffed nor received the requisite budgets to fulfil their legal mandates.

There are currently 3,276 village development committees (VDCs). There are usually around 10% of the VDC Secretary posts vacant at any given point.⁴² There are 81 women Secretaries out of the total 3,276 positions for Village Development Committee level.⁴³ Yet political and administrative commitments have been made by the GoN to significantly increase the numbers of women and diversity candidates within

⁴¹ In December 2014, a Municipal Area Delineation and Recommendation Committee headed by Dr. Keshabananda Giri suggested the government create 66 new municipalities, in line with the Local Self-Governance Act, 1999. (My Republica, December 2, 2014, http://www.myrepublica.com/portal/index.php?action=news_details&news_id=87849)

⁴² MoFALD estimation

⁴³

UNDP:

<http://www.np.undp.org/content/nepal/en/home/ourwork/democraticgovernance/successstories/UNDP-supports-training-of-64-new-women-VDC-Secretaries-among-others.html>

the civil service. Challenges remain on ensuring presence of the VDC Secretary, of staffing the VDC assistants position, and in ensuring they have the ability to undertake prime functions that include issuing vital documents (certificates of births, deaths and marriages), and in conjunction with the Ward Citizenship Forum in prioritising development plans and monitoring activities of line ministries.

The GoN has an acknowledged accountability gap at the local level due to a number of factors, including: limited GoN staffing at the VDC level, no local elections since 1997, administrative weaknesses identified in the previous All-Party Mechanism⁴⁴ and the lack of official audits⁴⁵ of VDC expenditures⁴⁶. Currently audits are carried out but through the contracting of private firms. There remain political challenges to holding elections until after the new constitution has been finalised. Procedural requirements imposed on local government bodies with limited capacity and resources, compounded by the political influence on public finance allocation decisions and other developmental activities have resulted in an “informalization of the processes and procedures of local governance”⁴⁷, making it difficult for the mechanism to ensure accountability in public services.

Local Bodies – Service Delivery Functions

District Development Committee: Coordinates and delivers all line ministries development activities, including agriculture, irrigation, infrastructure development, economic development, water etc;

Disaster Relief provision; Finalises district plan and land use plan

Municipal: Deliver and maintain/ operate basic community infrastructure; Solid Waste Management; Land use planning; Municipal plan development and implementation; Register Vital documentation; Uphold building code

Village: Register vital documentation; Coordinate Community Infrastructure; With Social Mobilisers and Ward Citizen Forum, ensure input into the planning process; distribute Social Security payments.

While local elections can provide a remedy for lack of representation and accountability at the local level, given the uncertainty of such dates, the Government, through its Local Governance and Community Development Programme (LGCDP), is working with Ward Citizen Forums (WCF) and Citizen Awareness Centre (CAC) to strengthen participation and representation in local governance processes. An interim arrangement was established by MoFALD in 2008 and rolled out in 2010 where 25 members are selected to the WCF to undertake many of the functions normally undertaken by the elected Ward Council. Members are selected with attention to gender balance and ethnic diversity, including disadvantaged groups. This lack of electoral representation disconnects Government from the population during the present planning and delivery of relief goods and provision of other local services.

Post-Disaster Context

Central Government infrastructure damaged by the earthquakes includes the Prime Minister’s office, the National Planning Commission, the Election Commission, the Supreme Court and the personnel records department of the Ministry of General Administration.

⁴⁴ Asia Foundation, Political Economy Analysis of Local Governance in Nepal

⁴⁵ Local Body Resource Mobilisation and Management Operation Guideline (LBRMMOG) from 2012, section 8, pt 48

⁴⁶ <http://www.ekantipur.com/2011/12/23/top-story/ciaa-directs-mold-to-scrap-apm/346038.html>

⁴⁷ Asia Foundation. 2015. Challenges and Opportunities in Municipal Governance.

The Ministry of General Administration has been working to ensure that the staffing levels for the damage assessment and relief is available, and the Government has set up an assessment process for damages at the district and sub-district level. Over 2,500 civil servants are currently part of the assessment process, which is made up of 200 volunteer engineers and 1,300 permanent civil servants from different districts and the central level. In total, 14 Secretaries, 57 Joint Secretaries, and 60 Under Secretaries were also deployed from the central government to the affected areas for periods of one week to a month in order to help supervise the setting up of the relief effort.

Daily operations of treasury functions were restored within one week of the first earthquake with no major effect on fund release or payment transactions. The main building of Financial Comptroller General's Office has several cracks and whilst habitable may require retrofitting according to engineering estimates. The main server in the building which houses the financial management information system is operational. Of the five affected District Treasury Comptroller Offices, the daily operations are being carried out in available space in other offices. Where information flow is affected due to collapse of the buildings, information is still available in the central server and hence any further transactions are still being managed.

In total, 1711 (602 excluding the army) central, district, village, and municipal structures have been fully or partially damaged as recorded in data received by the team. This includes: District Courts, Police Buildings, VDC, DDC, and Municipal, Appellate Attorney, District Attorney, Bar Association, District Administration offices, Prisons, Central ministry buildings and District Treasury Comptroller Office. Of the 580 VDCs in the most affected districts, 507 (87%) possess physical office buildings. Some of the buildings have been reduced to piles of rubble whilst others have severe cracks and have shifted on their foundations, losing roofs and destroying equipment. Before buildings can be rebuilt, the debris and rubble from the previous buildings needs to be removed. This will include safely removing and pulling down the destroyed buildings.

After the earthquake on April 25th, the local government structures reoriented their work to coordinating the relief from the GoN as well as volunteers and non-governmental organisations. With many of the sources of government revenue such as business premises destroyed or damaged, there will be a reduction in the budget for the affected districts over the coming financial year due to lost revenue. This will affect their ability to deliver services.

In terms of the sub-national governance structure in Nepal, it is worth recognizing the impact of the small average size of VDCs, which – on average -- have a population of less than 6,000 – 7,000 people. VDCs are generally considered too small to capture relevant scale economies in the delivery of public services, and are currently administratively weak. Despite this they have been called upon to be the frontline in the recovery and have been delivering services to the entire population under the current administrative structure. They represent one of the key governance assets for the delivery of the recovery programming and as such will be strengthened. However, the proposed future federal structure of Nepal may require a reduction in the number of VDC's. One consideration for government is whether all damaged and destroyed VDCs should be reinstated, or whether some restructuring is now possible.

The district records of birth, death and marriage certificates and citizenship certificates is paper file based, as is the information for identity records. Some of this has been lost as 173 VDC buildings, 9 district offices and 11 municipalities have been fully destroyed. These records are necessary for the reissuance of

ID/property documentation, and issuance of new documents is required to allow the population to receive relief services as well as to receive regular services like social security allowances.

The workload of the civil servants increased during the post-earthquake period as the local government structures were responsible for coordinating the relief from the GoN as well as volunteers and non-governmental organisations. The VDC Secretaries are working with the District Disaster Relief Committee to assist distribution of relief from the GoN (for instance cash grants such as the NPRs 15,000 (US\$150) relief grant, and the LGCDP emergency relief grants to all the VDCs and Municipalities); the assessment of all damages at the village level with the MoGA team; for assisting in the re-issuing of identity documents; coordination and monitoring of relief by NGOs and civil society. Realistically, it has not been possible for the VDC secretaries to accomplish all of this on their own. Therefore additional staff are urgently required at the local level. As much as possible, gender and social inclusion should be encouraged for new positions. In addition, there has to be clear direction and delegated authority to the VDC secretaries for them to effectively managing the relief and recovery. The VDC Secretary has taken on many of the responsibilities of the Village Development Committee.

Functions of the Supreme Court were disrupted for more than three weeks after the initial quake. The Supreme Court, under the Chief Justice, has responsibility for the administration of all courts in Nepal, including facilities management. Its building suffered critical damage and will need to be replaced. The court, at the time of writing, is still working on establishing benches in alternative buildings. This will compound the case backlog which at present stands near 20,000. At the district level, courts are just starting to operate again. In some lessor affected areas, the courts prioritized *habeas corpus*, serious crimes and any criminal cases with a statute of limitations issue looming. In more heavily affected districts courts are offering even more limited services out of tents. In several districts where the court buildings collapsed, court records have been destroyed/lost. Lack of appropriate office facilities for the Attorney General will impede the work of the prosecutors and could create additional backlogs.

Beyond structural damages to buildings, the justice sector is facing enormous challenges due to the fact that the administration of justice in Nepal is largely still paper based. In the 14 most affected districts records and files have suffered varying degrees of damages and loss.

The National Women's Commission and the National Dalit Commission structures have suffered damages. To ensure that these national GoN institutions are able to perform their essential work protecting some of the most vulnerable populations, their buildings should be assessed and supported.

The Nepal Police are also reporting significant damage to police stations and posts in various locations (16 different districts). A total of 92 police facilities have suffered some level of damage. It is not clear how many of these installations are rented and how many are actually owned by the Nepal Police. Even without static facilities police continue to provide law and order, and where needed, the Armed Police Force have deployed troops in tents.

The Nepal Bar Association (NBA) plays an integral role in ensuring access to justice along with the Ministry of Law and Justice. In a large number of districts, the Supreme Court allocates land within the district courts' property for the NBA. It is then the bar association that collects money from their members to build such an office. It is clear that the members of the bar will have difficulties in raising money at this critical time to fund the reconstruction themselves. The NBA has lost two buildings with four others partially damaged. Without these premises, services to the locally affected communities will likely suffer.

The National Human Rights Commission (NHRC) building in Kathmandu has suffered severe damage and is no longer habitable. The loss of this building is impeding the functioning of the commission, which is a constitutionally established body with central and regional offices responsible for ensuring the respect, protection and promotion of human rights.⁴⁸ There are numerous files that are at risk of damage or destruction due to the condition of the building. The commission is expected to have a significant role in monitoring the situation in earthquake affected districts and overseeing the human rights approach to ensure equitable recovery planning and implementation.

Several prisons in Nepal were also affected by the earthquakes. In particular, the central prison in Kathmandu, Bhadra Bandi Griha, suffered severe damage. Buildings collapsed killing 16 inmates and injuring another 23. In Sindupalchowk, the prison collapsed, allowing more than 200 prisoners to escape. Similarly in Dolakha District a prisoner housing block has also collapsed.

Damage and Loss

The cost of damage to the buildings is NPRs 16,690,429,775 (USD 166,904,297). This represents data available at the time of the assessment. Data gaps remain, with for example the Ministry of Urban Development waiting for more formal estimates of rebuilding/renovation costs for central level buildings. This includes the Election Commission building, the Office of the Auditor General, the Department of Personnel of the Ministry of General Administration among others. These are being collected.

Currently, the GoN is carrying out assessments of damages to the institutions in each of the villages within the most affected 14 districts. Five hundred teams have been deployed for this exercise, each team comprising five civil servants. The results are expected to be ready in mid-June and will give more detailed information. The current data in the PDNA is from Government sources as of June 10th. This includes data from the Nepal Army that estimated damage for the entire country.

As Governance is a cross cutting sector, the loss will be considered by other sectors, namely revenue and staffing costs.

Table 1: Breakdown of type, number and cost of damaged buildings⁴⁹

Type of Building	No of districts assessed	Number Damaged (fully)	Number Damaged (partially)	Cost of Damage	Reconstruction per building	Cost of Reconstruction
VDC building	14	178		756,500,000	5,000,000	890,000,000
DDC building	14	9	13	603,500,000	50,000,000	710,000,000
Municipal Building	14	11	13	550,800,000	40,000,000	648,000,000

⁴⁸ Interim Constitution Art. 132 (1).

⁴⁹ The number and estimated cost of the buildings were received from the Ministry of Home Affairs (police, prisons, and district administration offices), Supreme Court (courts), Office of Attorney General, Ministry of Federal Affairs and Local Development, Financial Comptroller General, Ministry of General Administration, National Planning Commission, Nepal Army and the National Human Rights Commission.

Municipal Ward Building		147		624,750,000	5,000,000	735,000,000
DTCO	14	5		85,000,000	20,000,000	100,000,000
District Court	31	22		294,525,000	10 - 80,000,000	346,500,000
Police office	17	25		318,750,000	15,000,000	375,000,000
Police post	17	66		280,500,000	5,000,000	330,000,000
District Attorney	31	5	14	45,050,000	5,000,000	53,000,000
Appellate Attorney	31	3		8,415,000	3,300,000	9,900,000
Bar Association	31	5		21,250,000	5,000,000	25,000,000
District Administration Office	31	15		637,500,000	50,000,000	750,000,000
Ilaka Office	31	15		127,500,000	10,000,000	150,000,000
Border Office	31	5		42,500,000	10,000,000	50,000,000
Prisons	31	34	6	3,640,000,000	100,150,000	3,645,460,000
Supreme Court	1	1		51,009,775	60,011,500	60,011,500
Judgement Execution Directorate	1	1		17,000,000	20,000,000	20,000,000
National Human Rights Commission	1	1		865,980,000	1,018,800,000	1,018,800,000
Auditor General	1	1		340,000,000	400,000,000	400,000,000
Ministry of General Admin	1	1		297,500,000	350,000,000	350,000,000
Ministry of Home Affairs	1	1		297,500,000	350,000,000	350,000,000
OPMCM	1	1		850,000,000	1,000,000,000	1,000,000,000
NPC	1	1		850,000,000	1,000,000,000	1,000,000,000
DOLIDAR Building, Shree Mahal, Pulchowk	1	1		212,500,000	250,000,000	250,000,000
Kathmandu Metropolitan City, Bagh Durbar	1	1		212,500,000	250,000,000	250,000,000
Central Registration Department, Narayan Bhawan (Women Development Training Centre)	1	1		85,000,000	100,000,000	100,000,000
Nepal Army	Whole country		1109	4,844,900,000		
Total		556	1155	16,960,429,775		13,616,671,500

Disaster Effects and Impact

Before the earthquake, filling all positions at municipal, district and village level was challenging. At the district level, most of the DDCs had gaps in officer level positions and there were frequent staff transfers of Local Development Officers, with the standard two year term often cut short due to personal preferences or upon request by political parties.

Challenges were exacerbated at the village level, where civil servants are often reluctant to be posted to remote areas. With the bulk of the response and the expectations of the population firmly on the VDC Secretary, these posts – at a time when they are particularly needed - may become even more difficult to fill. In some cases, the VDC Secretaries also feel personally insecure as they are unable to deliver the needed relief. Much of the civil service housing has been destroyed so until this is rebuilt, the posts are even less attractive. Restoring infrastructure at the VDC level, along with enforcement of GoN policies mandating staff to remain in such posts for a minimum period of time, will strengthen government services and relations with local communities. The GoN Integrated Action Plan 2015 states that the Ministry of General Administration should ensure all deputed staff return to their positions in the earthquake affected areas which should increase the number of VDC Secretaries on the ground.

While there is no doubt that every institution and its personnel concerned did their best to cope with the unimaginable level of challenges, the response to the disaster showed the need for a coordinating body with the overriding authority to mobilize resources, both human and capital at the central level. These lessons will be reflected into engineering an intergovernmental system that builds back better. This coordination body should be governed by a new Law on disaster risk management that sets out the roles of the different institutions including ministries such as the Ministry of Women, Children and Social Welfare and the different district level institutions.

Concerted actions will need to be taken by the Government to ensure transparency and accountability during the post disaster period. This is especially important for financial resources, and systems and procedures that already exist such as the central treasury system for Government resources should be used rather than newly created systems.

The district plans for the next fiscal year 2015- 2016 have already been completed and these will need to be reprioritised. Due to the tight timeline, the participatory planning process set up by the MoFALD may not be fully utilised for this reprioritisation. The social mobilisers can be used to reprioritise with the local government mechanism to ensure participation of the local communities.

The impact upon the more vulnerable populations will be particularly severe due to their lack of access to services and economic opportunities. Caste, ethnicity, language and religion remain the major sources of cultural identity. The country is struggling hard to reduce, if not eliminate, the gender-based, caste-based, ethnicity-based and spatial exclusions created by socio-economic and geo-political structures. For instance, women and girls lag behind men and boys because of disparities in education, lack of fair representation in decision making, low access to employment opportunities, limited access to and utilization of essential health care services and a high vulnerability to gender-based violence. These vulnerable communities need to be initially prioritised within the recovery planning framework as the most affected areas are the more remote regions which have been historically marginalised.

Dalits represent 10-17% of the population, and are often among the poorest in settlements; separated from other caste/ethnic communities. As Dalits were traditionally not permitted to own land, they often still lack any landholdings and rely on the local cash economy to support their families. If the GoN requires land title for resettlement, this presents a barrier to those without land title. Also nearly 100,000 Nepali citizens, often Tamang, Gurung or Ghale live in the northern VDCs along the Chinese border. Often these communities lack political influence in the district centres or central GoN due to language, religion, ethnic distinctions and isolated geographical locations. Given the High Himalayan environment and harsh winters, families in these remote VDCs should receive priority for early housing support– preferably before the snows of 2016 set in.

The monsoon will further compound the impact of the earthquake. Waterproof temporary office space needs to be provided to districts, municipalities and villages with destroyed buildings to ensure that administrative services can continue to be provided. On a practical level, where some paper based records have been salvaged, temporary storage is critical to save these from further deterioration before the monsoon. In addition, physical access to certain areas will be reduced due to landslides and this will compound the already difficult situation for the civil servants and the population in these areas. In addition, this period will be when the district plan needs to be revised; the monsoon will prevent access to more remote areas for consultation on priorities. Alternative consultation methods will be used such as phone communication with Ward Citizen Forum members.

Recovery Needs and strategy

Recovery and Reconstruction for Governance Sector

Reconstruction should take into account factors which would mitigate future hazards and risks. The new building designs for Government buildings should include considerations for more responsive service delivery, electricity provision through solar power and earthquake resilience. Recovery should be carried in a participatory manner with improved accountability mechanisms, planning and basic service delivery. This includes both coordination amongst the different ministries and with the different development actors including NGOs and most importantly the population.

The total cost of reconstruction is NPRs 13,616,671,500 (USD 136,166,715).

Key recovery needs are:

- Staffing, both numerically and in terms of new technical capacities to strengthen existing institutions. Priority could focus on recruiting locally from affected communities.
- Fiduciary risk mitigation at all level especially local levels
- Service delivery through participatory governance
- Expansion of effective patrolling and security provisions, in collaboration with local stakeholders to address the issues of violence against children and women, especially controlling the trafficking, sexual violence and child labor.

These need to be applied specifically to the most affected 14 districts as a first priority and then to the other 17 districts, while policy framework and coordinative mechanism are strengthened at the central level. Following the principles of 'build back better' the goal will be that these districts can serve as local governance and disaster risk reduction models once the reconstruction and state restructuring has been completed.

The recovery plan for governance sector will ensure capacity for service delivery and the total cost is NRPs 3,028,500,000 (USD 30,285,000) – see table 4 for breakdown.

Broader Governance Strategy to Support Recovery

Support to governance functions in the post-disaster period is critical for timely reconstruction and economic recovery, but equally for the continuous delivery of social security entitlements and other public services to local communities, including more marginalised groups and IDPs alike. This will also improve the public trust towards the capacities of the state to play its role of protection for all citizens, including the most vulnerable. We can also take this opportunity to address underlying institutional weaknesses and imbalances, and ensure that the governance systems for recovery are built back better. The strategy aims to strengthen the processes that the government needs in order to deliver recovery and reconstruction in a secure environment, whilst recognizing the current discourse on state restructuring.

The post-disaster recovery presents an opportunity to further redress inequalities through the allocation of recovery financial and human resources. The Government of Nepal's long-established and institutionalized principles and practices in gender-responsive budgeting will be applied to all the recovery strategies.

Also, given the widespread response of civil society to the crisis, it is vital to strengthen the capacity of both the GoN as well as civil society institutions. Nepali civil society has evidenced an immediate self-organizing capacity to the earthquake. A broader governance strategy will seek to tie the official responsibilities of the GoN closer to the vibrant civil society that has responded with such generosity and dedication to the national disaster. In this regard, as much as possible, new capacity building activities should be planned in a way that strengthens Nepali civil society organizations, both the established agencies, as well as newly established professional associations, volunteer associations and community leaders for whom these skills, trainings and curricula will further strengthen their relationship with the GoN in order to respond to future natural disasters.

Based on the initial qualitative impact assessment, the governance sector needs multidimensional support as follows:

- Restoration of infrastructure and assets as needed to sustain their operations
- Policy guidance for recovery strategy and planning
- Accountability mechanisms such as social audit, public audit and public hearing,, including Right to Information (RTI) strengthened at the district and VDC and municipality levels
- Inclusion of women, youth, historically marginalized communities and vulnerable groups in decision-making especially those adversely affected by the earthquakes
- Capacity development for crisis response coordination horizontally and vertically
- Expansion of awareness, security/patrolling and community based monitoring to respond to the issues of violence against women, girls and children, such as trafficking, sexual violence and child labor

Specifically the strategy will be to strengthen coordination, participation and equitable distribution of resources and opportunities.

The Government of Nepal's long-established and institutionalized principles and practices in Gender

Responsive Budgeting (GRB) will be applied to all the recommendations of the Post-Disaster Needs Assessment. Moreover, the post-disaster recovery presents an opportunity to further redress inequalities through the allocation of recovery financial and human resources and it is therefore recommended that budget allocations under the Government's GRB framework should be increased."

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Specifically the strategy will be to strengthen coordination and participation.

Table 2 on recovery and reconstruction initiatives and costs

The total cost for reconstruction and recovery is NPRs 16,645,171,500 (USD 166,451,715).

Functions						
Reconstruction of Buildings	Rebuild district and central level government buildings	4,538,890,500	4,538,890,500	4,538,890,500	13,616,671,500	Reconstruction of Buildings
Sub Total					13,616,671,500	Sub Total
Building Capacity for Service Delivery		1,439,000,000	768,100,000	533,900,000	2,741,000,000	Building Capacity for Service Delivery
	Provide technical assistance and training to districts in planning, financial management, procurement, geology and engineering	x	x			
	Capacity Development at the central level	x	x	x		
	Incentives to VDC secretaries	x				
	Set up guidelines for unspent funds in the 14 most affected districts to be reprogrammed for the next fiscal year	x				
	Strengthen capacity of WCFs and Social Mobilisers (from LGCDP) to support VDC Secretary in identifying the population and reissuing identity documents	x				
	Clarify guideline/ budget for expenditure reporting at the village level and make it a requirement to receive funding at the village level	x				
	Provide temporary structures for district buildings	x	x			
	Information Campaign on building codes	x	x			

	Hire temporary engineering staff (cluster VDC)	x	x			
	GoN permanent book-keepers and engineers at ilaka level - cluster VDC level including women and people from marginalized communities	x	x	x		
	GoN permanent employees for new municipalities including women and people from the marginalized communities		x	x		
	Set up electronic records and guidelines for land and identity documents		x	x		
	Building Code enforcement through technical assistance to the District Technical Office, VDC and Municipality (Mason, contractor, technician, house owner)	x	x	x		
Promote coordination and participation		91,000,000	102,500,000	94,000,000	287,500,000	Promote coordination and participation
	Participatory recovery planning guidelines developed (including DDRC)	x				
	Technical assistance for recovery planning and budgeting	x				
	Legislation on audit at sub district to be passed	x				
	Information provided about the grievance procedures and anti-corruption bodies and processes to the population	x	x			
	Right to Information campaign targeted WCFs and the general population	x	x			

	Support the coordination of recovery through technical assistance to the central body responsible for recovery	x	x	x		
	Once cabinet approved accountability mechanism used across each institution at the district and sub district level - Local Body Resource Mobilization and Management Operation Guidelines (LBRMMOG)		x			
	Review district recovery plan every four months through public hearings		x	x		
	Strengthen the Office of the Auditor General to carry out audits in all 14 most affected districts with additional temporary staff		x	x		
	Public Audit systems strengthened with technical audit from DTO and capacity building of WCFs		x	x		
	Set up a permanent secretariat for the DDMC and a contingency fund		x	x		
Sub Total		1,530,000,000	870,600,000	627,900,000	3,028,500,000	Sub Total
Total		6,068,890,500	5,409,490,500	5,166,790,500	16,645,171,500	Total
Functions	Description of Initiatives	Year One	Year Two	Year Three	Estimated cost (NRS)	Functions

Implementation Arrangements

The strategy for recovery of the Governance sector is set out in three areas. These are (i) Rebuilding and repair of Government infrastructure, (ii) Ensuring capacity for service delivery, and (iii) Strengthened coordination and participation.

Rebuilding and Repair Government Infrastructure

An immediate priority is to repair or rebuild damaged or destroyed buildings. The assessment estimates government buildings in need of repair or rebuilding at a cost of NRPs 13,616,671,500 (USD 136,166.715). These figures are estimates and the government engineers will develop detailed structural assessments and designs. As the assessment is deepened it will be necessary to differentiate – particularly for police and VDC's - which buildings were owned by government and rented by government, and the appropriate mechanisms for financing repair or reconstruction used. It will also be necessary to examine the in-depth analysis produced by the government assessments team at the district and village level.

Ensuring Capacity for Service Delivery

Human Resource Management in Local Bodies

Short Term

The VDC structure needs to be urgently strengthened with additional human resources. The two most key positions that are needed are an Accountant/Book Keeper and an Engineer/Overseer. These positions should be recruited initially on a temporary basis within the short term, with a process for permanent recruitment of an accountant and book keeper following. These positions could be placed at the ilaka¹ level to cover a cluster of VDCs.

For the 14 most affected districts covering 580 VDCs, 116 engineers and 116 accountants² will be needed. Specific measures should also be undertaken to provide additional incentives or bonuses for the work of the VDC Secretary in coordinating the relief.

With the ongoing debate regarding the restructuring of the State of Nepal and federalism, the district level should be strengthened on a temporary basis for recovery planning and implementation. Once it becomes clearer how this will dovetail into the potential provincial level, then permanent appointments could be made.

Medium/ Long Term

At the municipal level, Planning, Technical Officers and accounting personnel should be prioritised for recruitment within the 37 new municipalities in the 14 most affected districts.

¹ This is a unit under the district; it is a cluster of VDCs. It does not have an accompanying administrative structure. The Central Statistics Bureau states there are 967 ilakas in the 75 districts of Nepal.

² The panning guidelines state that there are 5 – 9 VDCs per Ilaka, therefore this has been calculated on the basis of 5 VDCs per Ilaka.

Financial Management

Financial Management needs to be strengthened at the village and municipal level, including: 1) setting up a guideline and template for expenditure reporting at this level; 2) training the new accountant/book-keeper; and 3) making this a requirement for funding tranches for recovery.

Short Term

The GoN has authorized the treasury to utilize all available budgets for relief and reconstruction. In the 14 most affected districts, unspent budgets from the present fiscal year should not be recouped and considered as unspent capital budgets, but be utilised for relief expenses up to the end of the fiscal year. Any remaining monies can be allocated to relief activities in the coming fiscal year. Clear yet succinct GoN guidelines should be written and approved before the close of the financial year to allow for this VDC-level reprogramming including the use of the 35% block grant for women, children and disadvantaged groups, and ensuring that such funds benefit all earthquake affected persons, including marginalized groups.

Record Management

Short Term

The assessment of the damage to the records is being carried out by the assessment teams that the Ministry of General Administration has sent out. It is not yet clear the number of records that have been destroyed. With 178 VDCs fully destroyed, it is assumed that the number of VDCs lacking records will be higher than this. However, these are vital for the re-issuing of identity documents and the Government will reinstate those using consultations within the local community through the VDC Secretary. An urgent guideline should be shared with the districts on how to issue earthquake victim ID cards, re-issue citizenship documents, and re-establish vital events records and social security beneficiaries. This guideline should include using the ward citizen forums to assist in confirming the identity of individuals; additional temporary staff to assess land documents and provide new documentation; and working with the district technical officer as the arbitration/ grievance mechanism for the process.

Medium/ Long Term

These records should be put on databases in a comprehensive manner and backed up at the provincial and central level. A citizen service centre should also be set up at the district level with mobile units at the village level to make the procurement of these documents by the population easier

Guidelines on how to re-establish other critical information such as accounts, bills and audit records, need to be provided as failure to provide these will cause an automatic failure of minimum conditions in annual assessments and result in a significant reduction of capital grant allocations the following year.

Under the third 5-Year Justice Sector Strategy 2014-2017, the Supreme Court was already setting targets to begin automating certain court processes. This crisis provides an opportunity for the justice sector to look at digitizing court records in addition to increasing the court administration efficiency. As part of the Strengthening Rule of Law and Human Rights Project (RoLHR) there is currently an ongoing effort in the Office of the Attorney General to digitally archive closed cases at the central level. This programme could be accelerated and expanded to include open cases and those at the districts to mitigate any future issues with loss of files and documents.

Building Code

Short Term

Infrastructure projects at the DDC are supported by the District Technical Office (DTO), but they normally do not have the capacity to provide technical support to VDCs and only serve the largest infrastructure projects in Municipalities. With the injection of engineering skills to the district and village, there will be more capacity to share information about the building codes. The capacity of the municipalities and districts will be built in terms of understanding the code and how to apply it, specifically the District Technical Officer. A tax break for housing tax can be explored as an incentive to ensure the building code is followed. An information campaign should be set up to ensure the population know the building code and the main characteristics of a safe building. Under the GoN's Integrated Action Plan, the Ministry of Urban Development and the Ministry of Federal Affairs and Local Development are responsible for this action. Legal enforcement of the building code will be likely to ensure greater compliance with the code.

Strengthened Coordination and Participation

Coordination at the Central Level

Short Term

A priority is to identify the gaps in the existing mandates and authorities granted to the Central Natural Disaster Relief Committee (CNDRC) so that they can respond in a timely and sufficient manner to the unfolding situations on the ground. Coordination will be needed across a multi-stakeholder platform³ for possible engagement in emergency operations, and media to ensure broad communication. The GoN has developed an Integrated Action Plan that sets out the different roles of for the government ministries and is in the process of defining an appropriate structure to lead the Earthquake response. Once this is decided, the institution should be strengthened for implementation and data management.

Coordination at the District Level

Short Term

A lot of the immediate response to the earthquakes have been carried out efficiently and quickly by civil society organisations and NGOs. The GoN will continue to work in collaboration with these I/NGOs and civic organisations at the local and national levels to ensure they have the required support and guidance needed to provide relief and reconstruction to the nation's citizens.

Medium/ Long Term

The District Disaster Management Committee will be strengthened through a secretariat to ensure that it is able to function as the main coordinating body for the response; this secretariat can also serve the District Disaster Relief Committee during the relief phases of any possible future crises. Technical assistance will be provided for recovery planning, budgeting and implementation.

³ In the case of Japan, in reflection of its numerous natural calamity experiences, Disaster Countermeasures Basis Act 1961 was promulgated, stipulating involvement of wider stakeholder involvement beyond government to be more comprehensively respond to disasters.

Accountability

Short Term

Detailed expenditure reporting from the VDCs is not currently a requirement for funding disbursement (from DDCs) within current GoN regulations. As they become the focus for recovery, transparent systems of reporting on financial resources will need to be strengthened. The Planning and Administration Officer in the DDC has also been appointed as the Grievance Officer, although it remains unclear how effective this has been in the aftermath of the immediate emergency, nor their pro-active role in handling any grievances or complaints.

To tackle the issue of accountability at the local level, GoN as a matter of priority needs to pass legislation currently in Parliament which, for the first time, would permit the Office of the Auditor General to carry out audits at the Municipality and VDC level. Audits are currently already carried out at the district level, and to promote district-level transparency and accountability the results of these district audits should be published locally and form the basis of three yearly public hearings within the district. In addition, MOFALD will give priority to implementing existing internal control mechanisms.

At the national and local level more public information should be provided to the local population, including through internet and community radio, on how citizens can use grievance management mechanisms so they can have their say on issues related to transparency and inclusion, as well as the specific priorities and means of implementation of recovery. The citizen awareness centres can be strengthened to deliver these campaigns. These right to information campaigns will be supported by the National Information Commission. The Right to Information Act (RTI) has been used more extensively at the central level to promote greater transparency. Similar promotion of this agenda at the district level will increase both the supply of and demand for transparency.

Medium/ Long Term

The MoFALD Local Body Resource Mobilisation and Management Operation Guidelines (LBRMMOG) approved by the Cabinet in 2012 includes a number of critical procedures that have proven effective to promote accountability and transparency at the local level⁴. The GoN is committed to implementing these mechanisms across the local bodies and devolved line departments to ensure that the earthquake recovery delivery is perceived as transparent and participatory.

Recovery planning

Short Term

The introduction of the WCF noted earlier has allowed for a participatory planning process in Nepal. The detailed description of procedures are to be found in the LBRMMOG. This includes holding a ward gathering to obtain demands of projects from the wider community and holding Integrated Planning and Formulation Committee (IPFC) meetings, including members from WCFs, as well as local political leaders, to recommend projects within the budget provisions to the local body council. Given that the FY2015 - 2016 participatory

⁴ The guidelines prepared by MoFALD on social audit, public audit and public hearings should also be utilized.

planning process was concluded for next fiscal year prior to the earthquakes, it needs to be reprioritised and budgeted to reflect new, more urgent priorities.

In order to set up a recovery plan and ensure its implementation, technical assistance would be provided at the district level to support the District Planning Officer to reprioritise the district plan by the end of August and to assist in its implementation. The GoN will develop a guideline based on the fourteen step planning process to ensure the timeliness of the recovery planning process, as well as participation of the population including women, Dalits and other vulnerable communities. The GoN will commit to greater gender and social inclusion in the provision of these new positions promoting women and marginal groups to increase the representation in the civil service. This guideline will look at the role of the social mobilisers and the WCF; it will attempt to rationalise the different mobilisers and combine them where possible.

The following assistance will be provided at the district level: 1) Planning; 2) Finance; 3) Procurement and 4) engineering. They will also coordinate with the DDMC and the newly established units of bookkeepers and engineers at the ilaka level. The GoN will ensure that new local staffing opportunities will recruit a broad mix of citizens, including women.

Assessment Methodology

Data has been collected through secondary sources from the central governments on the questionnaire developed jointly by the GON, UNDP and other development partners. The data on damaged buildings was received from the GON. This data is not in every instance broken down by district. The data from MoFALD and the Financial Comptroller Office covers the 14 most affected districts. The data for the Ministry of Home Affairs and the justice sector cover the 31 districts ascribed by the PDNA. The data from the Nepal Army has a figure that covers damages for the whole country both minor and major damage. For the purpose of this assessment, the buildings are all considered partially damaged. Three District visits were undertaken to assess the effect of the earthquake on the government structures at the district and village level. Government counterparts from major governance-related departments have also been consulted at the central level to gain information on recovery needs and the effects of the earthquakes on governance processes. The cost of reconstruction has been based upon prices given for buildings by the GoN. This includes equipment for the buildings, such as search and rescue equipment for the police, computers and furniture amongst other items. The damage cost is considered 15% less than the reconstruction cost. Partially damaged buildings are considered to be 40% of the reconstruction cost. All costs include equipment as well as building costs.

DISASTER RISK REDUCTION

Summary

The Post-Disaster Needs Assessment (PDNA) for the DRR sector is a joint effort of the Government of Nepal's relevant agencies, led by the National Planning Commission and the Ministry of Home Affairs and the Development Partners. The DRR Sector Assessment Team undertook consultations with relevant national and local government entities as well as field visits on 31 May 2015 in 3 different affected districts.

The DRR sector assessment estimated the cost of damage and loss on DRR system assets affected by the 25 April Earthquake and its aftershocks. DRR assets consist of search and rescue (SAR), seismological observation network, hydro-meteorological network, National and District Emergency Operations Centers (EOCs) and water induced disaster prevention measures. The total cost of damage and loss is NPR 154,883,200 (USD 1,548,832) with the highest reported on SAR related assets. Prior to the earthquake, investment in DRR assets was relatively low to have adequate disaster preparedness capacity and to respond effectively to the high natural multi hazards risks that Nepal faces.

DRR actions need to be multi-hazard and multi-sectoral, inclusive and accessible in order to be efficient and effective, enhancing a broader and more people-centered preventive approach to disaster risk. It is crucial to take this disaster as an opportunity to rebuild better, safer, and more resilient society by mainstreaming DRR in recovery strategy and encouraging DRR investment with a Build Back Better approach. In the recovery and reconstruction phase it is critical to prevent the creation of and to reduce disaster risk by Building Back Better and increasing public education and awareness of disaster risk, especially with the increased risk of landslides induced by the earthquake during the forthcoming monsoon (June –September). Noting the limited priority and resources given to DRR prior to the earthquake, improvements are urgently needed for the DRR system in Nepal in the short (6 months), medium (2 years) and long (5 years) terms to enhance the resilience of the country.

The following priorities are recommended:

Short term:

- Reconstruction of damaged DRR assets and improvements
- Improving preparedness, response, relief and logistics systems
- Strengthening Information and Communication capacities for relief, response and recovery
- Enhancing multi hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness

Medium to long term:

- Improving legal and institutional arrangements
- Mainstreaming DRM into development sector, particularly, housing and private & public infrastructure, Social sectors (health and Education) and Livelihood
- Improving integration of climate change adaptation and DRR, policy guidelines, institutional development

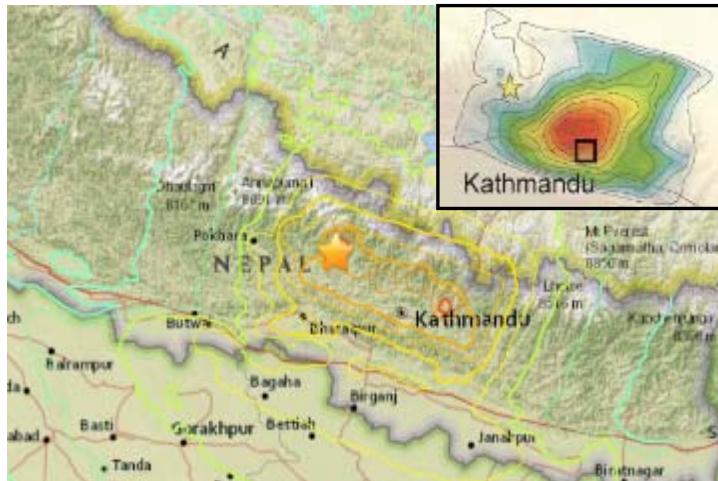
The total estimated reconstruction needs for the DRR affected sector is NPR 504,442,601 (USD 5,044,426). Based on the Build Back Better concept to further build resilience, the total additional recovery cost of NPR 7,699,570,000 (USD 76,995,700) was estimated. Consultations among sector experts, representatives of governments, civil society and development partners informed this estimate.

Pre-Disaster Context and Baseline

1.1 The 25 April 2015 Earthquake

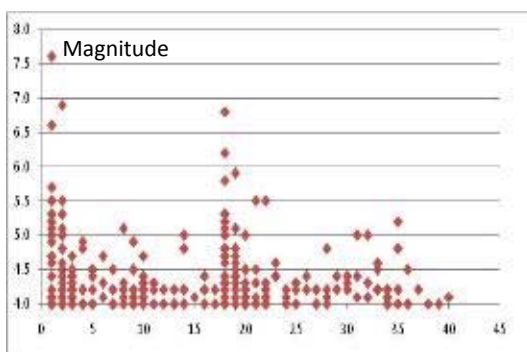
A strong earthquake of magnitude 7.8 (USGS), which was locally recorded as a 7.6 magnitude by the National Seismological Centre (NSC), struck the western and central Regions of Nepal, including Kathmandu Valley (KV) at 11:56 a.m. NST on Saturday, 25th April 2015. The earthquake was the strongest since the Bihar-Nepal earthquake in 1934.

The intensity on Modified Mercalli Intensity (MMI) scale at the fault area is mainly VIII (severe) with a very limited area of IX (Figure 1). The salient feature of ground motion records is a low peak value (PGA=164 cm/s/s), small response spectrum at short period (less than 1 second) and very long dominant period (around 4.5 second) compared to that of the events recorded in other areas. The most severe damage occurred mainly in the hilly areas northwest to northeast of KV. The reported losses as of 9 June are 8,781 dead; 22,303 injured; 6,266 public buildings damaged; 798,897 private houses damaged^{xix} and several cultural heritage buildings destroyed.

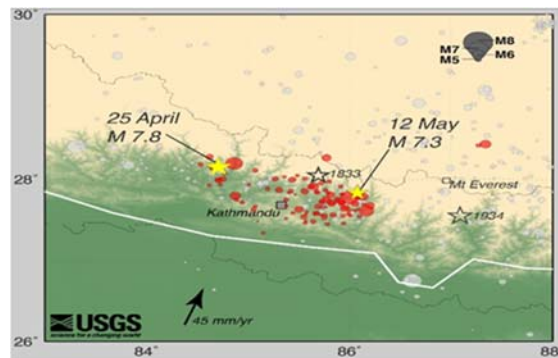


1.2 Aftershocks

Following the main shock of 25 April 2015, 300 aftershocks with $M > 4.0$ have occurred until 7 June. Four aftershocks were larger than $M 6.0$ and the largest one of $M 6.8$ ($M 7.3$, USGS) occurred on 12 May, which caused additional casualties of more than 200 dead and 2,500 injured. The distribution of aftershocks and their magnitude range is presented in Figure 2. The large aftershocks were strong enough to cause damage of vulnerable structures that had been weakened by the main shock. Aftershocks still continue and attention should be paid to damaged buildings and possible landslide disasters.



Days after the earthquake



Magnitude	Number	%
Major (7-7.9)	1	0.34
Strong (6-6.9)	4	1.38
Moderate (5-5.9)	36	12.41
Light (4-4.9)	249	85.86

Figure 2: Spatial and time distribution of aftershocks more than M4.0 (datasource:<http://www.seismonepal.gov.np/index.php?action=earthquakes&show=past>).

1.3 Secondary disasters

The ground motion of a strong earthquake not only causes direct damage or collapse of buildings, but also can trigger geological and/or geotechnical failure or other phenomena causing secondary disasters. The typical secondary disasters are fire, landslide, soil liquefaction, avalanches, etc. There were only three cases of fire in the KV after the 25 April earthquake. Avalanches and a number of landslides in the mountainous areas were identified by satellite imagery and field survey, and caused fatalities and damages to roads, constraining the relief activities (ICIMOD, <http://www.icimod.org/?q=18072>). A large landslide happened on 24 May 2015, which buried 25 houses and blocked the Kali Gandaki River. Liquefaction was observed in KV, without serious consequence. There was an avalanche in Langtang Valley, one of the popular tourist destinations, claiming reportedly more than 400 lives. The numerous landslides in fourteen districts damaged over 5,000 hectares of land.

The key issues relate to the general state of shock caused by the massive scale of the disaster, its high mortality, destruction of several decades' worth of housing stock. Continued seismicity in the country, combined with threat of monsoon related hazards and current status of preparedness and risk reduction remain significant concerns.

2 Pre-disaster sector status

2.1 Hazard, Vulnerability and Risk Profile

The vulnerability of the population in Nepal is a result of the interplay of low per capita income (\$ 742), poverty incidence (24%), high rural population (83%) where poverty rates are higher (27%) and is compounded by the rugged terrain in the middle and high mountains that is home to almost half of the total population scattered in settlements many of which are remote and difficult to access even in normal times. More than 55% of the poor rely on agriculture which is highly dependent on the monsoon and impacted by climate variability.

The geophysical location in one of the highest seismic risk areas, propensity to flash floods and landslides due to steep, unstable slopes are some of the natural factors that contribute to the country's high vulnerability.

2.1.1 Earthquakes

Nepal is located in a very high seismic risk area; large part of the country is Himalayan mountain range, where seismicity predominantly is due to collision of the Indian and Eurasian continental plates. Over the last 100 years, four large earthquakes preceded the 25 April 2015 Gorkha earthquake, in 1934, 1980, 1988 and 2011.

Most of the country could experience earthquakes with intensities on MMI scale of VIII (Severe), IX (Violent) or X (Extreme). (*NSDRM, 2009*)

The impacts from these earthquakes are magnified several-fold due to the high physical vulnerability of traditional (stone and mud) or inadequately designed masonry or reinforced cement concrete (RCC) framed structures, remoteness, rugged terrain, and other societal vulnerabilities that place Nepal in 37th position out of 172 countries. (*PDC Global Risk and Vulnerability Assessment*)

2.1.2 Floods

Terai plains are affected by riverine floods due to huge sediment loads, mid hills are prone to flash floods due to high intensity or continuous rainfall, while high mountain areas are at risk from glacial lake and landslide dam outburst floods. The monsoon period from June to September poses the highest flood risk in the country.

The impacts of floods on lives and livelihoods are enormous - affecting over 3.8 million people, 200,000 ha of crop lands, resulting in losses of over 3,100 lives and NPR 6 billion in the last three decades alone. (*Desinventar*)

2.1.3 Landslides

Landslides and slope failures are among the most common hazards in Nepal, due to geography (steep, fragile slopes), triggered by natural causes (earthquakes and heavy or intense rainfall) and human influence (deforestation, unplanned development, cultivation and settlements). The hilly districts of Siwalik, Mahabharat range, Mid-land, fore and higher Himalayas are all vulnerable; and the central, eastern and western regions have reported most frequent and severe impacts. In June 2014, a landslide in Sindhupalchok killed 156 people and blocked the Sunkoshi River creating a huge lake for 37 days and raising concerns of flooding downstream. Overall, over 4,000 lives and NPR 1 billion have been lost due to landslides in Nepal over the last three decades.

2.1.4 Droughts

Droughts are very common in districts of hill and mountainous ecological zones of the far and mid-western regions, and the Terai ecological zone of the eastern region. Droughts over the previous decade alone have resulted in a production loss of 1.7 million tonnes of food grains, affecting over 12 million people, which is four times more than floods and landslides put together.

2.1.5 Others

Avalanches, cold waves, windstorms, hailstorms, thunderbolts, epidemics and fires are among the other most significant disasters. Fires, especially in settlements, are among the most reported disasters and resulted in the highest losses (NPR 9 billion in the last three decades), while epidemics have led to over 16,000 deaths, higher than all other disasters put together. The eastern and central regions have reported most losses from fire, and the mid-western region the most deaths due to epidemics.

The records between 1971 and 2010 reveal that climate-related disasters accounted for almost 25% of deaths, 84% affected by disasters, and 76% suffered economic losses. It is evident that destructive earthquakes occur in Nepal with greater return periods (80 years on average) but have graver consequences than the more frequent disasters such as floods, landslides and droughts. The previous seismic event of

comparable magnitude and impact was the 1934 Nepal-Bihar earthquake which led to liquefaction and severe impacts in KV and hence until the 25 April 2015 earthquake was basis for worst-case scenario planning for KV.

2.2 DRR System in Nepal

Status of the DRR system is enumerated under the five priority actions envisaged as per the National Strategy for Disaster Risk Management (NSDRM), 2009.

2.2.1 Institutional, legislative and policy systems for DRR as national and local priority

The Central Natural Disaster Relief Committee (CNDRC) and the District Disaster Relief Committees (DDRCs) coordinate all post-disaster rescue, relief and response activities, at the national and district levels respectively. The Ministry of Home Affairs (MOHA) is the national focal agency for Disaster Management (DM). A Department for Fire Service and Disaster Management, recently established under the Ministry of Federal Affairs and Local Development (MOFALD) needs to develop its capacity for effective fire response. Success of Integrating DRM into national and sectoral plans, led by the NPC, is still behind the expectations and suffers from not having a system of providing coherence guidance to the sectors for DRM budget allocations.

The overarching legal instrument is the predominantly relief and response oriented Natural Calamity Relief Act, 1982 (amended in 1989 and 1992). National Climate Change Policy, National Adaptation Programmes of Action (NAPA), and Local Adaptation Plan of Action (LAPA) articulate the integration of CCA into development processes at national and local levels. The Local Self Governance Act, 1999, empowers local bodies to take charge of disaster mitigation and recovery planning and mitigation, while the Building Act (1998), amended in 2007 makes implementation of the National Building Code mandatory in all municipalities. The NSDRM, 2009 outlines over 29 activities and builds on the Hyogo Framework of Action (HFA), but its translation into concrete action has been weak.

The Nepal Risk Reduction Consortium (NRRRC) was set up in 2009 bringing together key national agencies and international partners to prioritise and implement key activities of the NSDRM in a coordinated manner. The National DRR Platform was established in 2009 for better coordination and information sharing among DRR actors in Nepal. The Disaster Preparedness Network (DP-Net) comprising of most NGOs, INGOs, International organizations and UN agencies involved in DRM serves as the secretariat to the National DRR platform.

2.2.2 Identification, assessment and monitoring of disaster risks and EWS

Earthquakes, floods and precipitation events are monitored through networks managed by National Seismological Centre of the Department of Mines and Geology (DMG) under Ministry of Industry and the Department of Hydrology and Meteorology (DHM) under Ministry of Science, Technology and Environment respectively. The seismic network comprises of 21 short-period seismic stations, 7 accelerometer stations and 29 GPS stations. The Birendranagar Regional Seismological Centre at Surkhet records data from 9 seismic stations in mid-western and far-western Nepal while the National Seismological Centre at Kathmandu records data of 12 stations from Pyuthan to Taplejung.

Early warning systems (EWS) for floods in 12 high risk areas of the Terai are largely community-based, while flood warning with a few hours lead time is provided by DHM based on upstream real-time gauge and precipitation measurements at 16 locations in 6 river basins (Karnali, Babai, West Rapti, Narayani, Bagmati

and Koshi). GLOF early warning systems were put in place for two of the highest risk locations (TshoRolpa and Imja) in the past which need further strengthening and better linkages with the community.

Risk assessments have been carried out in a fragmented manner covering parts of the country and addressing particular sectors or hazards, except for the nation-wide Multi-Hazard Risk Assessment completed in 2010. Landslide risks are assessed by agencies under three different ministries- , i.e., by the Department of Mines and Geology, the Department of Soil Conservation and Watershed Management and the Department of Water Induced Disaster Prevention. A three-phase process was initiated to conduct a nation-wide risk assessment through the NRRC, and is currently in the first (stock-taking) phase. Moreover, 265 schools in the Kathmandu Valley and 60 hospitals have also been assessed for safety. MOHA maintains a database of disaster events through its SAHANA Disaster Information Management System.

2.2.3 Enhanced preparedness for effective response

Nepalese Army, the Nepal Police and Armed Police Force comprise the first responders to any emergency in the country. They have personnel for search and rescue (SAR) and limited sets for collapsed structures and water SAR. The three security forces have separate divisions for SAR. In case of a large-scale disaster, the government has mechanisms to see assistance from neighbouring countries and international community on SAR, in which case the international teams work under the lead of the national forces.

MOHA has set up the National Emergency Operation Centre (NEOC) and Regional, District and Municipal EOCs, which are active currently in 46 districts. The MOHA's Guidance Note on Disaster Preparedness and Response Planning, 2011, forms the basis for disaster preparedness and response plans formulated in all 75 districts. The Prime Minister's Disaster Relief Fund and MOHA's regular Central Disaster Relief Fund finance disaster response activities, with the provision for establishing similar funds in districts. Preparedness programmes encompass critical areas like education and health. Security forces, humanitarian clusters and communities living in disaster prone districts actively participate in response coordinated by district disaster relief committees. Simulations/ mock exercises have been conducted in some districts in 2013, but the national simulation has not yet been conducted.

The National Disaster Response Framework, 2013 outlines the roles and responsibilities for an effective response involving a range of stakeholders from ministries, departments, security forces, diplomatic missions, UN and International agencies, NRCS, NGOs and professional bodies. It also identifies 49 key actions to be initiated by relevant lead agencies to operationalise the NDRF. Whilst its implementation is noted to be moving well in some areas, it is also lagging behind in others. MOHA has also formulated several related guidelines for disaster response, e.g. on: dead body management, relief, civil and military assets, and international military assistance. The NDRF has specified the specific roles and responsibilities of different line ministries and government agencies. The prepositioning of relief and response stocks is limited to some agencies like NRCS, some INGOs and the UN. Methodologies and capacities exist for Initial Rapid Assessment (IRA), Multi-cluster/sector IRA and detailed cluster-specific assessments, and the contextualisation of Post Disaster Needs Assessment methodologies and related training is planned.

2.2.4 Reduction of underlying risk factors- policies for mitigation

Vulnerability of population in Nepal is greatly linked to higher incidence of poverty of the majority of the population living in the rural areas (83%) in scattered settlements compounded by the fragile mountainous

terrain. This trend however is rapidly changing with a dramatic shift to increase in urban risk with consequent impact on vulnerability patterns.

Legislation, policies and plans for environmental management exist through the Environment Protection Act, 1996, Rules, 1997 and Environment Impact Assessment (EIA) Guidelines, and the National Adaptation Programme of Action (NAPA) offer opportunities for integrating DRR. Likewise, sound forest management, soil conservation and watershed management practices contribute to DRR but integration of climate risks into forest and watershed management planning has still not been fully realized and the underlying risks are not addressed during implementation. Despite agriculture being a national priority, prioritisation of strategies and actions in agriculture is not adequately informed by comprehensive assessment of climate/disaster risks and impacts, availability of specific weather-based agro-advisories and needed resources. Integration of CCA and DRM into periodic plans at national level led by National Planning Commission (NPC) is still at the beginning with respect to reflection of CCA/DRR priorities into sectoral plans and budgets.

Structural vulnerability is addressed through the National Building Code, 1994 and Building Act, 2007, but its implementation is limited to only few municipalities because of limited enforcement capacities of local bodies and awareness among the population. A retrofitting guideline drafted for the most common construction typologies is pending for approval. Safety standards for infrastructure for multi-hazard risks do not exist. Despite a national land use policy is in place its implementation is quite weak. A Risk Sensitive Land Use planning process has been recently initiated for the Kathmandu valley by the Kathmandu Valley Development Authority.

2.2.5 Information and Knowledge management - building a culture of safety and resilience

MOHA maintains a database of disaster events through SAHANA Disaster Information Management System and through DRR Portal, while Desinventar, disaster and loss database has records of disasters from 1971. Disaster information is shared through the mass media (TV, radio), social media, websites and with the districts through the NEOC. The annual Earthquake Safety Day to commemorate the 1934 earthquake event and International Day for Natural Disaster Reduction are some of the regular awareness campaigns.

Integration of DRR into curricula of primary, secondary schools and universities is advanced and specific DRR education programmes are offered in a few universities. Training conducted for government officials by the Nepal Administrative Staff College and the Local Development Training Academy also integrate disaster/climate risk management. The security forces (Army, Police and Armed Police Force) conduct specific training on disaster management for their personnel.

The DRR system is still relatively new, several milestones have been achieved such as the formulation of the NSDRM, NDRF, setting up of the NRRC. Yet, political instability and other pressing priorities have resulted in a number of set-backs- the legislation is not enacted, lack of technical, financial and human resources hinder implementation of initiatives which are seen in isolation. The NSDRM and the NRRC were attempts to address these lacunae, but have yielded limited success compared to the needs and the risks.

3. Overall assessment of DRR System performance

3.1 National Level Coordination and Response

Overall response to current disaster can be taken as a real test of coordination and response capacity of the government at national and local levels and effectiveness of the tools and systems built for that. NDRF was found to have served as a key tool for coordination. Decisions and instructions from central government were based on the objectives and scope of the NDRF. The first meeting of Central Disaster Relief Committee (CNDRC) was held after 2 hours of Earthquake event (1156 hours NST) on April 25 with the NEOC providing an initial report to the CNDRC recommending focus on search and rescue, lifesaving actions and declaration of state of national calamity. Financial resources from PM relief fund was allocated, an appeal for international assistance made and the Government's Cluster mechanisms comprising 11 sectors and co-led by international and UN agencies was activated.

Critical decisions and activation of response measures were undertaken under 7 hours of the stipulated response time indicating that the NEOC, CNDRC performed their coordination functions well within the timeframe during the first critical hours of the disaster response. Subsequent CNDRC meetings were held regularly (on 27th Apr, 30th Apr, 3rd May, 10th May, 12th May) focused on plans for effective search, rescue and relief related activities such as transit shelters, facilitation of entry of humanitarian assistance into the country and customs clearance procedures.

The key respondents consulted felt that conduct of a National Simulation planned since 2014 could have further smoothed some of the actions undertaken at the national level, though the scenario for the planned simulation envisaged maximum impact in the valley, including on vital services and lifelines. This disaster has wreaked much greater impact on rural areas than the KV.

3.2 District level Coordination and Response:

District authorities were overwhelmed with numerous overlapping and changing versions of reports demanded by the central government, various Ministries and international humanitarian agencies. Due to systemic capacity gaps existing at the local level to respond to large scale disasters, CDOs have exercised their crisis management roles using their own experience and judgement through DDRC mechanism starting since Day 2. DDRC has been the operational mechanism for local coordination, updating on damages and needs, prioritization of response and discussions for follow up of various agencies. District consultations revealed that DPRP was not effectively utilized in the response.

The use of humanitarian cluster system was highly uneven due to unfamiliarity by the subnational stakeholders. Although under resourced, the VDC Secretaries were very active and the Ward Citizen Forum and Social Mobilizers played important role in operational coordination at the village levels.

Multiple sources of information coming from the districts to the centre in the beginning made the damage analysis more complex and decision making difficult. Field observations indicate confusion over mechanics for selections of recipients of relief and compensation particularly for those whose houses were damaged by the earthquake.

3.3 Emergency Operation Centres

The communication network of the EOCs was very important and functional connecting the central command system to the districts. Information flow between NEOC and DEOC needs substantial improvement in terms of data quality and its effectiveness in providing timely information and basis for appropriate crisis management decisions at national and sub national level. SAHANA DIMS tailor-made for such situations was not utilised. However, DRR Portal served good for collection and dissemination of damage and loss related

data. From the field visits it was found that there was limited operational relationship between DEOC and VDCs. Except for Kathmandu, there was limited use of a disaster management or contingency plan^{xx} in the districts.

Where they are established and operational, DEOCs in Districts provided the much needed communication system especially during the immediate aftermath of the earthquake⁵. In the districts where physical locations of the EOCs were impacted because of the earthquake, alternative arrangements were made using local Police offices to serve as the hub for disaster related information. The effectiveness of the DEOC in terms of communication was limited by turnover of trained staffs (police), unfamiliarity with SAHANA DIMS and lack of reporting templates. DEOC's potential for serving as coordination platform at the district level was further constrained by limited attention given to information management. District/s visited lack the basic system for information management, including display of crisis management information and public information.

3.4 Search and Rescue (SAR)

Although a professional and integrated national search and rescue capacity has yet to be formed in accordance with the National Strategic Action Plan for Search and Rescue, 2014, the trained human resource of Nepalese Army (NA), Nepal Police (NP) and Armed Police Force (APF) carried out effective Search and Rescue (SAR) and saved lives despite several limitations. All key informants of this report indicated high level of satisfaction of the SAR operations particularly those undertaken by Nepal Police and the Security Forces. The Nepal Police Squadron in Kathmandu with 168 members reported rescuing 4 lives trapped under confined space of collapse structures. Additionally, 134 international SAR teams from 34 countries including from India, USA and China who arrived within 24 hours responded to Nepal's request for assistance and reported saving 16 lives. Nepal army coordinated for national rescue team and military aspects of international SAR Team. The UN Humanitarian unit coordinated international rescue team through INSARAG. An expression of gratitude and request for stand down of international SAR teams were made by CNDRC on May 3, 2015, based on assessment of capacity and needs at that time.

MOHA reported that "for SAR, 4236 helicopter flights were used (GoN/Private), with 7558 persons rescued by air and 4689 persons rescued by land." Media reports stated that 90% of the Security Forces were mobilized to focus on SAR and associated lifesaving actions. MOHA further reported that 22500 civil servants, 65059 staff of Nepal Army, 41776 staff of Nepal Police and 24775 staff of APF, and 4000 government health workers and private health workers mobilized for life saving actions.

There were complex SAR challenges including the lack of necessary equipment for location, extrication, and initial medical stabilization of victims trapped in structural collapse. SAR assets were also trapped inside damaged buildings and personnel deployed faced with hazardous environment, i.e. numerous aftershocks during the immediate 7 days while SAR was ongoing. As the potential to save lives of those trapped under collapsed structures rapidly declines from the time of an earthquake event, to near zero 24 hours later, it raises questions about the need for a large number of international teams who arrived in Nepal after the "golden 24 hour" period. Emphasis on organizing self-help measures and enhancement of national and local capacity of first responders were cited as desirable and SAR officials pushed for support and implementation of the National Strategic Action Plan for SAR.

⁵ From Day One reported in Sindhupalchowk and Kathmandu

3.5 Relief/ Humanitarian Assistance

Emergency relief and humanitarian assistance to the affected population was provided with active support and contribution from over 60 countries, UN and international agencies. Fixed wing and rotary aircraft were also engaged from friendly countries in carrying out numerous sorties to bring relief into the country and to distribute them in most affected, remote areas. A newly constructed humanitarian staging area established through WFP with support from UK aid at Tribhuvan International Airport (TIA) facilitated the receipt of cargo by air and by truck immediately after the earthquake and distribution around the country could commence. If such a facility had not been in place it would have taken weeks to improvise a logistics hub. The measures undertaken as a part of Getting Airports Ready for Disasters (GARD) programme in 2011 facilitated continued functioning of the TIA.

The flash appeal in support of response to the earthquake was launched on 29 April 2015 for an estimated US \$ 415 million (later revised to US \$ 422 million) required to meet critical humanitarian needs for the next three months. Till date, \$126.9 million or 30% of the appeal has been mobilised.

Transit shelters were established immediately with official support in Kathmandu using designated open spaces. Non-food items, particularly tarpaulins were inadequate with a surge in demand even from those families whose houses were not damaged due to fear of being trapped.

Outside of Kathmandu, in initial days almost all response efforts were based on self-help with many affected families staying close to their damaged houses. There were no prior investments in warehousing and logistics and prepositioning of relief items. In districts visited stocks of tarpaulins along with NFIs were found to be minimal. The “One Door” system for receipt of aid and relief distribution via DDRC was adopted, but in many instances this was not followed. At the sub national level, demand was articulated as a priority for access to “normal” government services, restoration of livelihood and cash grants for self-help transitional shelters. The most common constraint for relief operations and SAR is that landslides and floods in Nepal can isolate entire valleys or ranges given the specifically challenging topography and limited road networks. CDOs outside of Kathmandu and MoHA believed that this challenge strongly influenced their ability to respond on time.

Disaster Effects on DRR System and Impacts

4.1 Damage and loss to DRR system assets

Prior to the earthquake, investment in DRR assets was relatively low to respond effectively to potential disasters and to have sufficient disaster preparedness capacity. Total damages to DRR assets was NPR 154,883,200 (USD 1,548,832) with the highest reported on search and rescue (SAR) related assets at NPR 95,626,650. Damages to hydro-meteorological stations were NPR 41,800,000 and damages related to water induced disaster prevention department were NPR 14,156,550. District level Emergency Operations Centers (EOCs) reported damages of NPR 3,300,000 whereas very limited to no damage to the seismological observation network infrastructure were reported.

The damage/loss data was provided by the relevant government organizations: Ministry of Home Affairs, Department of Hydrology and Meteorology (DHM) under Ministry of Science, Technology and Environment, Nepal Police, Armed Polic Force and National Seismological Centre (NSC) under the Department of Mines and Geology.

Category	Damage and Loss
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	(million NPR)
Emergency Operation Centers	3.30
Hydro-meteorological observation networks	41.80
Search & Rescue and Fire Services	95.63
Field office buildings of the water induced disaster prevention department	14.16
Seismic network of National Seismic Centre	0
Total	154.89

Table 1: Estimates of Damages & Losses and Reconstruction needs to the DRR Assets (in million NPR)
Source: Internal reports of MoHA, DHM, Nepal Police, APF and NSC

The most affected districts in terms of DRR assets are Kathmandu, Sindhupalchowk, Chitawan, Nuwakot, Dolakha and Rasuwa. The highest damage was recorded in Kathmandu District which delivers service to the largest populated areas of the country.

The damages of DRR assets mostly includes damages to the office buildings of EOCs, hydro-meteorological stations, field offices of the department of water induced disaster prevention, police stations dedicated for DRM and fire stations in Kathmandu and other earthquake affected districts. The majority of hydro-meteorological stations along critical rivers are manual, requiring a human observer to record the observations. Due to the earthquake, many of these stations are not functional, as observers have abandoned their homes, and relocated elsewhere. Observations from these stations are crucial for DHM to provide uninterrupted services for flood warning and potential landslide information.

4.2 Impacts

4.2.1 Secondary Disasters

The numerous aftershocks since the 25 April 2015 earthquake with several tremors larger than M 6 pose a grave threat to the already existing vulnerable, partially damaged buildings, infrastructure and unstable slopes. The May 12 aftershock resulted in over 200 deaths and several collapsed buildings particularly in Sindhupalchok and Dolakha districts. Fresh avalanches were noted on Mount Everest and an aftershock caused a landslide on the Koshi Highway which blocked the section of the road between Bhedetar and Mulghat. On 24 May, cracks triggered by seismic activities led to a massive dry landslide near Baisari, Myagdi district. A total of 25 houses were buried and a huge volume of debris fell into the Kali Gandaki River forming a natural dam that blocked the flow creating a lake over a mile long, until the river level overtopped the dam and broke through. Already vulnerable areas in at least 6 districts are now more susceptible to such landslides and flooding.

Initial assessments revealed no increased threat of glacial lake outburst floods (GLOFs), however, detailed assessments are planned, including for the high-risk Tsho Rolpa lake, where some cracks in the moraine dam and seepage downstream (Imja lake) have to be further investigated. Tsho Rolpa GLOF could potentially affect up to 100 km downstream, threatening the lives of about 10,000 people, their agriculture, livestock, roads, bridges and hydropower projects.^{xxi}

4.2.2 Local government capacities

The impact of the disaster has been severe not just on the affected population, but also the local government institutions in the affected districts. Many VDCs have seen collapse of their office premises, many staff have been affected themselves, leaving them in an unenviable position. The situation is not very different at the district level, with the district administration similarly struggling to provide necessary services to the thousands of the affected people.

The massive scale of the destruction wrought by the disaster and the urgency of the proposed interventions poses a huge challenge in the current context when the district and local government capacities are already depleted. Coordination of the recovery activities and their implementation is most likely to require additional capacities at almost all levels.

4.2.3 Access

Even in normal times, many VDCs of the affected districts are not easily accessible. The earthquake and ensuing secondary disasters have made access to the remote, far-flung communities even more difficult. This lack of access not only hinders provision of services and assistance to the affected communities in such areas but also poses a challenge for communities' effective linkages with the markets to buy essential items or sell their produce.

5. Issues relating to emerging risks and vulnerabilities

5.1 Institutional Aspects

The existing DRM legislation is response centric and not focused enough to empower the authorities to engage proactively on risk analysis and management. Likewise, the current institutional set up is yet to drive risk reduction agenda across a range of ministries, departments and sub-national institutions and specific budgetary allocations for implementing risk reduction actions. Hence a need for a more comprehensive legislation and a dedicated institution has been greatly realized for effective disaster risk reduction and response.

Despite the formulation of a comprehensive National Strategy on Disaster Risk Management in 2009, its actual translation into concrete actions has not materialised nor been followed up, and the DRR activities have been largely driven by project-based international (external) assistance. The National Disaster Response Framework, 2013 provided a sound footing for coordination and allocation of roles and responsibilities across all agencies at the national level including the humanitarian clusters. Lack of adequate capacities at the national level including institutions to create trained human resources has also adversely impacted DRR capacities and the ability to respond at the district level. A critical gap arose in the recovery planning process, with no single agency specifically leading the process, until the NPC was designed to coordinate. The most critical issue noted is the urgent need for the district authorities to regulate physical development by integrating disaster risks. To a certain extent this is also applicable among sectoral ministries and departments at the national level.

5.2 Building Codes

The existing risks and vulnerabilities associated with building construction are linked to several urban trends such as addition of storeys, conversion of building occupancy from residential to

commercial/educational/health, increased construction in the periphery of municipalities with feeble by-laws, high rises on small plots compromising on structural stability. Most of these are driven by increased migration to urban areas, steeply rising land prices and unregulated land subdivision.

The destruction and damage of almost 800,000 houses and buildings is largely attributable to over 90% of buildings being non-engineered. Rural areas like in Sindhupalchowk, which have borne the brunt of the damage, have stone with mud mortar as the most common housing typology. National Building Code (NBC) implementation, approved in 2005 by the Cabinet, is mandatory in all municipalities as per amendment to Building Act, 2007, but in practice, ineffective governance coupled with limited technical, financial resources at national and local levels, shortage of skilled manpower and lack of political will has crippled its effective enforcement. Implementation of building code is limited to only few municipalities and has not touched upon the most prevalent construction typology (stone and mud mortar) in rural areas. The reconstruction programme needs to be informed by the learning that several buildings compliant to building codes were undamaged by the tremors even in Chautara. Also relevant is the satisfactory performance of many schools that were retrofitted over the past few years

Rural housing vulnerability is a combination of social and economic factors, and poor application of the National Building Code's guidance for earthquake resistant non-engineered buildings in remote areas, lack of availability of skilled masons and technical staff for supervision in the rural areas. The housing reconstruction programme not only needs to rebuild huge numbers of housing units but also has to address these gaps or else harbours the risk of increasing further vulnerabilities.

Poor enforcement of policy and regulations and gaps in institutional capacity could further exacerbate vulnerabilities. Very few municipalities have the capacity to develop building by-laws or regularly update them. The existing building permit process in most municipalities does not ensure the compliance to the national building code for reasons such as the lack of trained professionals in municipalities, which could be compounded by the pressure to rebuild rapidly. If the reconstruction of new housing stock is not regulated through risk-sensitive land use planning and building codes; and governed by well-resourced local governments and a skilled workforce, the vulnerabilities in the building construction sector will continue to increase in the near future- the perfect breeding ground for future earthquake disasters.

The quantity and low quality of urban infrastructure, such as water supply, sanitation, solid waste management, further contributes to the vulnerability in urban areas. For example, water supply is a serious problem in the Kathmandu Valley and in order to meet the large gap in supply and demand, the groundwater is being extracted from shallow and deep aquifers in an unsustainable manner. So too, the historical ponds which helped recharge the aquifers are being encroached as a result of urbanization, which increases urban flood risks.

5.3 Hazard and Risk Mapping and Application

Risk assessments appear to be fragmented and methodology are not unified that suits a particular demand for application- i.e. for contingency planning and preparedness as well as in mainstreaming DRR into development sectors. The resolution of maps are not in an appropriate scale that will guide local level DRR measures. Limited studies exist for areas outside of Kathmandu.

The actual application of risk assessment studies remains low and when used, it is for prioritizing response and recovery. The need for studies about emerging risks such as landslides and the onset of monsoon was not anticipated and many districts rely on local knowledge and reports from Security Forces usually prompted

when the effects of a hazard and danger are already imminent. Land use planning that did not integrate multi-hazard risk assessments also contributed to the large scale of damage, including the areas affected by avalanches and potentially affected by the landslide that blocked the Kali Gandaki River in Myagdi district. Limited hospital and school safety assessments (with regard to spatial coverage and in numbers) and follow-up in addressing structural vulnerabilities is manifested in the damage to over 7000 schools and 500 health facilities.

Given the extensive damages to infrastructure and housing with the 2015 earthquake, the priority given to application of scientific knowledge from these risk assessment studies was assessed to remain low at various levels. Actions and funding for earthquake risk reduction such as retrofitting of schools, hospital, public buildings and other infrastructure were very limited. When the earthquake happened, demand for technical and scientific knowledge was to information on magnitude and location^{xxii} as basis for prioritizing relief and recovery but not for planning risk reduction measures. Coordination among the ministries still needs to be improved for Integration of DRR and CRM in practical terms beyond the national periodic plans especially for the critical sectors like education, health, housing, infrastructure and tourism, which have been significantly impacted by the earthquake and subsequent disasters.

5.4 Preparedness and Response to address monsoon related risks

The on-going initiatives to stabilise slopes and reduce landslide risks have not been sufficient in coverage or scope to address the increased landslide risk in middle hills due to enhanced seismic activities after April 25 earthquake. This situation has been compounded by the declining trend of forest cover, and high annual soil erosion rates ranging from 2,700 to 57,000 tons/ sq.km in the middle mountains.

The summer monsoon brings with it increased risk for landslides, floods, hailstorms and avalanches across the country including in the affected districts. Cracks have been observed along slopes in several districts, and hence it is feared that the landslide could be triggered by even a lower threshold of rainfall intensity.

Climate related disaster events could have much greater impacts this time due to the increased vulnerability of the already affected population that are yet to relocate to safer locations.

El Niño conditions are anticipated. Coupled with the outlook for a below normal monsoon in most areas of South Asia, including Nepal, this could pose another risk. High dependence on agriculture and other climate-sensitive natural resources for income and well-being, compounded by lack of sufficient financial and technical capacities among the affected population to manage increasing climate-variability puts them at even higher risk.

5.5 Land use and settlement planning

The unprecedented post-earthquake reconstruction in both urban and rural areas could lead to tremendous pressure on land and natural resources resulting in rapid changes in land use, land degradation and land fragmentation. In addition to a staggering increase in built-up areas in already dense urban centres, it can also accelerate the current unregulated conversion of agricultural land to built-up in the peripheral region of Kathmandu Valley and the newly declared municipalities; and the mushrooming of unplanned settlements along the transport network.

Unplanned and unregulated growth will increase the exposure of the population and assets to seismic, landslide and flooding hazards and decrease the capacity of emergency services to deal with a large scale disaster event. The cause of haphazard development is also related to lack of effective local level land use,

zoning and land sub-division policy and limited capacity of municipalities to enforce regulations in urban areas. Rural areas that do not consider land use planning effectively will be at even higher risk due to the massive reconstruction of settlements, including roads that can further exacerbate landslide risks.

Thus moving forward, high priority should be given to implementation of integrated policies and long-term comprehensive urban recovery plans under the risk assessment, related to future population forecast, future urban structure, land use planning, transportation, development control, and social and physical infrastructure investments in order to direct future resilient urban growth on the concept of Build Back Better.

5.6 Possible relocation of populations most at risk to other regions

With thousands of people living in temporary sites, it is certain that many would need to be permanently relocated to new sites as part of the earthquake recovery process. Factoring multi-hazard risk considerations and availability of suitable livelihoods while selecting such sites will be crucial. Further the relocation process should also consider the socio-economic vulnerabilities related to land and population needs. For example, issues related to land tenure, land allocation, tenancy, selection of beneficiaries for housing should follow a rights based approach with due considerations for addressing the needs of vulnerable populations, women headed households and socially disadvantaged groups. The relocation of the affected population has to be managed in a way that helps getting employments and supports livelihood building.

Recovery needs and strategy

There are always risks of seismic induced disasters in and around Kathmandu Valley besides those emerging risks outlined in the previous sections. Restoration in affected area to the same status as before the earthquake means that the country will continuously experience high cost of damages and losses. It is, therefore crucial to take this disaster as an opportunity to rebuild better, safer, and more resilient society by mainstreaming DRR in recovery strategy and encouraging DRR investment with a Build Back Better approach.

The communities in Nepal, majority of whom are in rural areas outside of Kathmandu suffered from the effects of this disaster event in many ways. Although the damages and losses were much severe and widespread in the rural areas, Kathmandu Valley was also affected with the earthquake damaging old public and private buildings and cultural heritage. The affected community's current living conditions and unsafe environment exacerbated their exposure to hazards and increase their vulnerabilities. They can be affected by the onset of the monsoon period and these accumulated impacts can further diminish any existing coping mechanism. Urban and rural communities will be both impacted, but those already living in poverty and live in marginal areas will suffer from its worst effects. Addressing their immediate recovery needs, i.e. housing, livelihood, access to basic services and the restoration of government functions and local economy are urgent. However if recovery programmes ignored the importance of incorporating disaster risk reduction, gains can be negated and pre-disaster vulnerabilities can be recreated or worsened.

As a cross cutting theme, strengthening of the DRR system necessary for resilient recovery is an imperative. Damaged assets such as for early warning systems, EOCs, search and rescue, logistics and other public infrastructure for efficient and timely emergency response associated with the monsoon and potential major earthquakes need to be restored urgently. Existing DRR assets need to be up scaled and improvement of performance of the system and enhancing coherence and coordination to prepare sufficiently for future crisis events are important. Restoration of livelihoods, particularly those that are climate sensitive need to be risk

informed such as the application of seasonal variability forecast to agriculture and water resource management.

The post-earthquake recovery should also be used as an opportunity to promote strategic changes in how disaster risk management is planned, organized, coordinated, implemented, scaled up and sustained in Nepal. With focus on earthquake affected areas, the necessary enhancement and clarification of policies and institutional set up must be supported. There is urgency to conduct multi hazard risk assessment that can guide construction of safer housing and infrastructure and identification of safer settlements. With dangers still lingering in peoples mind, the generation of science based risk information and their dissemination through public awareness and community based approaches are crucial particularly in rural communities. Development sectors at risk should be guided by appropriate tools and methodology to plan and apply risk reduction measures. Risk informed recovery must also address underlying causes of vulnerability linked with ecosystem decline, poverty and inequality and inadequate community participation to be sustainable.

For these to happen, the enhancement of risk governance i.e. policy, institutional capacities at all levels of governance is important both on the short and long term. This will involve support to development of policies that encompasses both prospective and corrective risk reduction measures as part of the country's sustainable development strategy. Risk management strategies must be developed and implemented along with climate change adaptation measures where applicable. The accountability for risk reduction must be clarified and dedicated budget for DRR both as stand-alone and mainstreamed into development sectors must be mandated. Risk knowledge through manuals and guidelines should be developed and adequately disseminated. Technical and human resource skills development must be systematically supported to ensure that people trained are meaningfully involved in resilient reconstruction such as in housing, public infrastructure. A significant shift in emphasis to support local governments outside of Kathmandu is very important. Tied up with efforts in the Governance Sector, risk management capacities must be improved and vertical and horizontal integration must be promoted.

Based on these, the Government of Nepal have identified the following priorities:

Short term:

- Reconstruction of damaged DRR assets and improvements;
- Improving preparedness, response, relief and logistics systems
- Strengthening Information and Communication capacities for relief, response and recovery
- Enhancing multi hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness

Medium to long term:

- Improving Legal and Institutional Arrangements
- Mainstreaming DRM into development sector, particularly, housing and private & public infrastructure, Social sectors (health and Education) and Livelihood
- Improving integration of climate change adaptation and DRR, policy guidelines, institutional development

The total estimated reconstruction needs for the DRR affected sector is NPR 504,442,601 (USD 5,044,426). Based on the Build Back Better concept to further build resilience, the total additional recovery cost of NPR 7,699,570,000 (USD 76,995,700) was estimated. Consultations among sector experts, representatives of governments, civil society and development partners informed this estimate.

6.1 Reconstruction of Damaged DRR assets

The Estimate of reconstruction needs is NPR 504,442,601 (USD 5,044,426) with the highest cost of needs in hydro-meteorological stations at NPR 343,426,001 (USD 3,434,260). Needs for others are as follows: SAR at NPR 139,760,050 (USD 1,397,601); field offices of water induced disaster prevention department at NPR 14,156,550 (USD 141,566); EOCs at NPR 7,100,000 (USD 71,000).

The immediate replacement of lost and damaged assets and scaling up to a minimum level required for SAR and hydro-meteorological related system such as flood forecasting and early warning system are urgent with probability of continued seismic activities and onset of monsoon with high possibility of floods and landslides. By incorporating build back better principles through automation/ telemetry of damaged stations, DHM could also contribute to improved agro-advisory for climate-informed agriculture practices for safeguarding livelihood during recovery phase.

6.2 DRR Recovery Needs

Recovery needs in DRR are to improve performance, scale up and enhance coherence of disaster risk reduction system in Nepal, encompassed 6 broad categories as below.

6.2.1 Improving preparedness for response, relief and logistics systems (NPR 4,691,320,000).

The main lessons learned is that investment in preparedness particularly on life saving capacities and relief materials were inadequate and that when the earthquake occurred, the need for mobilizing international assistance became crucial. While there had been ongoing initiatives on SAR, establishment of EOCs, warehousing and prepositioning of relief supplies, the effectiveness of response to future disaster events can be enhanced through increased support in these capacities.

In the aftermath of a disaster the affected population needs search and rescue (SAR) service, especially within the immediate hours of an earthquake. Within the first month, communities will need timely support and access to emergency services such as temporary shelter, food, health, WASH and protection services. There is also a need for improved capacity of government system for effective coordination and communication to ensure proper mobilization of response that delivers services to the most needy. Investing on developing national and local SAR capacity is cost-effective in saving lives, crucial within first 24 hours where the chances of survival of people trapped under damaged structures remains high. Given the remoteness of many places in the country and need of accessing those areas by SAR services, Nepal needs capacity for remote areas operation and this can be supported by institutionalizing cooperation with the private sector, mutual aid schemes with neighboring countries and enhancing stand by arrangements for crucial airborne capacity for SAR with the UN. While acquisition of dedicated air transport is desirable, these are costly and cost benefit compared to options earlier mentioned is lower. The establishment of disaster management training centre at Nepal Police will also play instrumental role in strengthening disaster response capacity at national and local level, further bolstering on the capacities at Nepal Army and Armed Police Force for SAR and evacuation.

Likewise, stockpiling of life saving non-food relief items (NFRI) such as shelter kits remains very useful in addressing immediate needs of displaced population mostly within first 72 hours, before international assistance starts flowing in to the country. This further needs to be complemented with increased warehousing and logistics capacity, in selected locations outside of Kathmandu.

The scaling up and strengthening of EOC network across the country along with human resources development, periodic drills at district level and effective information management capacity will add to the emergency preparedness, resulting in to improved surveillance, coordination and command system.

Key activities and result areas will include:

Preparedness for response

- i. Strengthening and expansion of Emergency Operation Centers to all districts and enhancing community outreach for better preparedness
- ii. Conducting periodic monsoon forums, as a regular forum integrating scientific information providers such as DHM with the climate sensitive user sectors, to improve preparedness at national and district levels
- iii. Creation of sustainable National Search and Rescue capacity with Nepal Army, Armed Police Force and Police through implementation of programme designed as per National Strategic Action plan on SAR. On top of implementing the National Strategic Action Plan on SAR, there has been a realization from the learning from the Mega earthquake 2015 that SAR capacity strengthening also needs provisioning of air rescue capacity at regional level across the country so that the immediate SAR action could be prompt and further effective. This could be achieved through provisioning of an MI-8 helicopter at regional level with its required level of operation management structure. While provisioning budget for the helicopters may require a considerably good size of resources this could be achieved by embedding with the SAR strategic plan, and managed under the Nepal Army annual budgeting system, or by provisioning a standby contract with some air service provider company/ies for the emergency air SAR that could be activated through MoHA (or Regional Administration Office) with the onset of a disaster provided that activation need has been triggered.
- iv. Strengthening preparedness/response effectiveness and information coordination in districts and communities by leveraging existing technologies such as mobile SMS, and local radio stations to engage with communities and facilitate their active participation in response and recovery.
- v. Community based disaster preparedness programmes are designed and implemented with the participation and engagement of the community including women and other disadvantaged groups. Women are given the opportunity to assume leadership positions in the process. Disaster preparedness and contingency plans are prepared or reviewed at community and district level in consultation with the community including women and other disadvantaged groups. They participate in mock drills and are trained so that they have the capacity to reduce the impact of the disaster on themselves.
- vi. Standardizing CWC and use of common messages as part of preparedness and response and the need for sustained (5 year) communications campaigns for risk reduction to all parts of the community including migrants.

Logistics systems and relief

- vii. Enhanced effectiveness of emergency relief through logistics hubs for food stocks, prepositioned emergency response supplies, emergency telecommunications, stacking shipping containers, temperate controlled environment to store special nutritious food, medicines and vaccines to cater to vulnerable groups such as pregnant women, elderly citizens, infants and children. It will also strengthen the four existing government warehouses to be disaster resistant and able to deliver during the time of emergency, and create additional two major hubs so as to cover the five development zones so that major hubs will be spread across the Terai region and additional ten smaller hubs are spread in hilly and mountainous regions in a hub and spoke configuration.
- viii. Development of logistics management capacity at district, region and national level

- ix. Provisioning of life saving relief materials such as shelter kits and NFRI in regional and other hubs
- x. Provisioning of a system of having virtual stock of life saving relief materials

6.2.2 *Strengthening Information and Communication capacities for relief, response and recovery (NPR 423,250,000).*

Priority needs focus on strengthening and harmonization of the existing DRR portal and SAHANA and associated disaster data bases like the DesInventar, capacity building and training for communications personnel at the national level, including the designated recovery agency:

- i. Capacity building and trainings on Big Data mining for major events engaging with leading specialized institutions to create national capacities for mining data from social forums to create and validate data points, and effectiveness of various activities and gauge trajectory of on-going relief, response initiatives and make any mid-course corrections.
- ii. Establish a more direct, simple community-based information and communication whereby the affected people can convey their emerging concerns and at the same time local and national government can relay information on arrangements being put in place to support the affected people.
- iii. Strengthening the DRR portal and SAHANA as the emergency preparedness response tools for effective and coordinated actions across the national and district level stakeholders in any emergency by institutionalizing across key ministries and departments and to build capacities for their effective use in a sustainable manner. Enhance the ability to systematically record disaster damages and losses as a basis for monitoring DRR outcome trends.
- iv. Strengthening the communications capacity of NEOC including staffing through trained personnel noting the huge demand for data and information updates of the national, international media and public from the government agencies during the emergencies.
- v. Creating/ strengthening centralized communication capacity at the designated recovery agency focused on all recovery strategies and activities for all stakeholders. Trained personnel would undertake regular communications and outreach to the national, international stakeholders including public entities, private sector, UN and international agencies, I/NGOs and the general public. Support for updates through website(s), social media, mass media are envisaged. Ensure that the community including women and other vulnerable groups have access to information on services in relation to disaster management such as basic health services, including reproductive and sexual health services, compensations, cash transfers, insurance, social security, credit, employment.

6.2.3 *Enhancing multi hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness. (NPR 1,000,000,000)*

Over the years, several institutions in Nepal have undertaken various types of hazard and vulnerability assessments, however there is a need to harmonize the methodologies, identify and standardize the most appropriate level of the risk and vulnerability information (national strategic maps / detailed maps at district level) and disseminate this information widely to benefit the long-term recovery, reconstruction and development planning. Key needs identified are:

- i. To improve technical and human resources capacity of relevant national technical institutions (under Ministry of Industry, Ministry of Science, Technology and Environment, Ministry of Irrigation, Ministry of Agriculture, Ministry of Forests and Soil Conservation) and of local government, including production of geo-referenced risk information complemented by community-based VCAs to support immediate recovery and reconstruction planning and inform sector programmes, and to monitor hazards and produce/enhance early warning and forecast systems for seismic and hydro-meteorological hazards.

- ii. To assess the potential impacts of multi hazard exposure on vulnerable groups (children, women, people with disability, elderly, ethnic groups) and ecosystems. This risk-based information is to be used at local level in the affected districts during the immediate recovery and reconstruction before being extended to the other parts of the country.
- iii. To improve the quality of risk information products and their nationwide dissemination at all levels by developing partnerships between the government, private sector, NGOs, to implement informed preparedness, prevention and mitigation measures.
To collect and use gender and sex disaggregated data and involve the community including women, elderly and the disabled in articulating and understanding their own risks, vulnerabilities and capacities.

6.2.4 Improving Legal and Institutional Arrangements (NPR 670,000,000)

Policy support and system development as an entry point of this intervention, a broader Post 2015 DRM Policy Framework for Nepal will be planned. The policy will pave the way for promulgating the much needed DRM act and related regulations. The act will necessitate a dedicated agency for DRM in Nepal. It has been proposed to capacitate the agency in terms of technical, logistics and administrative aspects, both in national and local levels. After the establishment of the agency, it may need a wide range of development policy and guidelines related to mainstreaming DRM issues such as integration of DRR approaches in national periodic, sectoral and local level plans. The initiatives on Improving risk governance as the recovery needs involves the formulation of legislation and establishment of institutional arrangement required to address the current needs. The institutional arrangement will be strengthened guiding with principle to reflect and connect all the recovery needs to be part of globally agreed Post 2015 MDG commitment "Sustainable Development Goals". The recovery need identified in above activities are NRs.210,000,000.

To address the gap in risk governance methodology, standard operating procedures will be developed and subsequently the human resources involved will be trained and the capacity of stakeholders will be enhanced on different tools and techniques of DRM. Involvement of the private sector on current recovery needs as well as on DRM is key and national strategy on public private partnership will be developed to on-board private sector.

One of the key area under DRR component is implementation of safer building construction practices. The appropriate building bye laws will be formulated to implement the Risk Sensitive Land Use Plan of the settlements. The compliance of building codes will be ensured through implementing code compliant manual, standardization of system, tools, and human resources involved in the construction business (engineers, architects, mid-level technicians, masons), and expanding electronic-building permit system. The compliance will be further strengthened by implementing Municipal Information System (MIS⁶). In order to address the existing vulnerabilities of the building stocks, the retrofitting guidelines will be implemented. To implement above initiatives an amount of NRs. 340,000,000 has been proposed.

In order to implement all above measures of risk governance, the respective agencies will be supported to address the gaps in terms of institutional and technical capacity. Local government (DDC, municipalities, VDCs and line agencies) are the key implementing hands those will be capacitated with appropriate skill, tools and techniques to implement recovery needs. National training institutes such as Nepal Administration Staff College, Local Development Training Academy and Council for Technical Education & Vocational Training will be mobilized to train the government officials. To address this issue, standard operating procedures will be

⁶ This include all the information related to infrastructures including building stocks.

developed and subsequently the human resources involved will be trained and the capacity of stakeholders will be enhanced on different tools and techniques of DRM.

6.2.5 Mainstreaming DRM into development sector, particularly, building (private & public) and Livelihood. (NPR 615,000,000)

One of the broader areas of the recovery needs is mainstreaming DRR into development sectors with the build back better approach. Existing Nepal National Building Code is one such tool, which incorporates earthquake resistant design of buildings. Post-Earthquake of April 25, it has been observed that the existing building code is 20 years old and need to be revised. Similarly, appropriate guidelines related to risk sensitive infrastructure design and construction process will be developed. A common methodology for preparing Risk Sensitive Land Use Plan (RSLUP) to all the settlements will be developed. The RSLUP will be integrated with the land management policy. A building research institute will be set up and institutionalized to address the technological gap in regards to the appropriate technology, building materials that address the needs of the diverse geographical and ethnic population in Nepal. To address the above identified recovery need NRs 550,000,000 has been proposed?

DRR mainstreaming initiatives in health and educational buildings will be implemented by integration of DRR in to health and education development policies, based on which relevant strategies and action plans will be developed. To implement the above action plans the institutional framework for the agencies will be reviewed and the gaps will be addressed.

As part of livelihood sectors, the risk profile of the communities will be prepared and appropriate mitigation measures will be implemented. Further, multi livelihood options in such areas building construction, agriculture, tourism, micro-enterprises will be developed and implemented.

All above sectoral initiatives will be complemented by a series of capacity development activities at national, local and community levels. The capacity development package will consist of the combination of technical, logistics and administrative components. The technical skills will be enhanced through existing training institutes as well as newly proposed institutions such as Engineering Staff College, Building Research Centers and dedicated agency for DRM.

6.2.6 Improving integration of climate change adaptation (CCA) and DRR, policy guidelines, institutional development. (NPR 300,000,000)

To address the critical need already necessary before the earthquake disaster of integrating climate change adaptation and DRR to ensure a climate resilient recovery and reconstruction of the affected communities and enhance climate resilience of Nepal, the following actions are recommended:

- i. To improve climate change modelling in the country to define future trends, vulnerability indices, and institutionalize climate risk management and adaptation measures. The dissemination of climate change risk information will be highly important at national and local levels to inform planning, and sustainable investments on preparedness, prevention and mitigation.
- ii. To operationalize integration of CCA and DRR in sectoral programming at national and district levels. Support district and local bodies to contextualize their needs and priorities for implementation of measures such as watershed-based approach, to address DRR and CCA through planning cycle, especially the District Risk Management Plans and District Disaster Response Plans, as well as the annual and periodic sectoral plans.
- iii. To demonstrate the benefits of integrated and unified CCA and DRR, at least five demonstration projects at national and community levels will be designed and implemented in various sectors (energy,

agriculture, flood and landslides risk management) to generate evidence-basis for scaling up of future integrated interventions.

Annex 1: Estimation of damage/loss, reconstruction and recovery needs

(1) Emergency Operation Centers			Office infrastructure /equipment					Total
Damage&Loss	Estimation of Damage to Infrastructure and Physical Assets	Number of sites/assets damaged	9					9
		Estimated value of damage, NPR	3,300,000					3,300,000
	Estimation of Loss	Estimated loss, NPR	n/a					n/a
Reconstruction Needs	Reconstruction: Replacement /repair of damaged DRR assets	Number of asset requires recovery	9					
		Repair cost/ replacement cost, NPR	7,100,000					7,100,000

(2) Hydro-meteorological observation networks			Hydro Station	Met Station				Total
Damage&Loss	Estimation of Damage to Infrastructure and Physical Assets	Number of Sites/assets damaged	41	48				89
		Estimated value of damage, NPR	34,850,000	6,950,000				41,800,000
	Estimation of Loss	Estimated loss, NPR	n/a	n/a				n/a
Reconstruction Needs	Reconstruction: Replacement /repair of damaged DRR assets	Number of Sites/assets damaged	56	48				104
		Estimated value, NPR	285,186,001	58,240,000				343,426,001

(3) Search & Rescue and Fire Services			Building - Nepal Police Disaster Management Division (m2)	Office Equipment - Nepal Police, Disaster Management Division	SAR equipment, Nepal Police DM Division	Rescue equipment Sets in Police Units (106 Units)	Damages to Fire Stations	APF Assets	Total
Damage&Loss	Estimation of Damage to Infrastructure and Physical Assets	Number of Sites/assets damaged	2860.7	98	18	17	3	2	-
		Estimated value of damage, NPR	79,919,600	458,700	1,709,250	89,100	6,950,000	6,500,000	95,626,650
	Estimation of Loss	Estimated loss, NPR	n/a	n/a	n/a	n/a	n/a		n/a
Reconstruction Needs	Reconstruction: Replacement /repair of damaged DRR assets	Number of Sites/assets	2860.7	98	18	17	3	2	
		Estimated cost, NPR	114,228,000	458,700	1,709,250	89,100	15,800,000	7,475,000	139,760,050

(4) Mitigation mechanism - River/ Flood Protection Embankments (flood mitigation/ landslide mitigation structures of DWIDP)			DWIDP division offices	Embankment				Total
Damage&Loss	Estimation of Damage to	Number of Sites/assets	7	multiple				7

	Infrastructure and Physical Assets	Estimated value of damage, NPR	14,000,000	156,550					14,156,550
	Estimation of Loss	Estimated loss, NPR	n/a						n/a
Reconstruction Needs	Reconstruction: Replacement /repair of damaged DRR assets	Number of Sites/assets	7	multiple					3
		Estimated Cost, NPR	14,000,000	156,550					14,156,550

(5) Seismic network of National Seismic Centre			infrastructure/ equipment of seismic stations						Total
Damage&Loss	Estimation of Damage to Infrastructure and Physical Assets	Number of Sites/assets	0						0
		Estimated value of damage, NPR	0						0
	Estimation of Loss	Estimated loss, NPR	0						0
Reconstruction Needs	Reconstruction: Replacement /repair of damaged DRR assets	Number of Sites/assets	0						0
		Estimated Cost, NPR	0						0

(6) Build Back Better/improvement of overall DRR mechanism (Recovery Needs)		NPR
Enhancing multi hazard risk monitoring, vulnerability assessment, risk information dissemination and awareness.	Multi Hazard risk assessment	200,000,000
	Associated Vulnerability Assessment	100,000,000
	Monitoring of multi hazard (it does NOT include any cost of any mitigation measures)	420,000,000
	Risk information dissemination and public education and awareness	200,000,000
	Institutional Aspects	80,000,000
	Sub-total	1,000,000,000
Improving Legal and Institutional Arrangements	Legislation and Institutional Development	210,000,000
	Development Policy	25,000,000
	Guidelines and Frameworks	45,000,000
	Implementation of Safer Building construction Practices	340,000,000
	Operationalization of policy, guidelines and framework	50,000,000
	Sub-total	670,000,000
Improving preparedness, evidence based response, relief and logistics system, public education.	Building and Strengthening the EOC/ DOCs	362,220,000
	Monsoon forums for enhanced preparedness and forums	80,000,000
	Search and Rescue Operation (Professional - Army, Nepal Police, Armed Police Force)	1,240,000,000
	Developing logistics hubs for disaster response	2,295,000,000
	Strengthening preparedness/ response effectiveness and information coordination in districts and communities by leveraging existing technologies	714,100,000
	Sub-total	4,691,320,000
Strengthening Information and Communication capacities for relief, response and recovery	Big data mining for every major events - Capacity building and trainings (Mining the data from social forums to create and validate data points, and effectiveness of various programs)	125,000,000
	Communication for relief and recovery	298,250,000
	Sub-total	423,250,000
Improving integration of climate change adaptation and DRR, policy guidelines, institutional development	Improving integration of climate change adaptation and DRR, policy guidelines, institutional development.	300,000,000
	Sub-total	300,000,000
	Structural - Housing (private & public) and Physical Infrastructure	550,000,000

Mainstreaming DRM into development sectors	Social Sector (Health & Education)	40,000,000
	Livelihood	25,000,000
	Sub-total	615,000,000
Recovery Needs TOTAL		7,699,570,000

Grand Total (Damage & Loss) NPR 154,883,200
 USD 1,548,832

Grand Total (Reconstruction Needs) NPR 504,442,601
 USD 5,044,426

Grand Total (Recovery Needs) NPR 7,699,570,000
 USD 76,995,700

Annex 2:

Externally supported DRR Programs

Below are some highlights of the externally supported programs directly associated with DRR:

Earthquake

- French Government has been supporting the National Seismological Centre in monitoring earthquakes since 1978, which has been providing the earthquake magnitudes and epicentre related information to the response agencies and the public. However, the public awareness on the characteristics of earthquakes and its aftershocks was found very low, which made the majority of the people scary and believing on astrologers' predictions and sometimes caught by the rumours. It revealed that the necessity of information processing and communicating to the public related to earthquake hazard.
- JICA supported the Government of Nepal to conduct earthquake risk assessments of Kathmandu Valley in 2002. It had revealed the damages and losses for the scenario earthquakes and recommended the policy, institutional and programmatic measures to address the disaster risks. It contributed to generate awareness to the public as well as the policy makers and to guide some programs, but all of its recommendations lacked implementation. The second round of assessment was about to kick off in May, 2015.
- UNDP supported the 2011 post-earthquake rehabilitation and reconstruction in the eastern part of Nepal. UNDP's CBDRMP is ongoing since 2011 with its major components of preparing risk sensitive land use plan in KV, piloting electronic building permit system in Kathmandu and Lalitpur metropolitan cities, preparing retrofitting guidelines, and enhancing preparedness for better response through support for formulation of the NDRF, establishing EOCs, training and equipment support for search and rescue among others. The electronic building permit system has shown impressive response. Climate risk management focussed interventions with key sectors are being supported at national level and in 4 districts (Dolakha, Sindhupalchok, Chitwan and Surkhet)
- USAID support to implementation of national building codes in twenty four municipalities was ongoing. Initial results were encouraging.
- NRCS with the support from UKAID has been implementing earthquake preparedness support program targeting the selected governance units of KV. It has tried to prepare the people and communities for the earthquake disaster by creating and capacitating community disaster management committees. It helped to activate the community volunteers in response activities, but the performance was much limited to individual level.
- WHO consortium with support from the European Commission Humanitarian Aid and Civil Protection (ECHO) has been implementing health emergency preparedness project in Kathmandu Valley establishing Health Emergency Operation Centre (HEOC), development of Mass Casualty Management

Strategy, Emergency Referral Guidelines, Health Sector Contingency Plans and different protocols for the management of emergency trauma to respond mass casualty as result of earthquake.

- UNICEF, in partnership with NSET, commissioned an earthquake vulnerability study of the water systems in Kathmandu Valley in 2003, with some recommendations taken forward.
- DFID supported-programme aims to increase preparedness and improve the capacity of Nepal's disaster management systems, building the resilience of four million people to earthquakes and other shocks with the establishment of an Emergency Operation Centre Network; pre-positioning of emergency equipment; enhancing capacity of the Nepal Red Cross; improving hospital resilience and building code compliance; strengthening the capacity of "first responders" and the development of Urban Search and Rescue Capacity in key organisations; and community-based disaster resilience programmes.
- The first DFID-funded Emergency Aid Base, implemented by WFP, opened in March 2015 to prepare for natural disasters, and has been utilised throughout response. This was part of DFID's 5-year £22m programme to strengthen preparedness and build disaster resilience in Nepal which began in 2011. It also included stockpiling relief items for 10,000 families at four locations, pre-positioning water and sanitation supplies for 100,000 people, and training humanitarian responders in search and rescue and first aid.

Others

- Nepal Risk Reduction Consortium (NRRC) is an initiative jointly launched by the Government of Nepal and various external partners including ADB, WB, UN, UKAID, AusAID, ECHO, IFRC, USAID etc. It has five main flagship programs on - (i) Schools and Hospital Safety, (ii) Preparedness, (iii) Flood management, (iv) Community based DRM, and (v) Policy support. It helped bringing partners together to address the disaster risks.
- A large number of capable and empowered community-based organisations (CBOs), NGOs and other agencies, such as the Nepal Red Cross Society (NRCS), are making an important contribution. These organisations are helping at-risk communities to understand their vulnerabilities. They work with the community to undertake mitigation and adaptation actions, to act on hazard analysis and early warnings, and to plan and prepare for their eventual need to react to disaster events as first responders.
- Led by MoFALD and in partnership with UNICEF, the Child Friendly Local Governance (CFLG) initiative in 12 VDCs and 15 districts engages children and youth in participatory risk assessment that informs local development plans including the District Disaster Management Plans.
- The overall performance of the externally supported DRR programs has helped to create awareness, build capacity of the public agencies and the people, establish institutions like EOCs, develop strategies, frameworks, guidelines, manuals, etc. All those initiatives were vital to develop the building blocks, however all those building blocks now need to be connected to the overall system in order to act as an organic and effective system able to respond at the time of a disaster.

HUMAN DEVELOPMENT IMPACT ASSESSMENT

Introduction

This report/chapter focuses on the consequences of the earthquakes of April 25 and May 12, 2015, on poverty and human development in Nepal. Although "human development (HD)" is to a large extent intangible, there are several numerical indicators meant to capture relevant dimensions of it such as income, assets, health, education, inequity, social cohesion, gender inequality, children's welfare, human rights, security and psychological well-being for all. All of these have been affected immediately by the earthquakes:

the duration of the negative impact will depend on the quick adoption of a careful approach towards resilient rebuilding, strong partnership between all stakeholders, and significant amounts of incremental development assistance through relevant channels. Poverty is one of the most important considerations, because it affects all other aspects of HD. It has been affected instantly, because of the loss of livelihood of millions of poor people. There is a significant proportion of the Nepali population just above the \$1.25 line, but below the \$2.00 line. The vulnerability of this group, especially the female-headed and high-dependency rate families could be a particular concern. The second immediate effect has been felt in education, especially the schooling sub-sector due to the massive destruction of infrastructure and mental trauma of young students. There are other effects on HD too, addressed in the sections below.

Section 1 provides some of the important indicators, especially poverty rates, related to HD that prevailed before the event both nationally and regionally - and where possible, for the 19 “crisis-hit” and “hit with heavy losses” districts⁷. Section 2 captures the immediate effects on HD through primary field surveys in some of the severely affected districts. Section 3 is devoted to the channels through which poverty and HD may be affected in the medium to long term. Section 4 concludes with certain indicative policy recommendations to mitigate the impact.

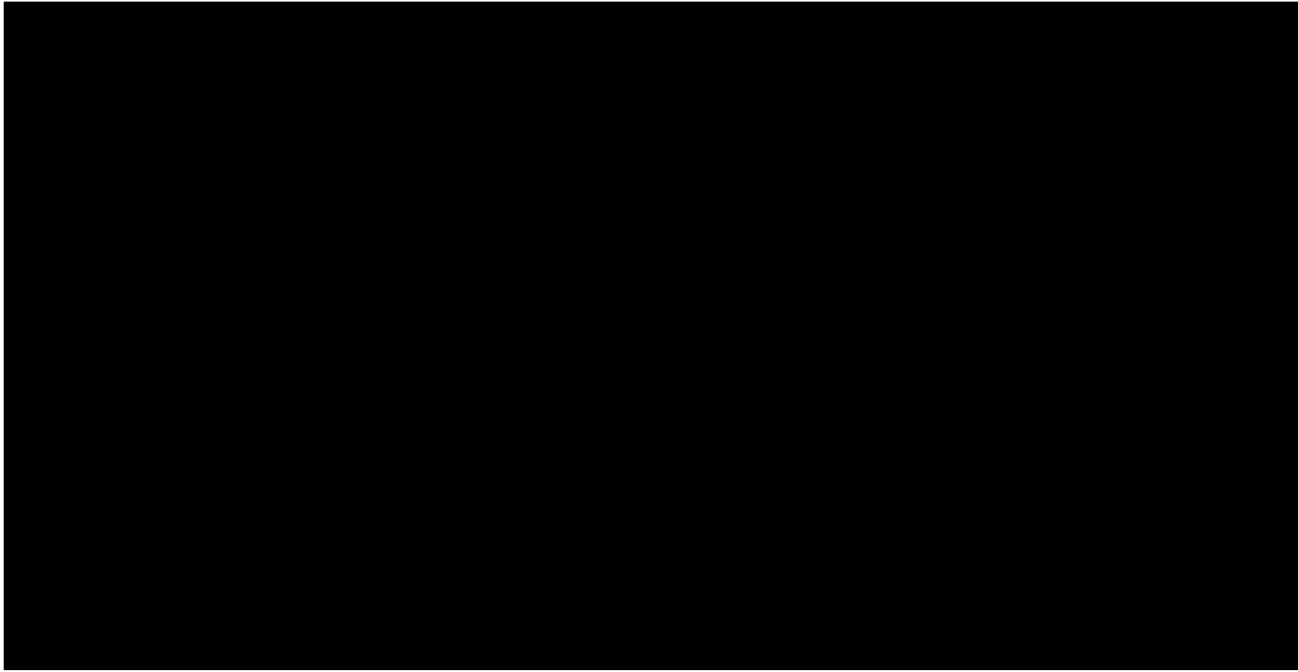
Section 1: Poverty and HD profile before April 25

Baseline indicators of the 19 affected districts

Focusing on the 19 most-affected districts, some key baseline indicators, including the human development index are given in Table 1. It may be noted that the affected districts (a) had HDI either well above the national average (.490) or thereabouts (b) per capita GDP well above the national average. This presents a rather complex challenge: the recovery plan will need to focus on the affected districts, but at the same time, one needs to bear in mind that the low-HDI districts of Nepal require equal attention, financial and otherwise.

Table 1:

⁷ Based on Government of Nepal, Disaster Risk Reduction Portal, as of May 27, 2015, 14 districts have been designated “Affected and Declared Crisis Hit” as well as an additional 5 districts have been designated “Hit with Heavy Losses” by the Government of Nepal.



The proportion of out migrants in total population, and consequently, the share of remittances is significant in household income; therefore, given the uncertainty surrounding the readiness or willingness of migrants who returned home after the earthquake, longer term effect on household income may be significant. Labour productivity is also on the high side in these districts, directly contributing to the overall *growth rate* of the economy. Thus, if livelihoods are not restored quickly, national growth rate will suffer, and consequently poverty and HD.

Poverty and Inequality

The national poverty rate declined steadily from 1996 to 2011 to 25.2%. While rural poverty declined throughout the period, urban poverty increased in the second half of the period. A noteworthy feature of the trend is the doubling of the number of *urban* poor between 1996 and 2011. The number of rural poor has fallen. Thus, there is a tendency towards “urbanization” of poverty, according to the head-count criterion, in Nepal.

There is high variation in poverty rates amongst the different analytical domains of the country. Urban Hill (basically, Kathmandu valley) is the *least* poor region with a poverty incidence of just 9 percent. The depth and severity is also the lowest for this region. Within *urban* areas, poverty ranges from 9 percent in urban Hills to 22 percent in urban Terai. Within rural hills, poverty ranges from 16 percent in the Eastern region to 37 percent in mid and Far Western region. Within rural Tarai, poverty ranges from 21 percent in Eastern region to 31 percent in mid and Far Western region.

Within each of the development regions except the Eastern, *hills have higher poverty rates than Tarai*. The depth and severity of poverty is highest in rural hills of Western and Mid-Far-Western region. In the current context, another relevant disaggregation of poverty profile is by “affected” versus “less affected” regions, provided by the World Bank.

Poverty and Vulnerability Profile of the Earthquake Affected Regions

	Affected Regions		Relatively Unaffected Regions
	Urban (including Kathmandu valley)	Rural	
Poverty rate (%)	9.7	26.5	26.5
Poverty gap, FGT(1) x 100	2.5	6.7	5.4
Squared poverty gap, FGT(2) x 100	0.9	2.7	1.7
Moderate poor (% below 2 x poverty line)	51.7	66.8	76.1
Food poor (%)	11.3	24.8	24.9

Source: WB Staff calculations based on NLSS III, 2010/11

According to the WB estimates, “poverty in the districts that have been hardest hit range from among the lowest in the country in urban Kathmandu to among the highest in the mountainous VDCs of Gorkha, closer to the epicenter. Overall, the poverty rate is around 9.7% in the urban parts of the affected areas and 26.5% in the rural parts. Poverty is deeper – that is those below the poverty line are further away from the poverty line – in the rural parts of the *affected regions* than the average poverty depths in the other parts of the country. Using a slightly moderate definition of poverty (twice the poverty line) to crudely take into account the larger concentration of households that are vulnerable to falling back into poverty, 51.7% of the population in the urban areas and 66.8% in rural areas within the earthquake affected region are either already poor or at risk of falling into poverty.”

Between 1990 and 2004, the “below \$1.25” poverty rate declined at an annualized rate of 5.11%, and, the “below \$2” poverty rate at the rate of 0.9%. But, if we take the more recent sub-period, 2004-2011, the numbers are very different: below \$1.25 poverty declined at 2.8%, while below \$2 at 4.2%, chiefly attributable to remittances. *This trend, a positive one for HD through other channels – may be affected negatively.*

Inequality has been a cause of concern in Nepal – among other things, due to its implications for social cohesion, which is an important aspect of HD. The trends in consumption inequality in Nepal over the 3 rounds of household surveys conducted in 1996, 2005 and 2011 show that the Gini coefficient based on per capita consumption returned to its 1996 value after a temporary rise in 2003. Urban inequality rose moderately but fell more sharply, although it is higher than rural inequality. The shares of the top and bottom 20% also remain more or less unchanged between 1996 and 2011. One can conclude that the trend towards rising inequality witnessed during 1996-2003 has been somewhat reversed subsequently, during 2003-2011. Having gone through a decade-long conflict, these are remarkable achievements in poverty and consumption-based inequality reduction. The massive destruction of livelihoods, disruption of basic services, limited access to facilities including relief, exposure to diseases due to poor sanitation in the camp-sites can not only affect poverty, it is likely to increase inequality, given that the poorer sections of the population have been more severely affected.

Multi-Dimensional Poverty Index

The Multi-Dimensional Poverty Index (MPI) identifies deprivations across income, education and health, showing the number of people who are multi-dimensionally poor and, the number of deprivations with which poor households typically contend. The latest MPI (.217) showed that 44.2% of Nepalese live in acute

multidimensional poverty. But Nepal's MPI is now below that of India, Pakistan or Bangladesh⁸. Thus, over five years, Nepal reduced the percentage of MPI poor people by 20.5% and reduced intensity by 5%. At the national level, Nepal's progress with MPI is driven by the three sub-components, *Electricity, Assets and Nutrition*. It is widely believed that remittance received from abroad is the primary factor as far as asset accumulation and nutrition status are concerned. Assets have been destroyed by the earthquake and nutrition status is also at risk at the moment. *MPI in the affected districts will undoubtedly deteriorate.*

However, within Nepal, the fastest reduction in MPI has been in the western Tarai where the total number of poor went down from 67 per cent to 33 per cent in five years. The far-western Tarai also saw a dramatic drop from 81 per cent poverty to 50 per cent. These are not among the areas which were most severely affected by the earthquake. Therefore, MPI at the national level may remain more or less intact, but may differ significantly at regional levels.

Millennium Development Goals

Nepal is known as a "success story" in MDGs. The following table summarizes the achievements in Goals 1-7, according to the latest report published by UN-ESCAP. It provides the latest figure, in comparison to the earliest (comparable) figure.

There is outstanding progress in most of the indicators at the national level, although it should be borne in mind that there are spatial and socio-economic group-based disparities. Not only did Nepal achieve its poverty reduction target before the deadline, it is well on its way to eradication of poverty (Sustainable Development Goal 1). There are concerns with gender parity, e.g., *women's enrolment in tertiary education*, which may receive a further setback due to the earthquake. The disruption of schooling, and the loss of motivation of students to study, may affect the "*reaching final grade*" percentage, which is already on the lower side. Due to the destruction of health facilities and disruption of health services, "*maternal mortality rate*" – an area where Nepal made outstanding reduction, could be affected negatively.

Selected MDG Indicators for Nepal (From Asia-Pacific Regional MDG Report 2014/15)

⁸The MPI in 2010, based on data collected in 206 was 0.35, significantly higher than the latest figure.

Goals	Indicators	Achievement	
		Earliest	Latest
Goal 1: Eradicate extreme poverty and hunger	\$ 1.25 per day poverty (%)	68.0 (96)	23.7 (10)
	Country line poverty (%)	...	25.2 (10)
	Under weight children (% under 5 age)	42.6 (95)	29.1 (11)
Goal 2: Goal 2: Achieve universal primary education	Primary enrollment ratio (%)	69.3 (99)	98.5(13)
	Reaching last grade (%)	59.0 (99)	55.3(12)
	Primary completion rate (%)	66.4(99)	99.8 (13)
Goal 3: Promote gender equality and empower women	Gender parity index in primary education	0.77(99)	1.00(12)
	Gender parity index in secondary education	...	1.06(14)
	Gender parity index in tertiary education	0.31 (90)	0.64(11)
Goal 4: Reduce child mortality	Under-5 mortality rate (per 1,000 live births)	141.9 (90)	41.6 (12)
	Infant mortality rate (per 1,000 live births)	98.5 (90)	33.6 (12)
Goal 5: Improve maternal health	Maternal mortality ratio (per 100,000 live births)	790 (90)	190(13)
	Skilled birth attendance (%)	7.4(91)	36(11)
	Antenatal care (>= 1 visit) (%)	15.4(91)	58.3(11)
Goal 6: Combat HIV and AIDS, malaria and other diseases	HIV prevalence(% ages 15-49)	0.1 (90)	0.2(13)
	TB incidence rate(per 100,000)	163(90)	163(12)
	TB prevalence rate(per 100,000)	364(90)	241(12)
Goal 7: Ensure environmental sustainability	Forest cover(% land area)	33.7(90)	25.4(10)
	Protected area(% territorial area)	7.70(90)	16.38(12)
	CO2 emissions per GDP(kg CO2 per \$1 GDP (PPP))	0.047(90)	0.116(10)
	Safe drinking water(% population)	66(90)	88(12)
	Basic sanitation(% population)	6(90)	37(12)

Section 2: Findings on immediate effect from primary survey(s)

The immediate effect on human development in its entirety is less “spectacular” as the effects on physical property. However, this event does have some significant immediate effects on families by making them homeless in a split second, making them jobless or without a livelihood, vulnerable to food insecurity and diseases and disrupting normal education schedule. All of these add up to immense psychological stress, which *no scale can measure*.

Survey 1: UNDP-UNFPA

To get at least a partial sense of the immediate effect, we decided to hear directly from the affected people. A primary survey of 408 – *half of the respondents were women* - displaced households was conducted in 6

severely affected districts, a month after the April 25 earthquake: Sindhupalchowk, Sindhuli, Gorkha, Kathmandu, Bhaktapur and Lalitpur.⁹

The main message that comes through is one of *extreme uncertainty* about what lies ahead, captured by the diverse nature of responses to all of the questions asked. The uncertainty is about life (possibility of the disaster repeating itself), and livelihood. This “state of mind” is in itself a serious negative effect on one’s perception of *well-being*, and thereby, on human development in its broadest sense.

Overall, 95% of the people surveyed received relief, 68.8% perceived them as *fair*, 61% went back to their normal occupation, 82% wanted to return to their original village (of those who did, only 38.3% wanted to settle in a new location in the old village), 19.8 received remittances before the quake (of which only 26.6% did so after the event), 13.2% of migrants returned from their foreign occupation, and the average loss of annual income predicted was 32.8%.

99% of HHs in Gorkha received relief and 95% perceived them as “fair”. Nearly 90% were back to their normal occupation (which is mainly subsistence farming). This is in sharp contrast to the response received in, e.g., Kathmandu district, where only 20% described relief distribution as fair and 43.8% were able to return to their normal occupation. Lalitpur and Bhaktapur responded similarly to Kathmandu. In Sindhupalchowk, only 25% of the people were able to return to their normal occupation. 56.8% of the surveyed people are Janjati, and 17% Dalits. Only around 20% of the people “did not want” to go back to their village of origin.

Table 1 above provided the composition of population in the affected districts according to 3 groups: Janjatis, Dalits and Others. Table 2 does the same for the affected population in our sample. A couple of observations can be made: (a) the proportion of Janjatis in the survey is significantly higher in Kathmandu, Bhaktapur, and Lalitpur districts, compared to the pre-existing composition derived from the previous census (b) the proportion of Dalits is significantly higher in the affected population in all the districts -Kathmandu, Lalitpur, Bhaktapur, Sindhupalchowk, Sindhuli and Gorkha. Thus, there is a caste-ethnicity dimension to victims and affected population, which requires careful attention for social-cohesion. Table 2 summarizes some of the main observations.

Table 2

⁹ The questions focused on the (a) damage/loss of house, livestock and other assets (b) HH Income (without remittance) (c) migration and remittance (do they receive remittance, if yes, what is the monthly average remittance received, if they received remittance after the earthquake, did the family member who was abroad for employment return after the earthquake, if s/he has returned, how long will s/he stay back: one month, 1-3 month, 3-6 month, > 6 month) (e) relief (food, shelter, others; how long will it sustain them, is the distribution fair or up to their expectations) (f) coping mechanism (resumed normal work or not, if not how are they surviving – relief, debt, community support if any, how much longer they anticipate going back to their original livelihood) (g) relocation/resettlement (if they wish to go back to their original village/home, if not, what could be the reasons, if yes, would they want to be relocated if such opportunity is provided).

Post Earth Quake Situation with Basic Indicators by District													
	N	HH received relief	fairness in relief distribution	Back to normal occupation	Willing to go back to village?	If Yes, willing to settle in new place?	HH receives remittance	HH received remittance after EQ	Migrant returned at home after EQ	% of expected loss in income after EQ this year	% of Janajati HHs	% of Dalit HHs	% of Rest HHs
Kathmandu	33	29	6	14	26	13	2	1	1	44.75	19	1	12
		87.9%	20.7%	43.8%	81.3%	50.0%	6.9%	50.0%	50.0%		59.4%	3.1%	37.5%
Lalitpur	33	23	8	18	26	8	4	1		28.74	31	0	2
		69.7%	32.0%	58.1%	83.9%	30.8%	12.1%	25.0%			93.9%	0.0%	6.1%
Bhaktapur	34	31	23	14	26	3	0		0	18.08	34	0	0
		91.2%	67.6%	41.2%	78.8%	11.5%	0.0%		0.0%		100.0%	0.0%	0.0%
Sindhupalchowk	100	99	58	25	79	49	24	9	5	43.81	42	29	29
		99.0%	58.6%	25.0%	79.8%	62.0%	24.0%	37.5%	20.8%		42.0%	29.0%	29.0%
Sindhuli	108	106	79	85	92	17	13	2	0	23.62	52	17	39
		98.1%	76.0%	78.7%	86.0%	18.5%	12.0%	16.7%	0.0%		48.1%	15.7%	36.1%
Gorkha	100	99	95	90	80	36	37	8	4	30.42	53	22	25
		99.0%	95.0%	90.9%	80.0%	45.0%	37.0%	21.6%	10.8%		53.0%	22.0%	25.0%
Total	408	387	269	246	329	126	80	21	10	32.97	231	69	107
		94.9%	68.8%	60.9%	81.8%	38.3%	19.8%	26.6%	13.2%		56.8%	17.0%	26.3%

Households which are yet unable to return to their original occupation are compelled to adapt with different kinds of coping mechanisms after earthquake. The HHs of each district are adopting a particular type of coping mechanism which differs by district. The following chart summarizes coping mechanisms.

Coping Mechanisms of HHs by District					
	Living with Relief Support	Living with Community Support	Living with debt	Other	Total
Kathmandu	4.00	2.00	7.00	4.00	17.00
	23.53	11.76	41.18	23.53	100.00
Lalitpur	3.00	8.00	5.00	0.00	16.00
	18.75	50.00	31.25	0.00	100.00
Bhaktapur	16.00	17.00	0.00	1.00	34.00
	47.06	50.00	0.00	2.94	100.00
Sindhupalchowk	63.00	4.00	29.00	10.00	106.00
	59.43	3.77	27.36	9.43	100.00
Sindhuli	3.00	1.00	15.00	3.00	22.00
	13.64	4.55	68.18	13.64	100.00
Gorkha	0.00	0.00	7.00	1.00	8.00
	0.00	0.00	87.50	12.50	100.00
Total	89.00	32.00	63.00	19.00	203.00
	43.84	15.76	31.03	9.36	100.00

Nearly 44% of the surveyed HHs are coping with relief support, while 31% have *acquired new debt*. HHs in Gorkha, as noted before, have resumed their normal livelihoods, but the income generated from them is clearly insufficient to meet their needs: as a result, they are incurring new debt. The loss due to the earthquake (house, livestock and other productive assets) differs by district. These numbers should be interpreted jointly with the per capita incomes of the districts. For example, Kathmandu has one of the highest per capita incomes, and the reported average loss due to collapsed/damaged house is NPR 2,574,413, which is several times higher than that in Gorkha (NPR 895600). The chart below summarizes.

Loss House, Livestock and Other Assets due to Earthquake by District (Mean NRs.)					
District		Cost of House	Cost of Livestock	Other asset cost	Total cost
Kathmandu	Mean	2,574,413.79	45,000.00	300,000.00	2,441,086.96
	N	29.0	3.0	2.0	23.0
Lalitpur	Mean	709,242.42		83,000.00	525,000.00
	N	33.0		5.0	18.0
Bhaktapur	Mean	2,129,411.76	4,000.00	239,812.50	-
	N	34.0	1.0	16.0	0.0
Sindhupalchowk	Mean	479,000.00	23,900.00	86,970.00	589,870.00
	N	100.0	100.0	100.0	100.0
Sindhuli	Mean	456,437.04	1,893.52	12,801.85	471,132.41
	N	108.0	108.0	108.0	108.0
Gorkha	Mean	895,600.00	722.50	26,545.00	922,867.50
	N	100.0	100.0	100.0	100.0
Total	Mean	884,203.47	8,992.79	53,130.21	767,194.99
	N	404.0	312.0	331.0	349.0

Survey 2: Gender Equality and Social Inclusion (GESI)

Admittedly, the sample size above is limited, but independent primary survey based reflections of the GESI sector also reiterate the need to ensure relief and rebuilding programs are designed to address the gender and social inclusion dimension with care. Sindhupalchowk, with nearly 95 percent toilet coverage before the earthquake was about to be declared as ODF (Open Defecation Free) district. But, about 80 % of toilets have now collapsed. Women's and girls' health and safety will negatively suffer. Likewise, the existing 475 drinking water schemes have collapsed. This will have direct negative impact on women's and girls' work drudgery as they will have to fetch water from distance. Similarly, in Kavrepalanchowk, 22 VDCs were already declared ODF. The DDC was preparing to declare the entire district as ODF by December 2015. Most of the drinking water schemes have been damaged by landslides triggered by quakes and aftershocks. An important, dimension of poverty is time poverty, which can be broadly understood in the context of "the burden of competing claims on individuals' time that reduce their ability to make unconstrained choices on how they allocate their time, leading, in many instances, to increased work intensity and to tradeoffs among various tasks." Time poverty can exacerbate income poverty in poor households in several ways, and many of these *particularly affect women*. The work burden on women, and the disproportionate cost borne by women in the household economy not only limits the time they can spend in economic activities but restricts them (spatially and culturally) to activities that are compatible with their domestic obligations.¹⁰

¹⁰ Gender, Time Use and Poverty in Sub-Saharan Africa. World Bank Working Paper No. 73. http://siteresources.worldbank.org/INTAFRREGTOPGENDER/Resources/gender_time_use_pov.pdf

Poverty and food insecurity will increase in the aftermath of the earthquake. Dalit, the landless, and female headed households (FHHs) will face severe crisis as their coping capacity and scale of resilience are usually very low. It is important to note that in 14 hard-hit districts, share of FHHs ranges between 21.3% (Nuwakot and Kavre) to 37.2% (Gorkha). As the number of single-headed households and FHHs are likely to rise in the aftermath of the earthquake, there should be a special support system to promote their survival and social resilience.

Survey 3: Affected children

The effect on children has been significant. Four child-focused agencies, Plan International, Save the Children, United Nations Children's Fund, and World Vision International Nepal, are currently undertaking a children's consultation in the 14 districts most affected. Their preliminary findings from Focus Group Discussions reveal the following main effects on children concerning shelter, education, food, hygiene and access to drinking water, other issues (unfair distribution, psychosocial support).

In 16 out of 24 FGDs children groups identified shelter as the first priority issue in the current context and children in five FGDs said it was the second most important issue for them. Major problems relating to shelter listed by children are as follows: (a) Houses have collapsed and they do not know when new ones will be built (b) Houses are cracked and they are unable to live inside them; (c) Their parents have no/not enough money to afford new houses; (d) Parents are stressed due to lack of shelter and they are not able to pay attention to children's needs; (e) Sleeping under the tents is not comfortable and they have difficulty in getting proper shelter many are still living outside.

Children in seven out of 24 FGDs stated that education is the first priority need for them, whereas children in 12 FGDs cited education as the second most important issue. They have lost motivation and confidence to study as their learning habits have been disrupted. They fear that they might have forgotten what they have learned, which may make it difficult to pass their exams (particularly with children who are in grade 8 and grade 10 (SLC)). The extent of damages and losses has been the highest in school education, with the subsector accounting for 88.8% of the total damages and losses faced by the entire education sector. More specifically, 8,242 community (public) schools have been affected by the earthquake, with 25,134 classrooms fully destroyed and another 22,097 partially damaged. Private schools also experienced significant infrastructure damage with 956 classrooms fully destroyed and 3,983 classrooms partially damaged. The earthquake and the series of continuing aftershocks led to the complete closure of schools and colleges for 37 days (26 April–30 May) in the affected districts, forcing more than 5 million children and youth to stay out of education institutions for a significant period of time at a time when the academic year had just started. The standard school opening days per year is 220 days, with 190 days for teaching-learning. Therefore, actual physical damages to schools, compounded with the psychological trauma of students, may have a significant impact on all education related HD outcomes.

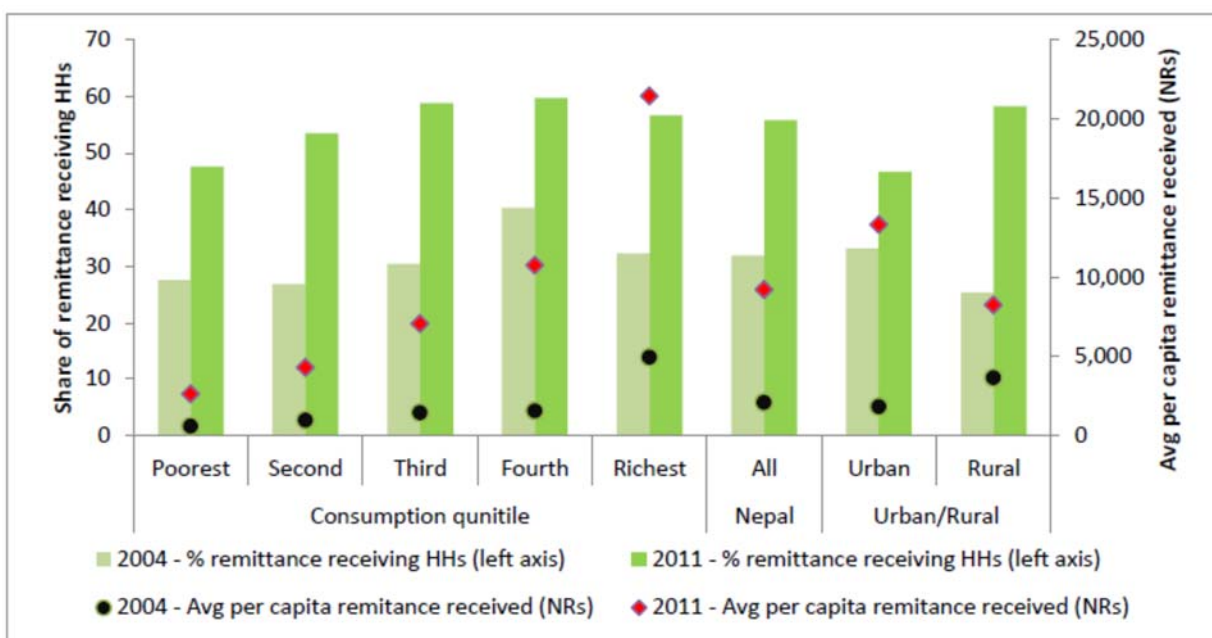
Among the most common issues relating to food expressed by the children was there is not enough food for the whole family and they have to depend on neighbors and relief handouts and, because of this, they do not get to eat on time. Hygiene and access to drinking water is another area identified prioritised by children. Out of 24 groups consulted, two groups prioritized it as the second most important problem for them. Issues listed by the children include the lack of toilets, garbage littered everywhere, insufficient water supply, contaminated water due to damage at its source. Due to the shortage of safe drinking water, children are forced to drink river water due to which diarrhoea is breaking out among children.

Section 3: Channels of longer term impact on poverty and human development

Impact on poverty and human development relates to the consequences of the effect in the short, medium and long term. The following channels are most likely to exert a strong influence on how poverty and HD unfolds.

Migration and Remittances

One of the most important drivers of poverty reduction has been remittances. The following chart provides the share of remittance receiving households, and the share of remittances in total income.¹¹



The share of remittance in total income went up significantly between 2004 and 2011 across all income groups, but especially in the upper ones. The share of households receiving remittances rose too, but not that sharply. Thus, households which receive remittances have become *increasingly more dependent* on them as their main source of income. If this is not sustained, the income levels of such households take a hit, affecting poverty rate directly. It will indirectly impact on the *growth rate* of the economy by reducing investment in human capital, lowering nutrition/health status and causing a general slowdown in consumer spending.

Loss of productive assets

The second channel through which the incidence of poverty will be affected is the damage and loss to productive assets, partly captured by the survey, and complemented by other studies including that of the World Bank. Damage or destruction of houses implies loss of rental income for many households. Destruction of productive assets such as land, seeds, machinery and working tools implies loss of wage income. The

¹¹ "Inclusive Economic Growth in Nepal" by Chandan Sapkota, *Journal of Poverty Alleviation and International Development*, 5(2)

following chart (World Bank) provides three alternative scenarios. It combines the possible impacts on remittances, the overall growth rate of GDP, the loss of assets, and the loss of income. Under the most optimistic scenario, the national poverty rate could *increase by 2 percent*.

	Baseline - No Earthquake Scenario 2015	Low Impact		Medium Impact		High Impact	
		Housing and durable asset loss: 50%; Annual income loss: 35%; Growth rate in 2015/16: 4.5%; Foreign remittance increase: 15%		Housing and durable asset loss: 70%; Annual income loss: 45%; Growth rate in 2015/16: 4.5%; Foreign remittance increase: 5%		Housing and durable asset loss: 100%; Annual income loss: 50%; Growth rate in 2015/16: 4%; Foreign remittance increase: 0%	
	% Poor	% Poor	Δ # Poor (in '000)	% Poor	Δ # Poor (in '000)	% Poor	Δ # Poor (in '000)
National	21.2	23.2	561	24.0	786	24.9	1038
Mountains	35.9	41.1	102	43.8	152	45.1	180
Urban Kathmandu	9.4	12.1	43	13.0	56	14.6	82
Urban Hills	7.3	7.8	6	7.8	6	7.8	6
Urban Terai	17.8	18.3	11	18.3	11	18.4	14
Rural Eastern Hills	13.0	13.7	13	14.1	19	14.2	22
Rural Central Hills	25.8	36.6	280	41.2	395	45.1	500
Rural Western Hills	21.8	24.3	66	25.8	106	27.1	141
Rural Mid and Far Western Hills	32.8	33.9	27	33.9	27	34.1	32
Rural Eastern Terai	17.9	18.1	7	18.1	7	18.4	17
Rural Central Terai	19.3	19.3	0	19.3	0	19.8	22
Rural Western Terai	18.6	18.6	0	18.6	0	19.2	10
Rural Mid and Far Western Terai	26.0	26.3	6	26.3	6	26.6	11

Human Asset and Economic Vulnerability Indexes

There is a likely impact on the “human asset” and “economic vulnerability” indexes (HAI, EVI, respectively) – two of the three criteria for graduation and also closely connected to HD. The 17th session (March 23-27, 2015) of the Committee for Development Policy in UN-DESA, announced that Nepal fulfils the criteria for graduation for the first time. Nepal made the list mainly due to its remarkable progress in HAI and EVI. The composition of HAI used for the 2015 review is an equally weighted index of percentage of population undernourished, mortality rate of children under 5, gross secondary school enrolment ratio and adult literacy. For the next triennial, *maternal mortality rate will be added as an additional criterion*.

Thus, while all the pre-existing components will be affected by the earthquake, an additional channel has been created through which the impact of the earthquake will have long term implications for the HAI and hence, the outcome of the next triennial review scheduled for 2018. It could be useful to identify affected women at different stages of their pregnancies and ensure they receive adequate care to give safe birth.

The earthquake will also have implications for the Economic Vulnerability Index (EVI). Nepal had achieved the benchmark level according to the March 2015 review. The EVI comprises two sub-indices, exposure and shock, respectively. The shock sub-index in turn includes 3 components, export instability, victims of natural disaster and instability of agriculture. All three are likely to receive at least a temporary setback.

Millennium and Sustainable Development Goals

As far as MDGs are concerned, the likelihood of achieving the education, and health related targets will most certainly be affected due to the destruction of physical infrastructure. The impact on hunger will depend on the efficacy of food distribution in the coming months. It will also depend on the extent of food price inflation, which is expected to go up in the coming months. Without the earthquake, Nepal may have well been on target to *eradicate poverty* (Sustainable Development Goal 1). This is still possible, if the rebuilding process is well-designed.

On the positive side, this may be an opportune moment to reverse the pessimistic scenarios on gender equality and women's empowerment by bringing them firmly up front in the recovery strategy.

Conclusions

Transient poverty

Whether or not affected households fell back into *transient* or *structural* poverty due to the earthquake, will have longer term implications for all additional and broader measures of HD discussed above. There are several channels through which the duration of poverty will be affected. The most obvious one is the loss of income due to death and injuries to primary wage earners in the family. The poor are very often reliant on labor income and an injury to a working member of the family significantly increases the likelihood of falling into at least transient (temporary) poverty and reduces the chances of escaping poverty.

Targeted social protection

Transient poverty is probably easier to rectify with the help of well-targeted social protection measures. These may include temporary top-up of cash benefits for at least five vulnerable groups (*senior citizens, widows and single women, Dalit children, disabled population*), scaling up Child Grant (currently 200 NPRs/month), strengthening of the administrative systems for social protection service delivery through the introduction of an electronic payment system, addressing the coverage gaps in the current social protection system, and developing an integrated system across all social protection programmes addressing different kinds of contingencies. Such an approach can go a long way in reducing the immediate threats to school enrolment, nutrition and food security. The earthquakes destroyed physical assets in large scale. To mitigate this, access to credit and insurance markets need to be strengthened and well-targeted. It will help faster recovery and prevent falling into structural poverty.

Structural poverty

The long term impact of the earthquake on human development in a broader sense could be significant if the dent on poverty is of a permanent nature. In that case, the impact on other HD indicators will be more visible in the coming months. A permanent falling back to poverty can happen if livelihoods are not restored within a reasonable period of time. However, given the significant losses which the poorer sections of the affected population have suffered, a return to original livelihood is not going to be enough. Sooner than later, there may be a need for a *permanent transformation of the economy to lift people from low value-added to higher value added sectors*. Without that, the already high inequality in the society is likely to be exacerbated.

Risk management

The WDR 2014 argues that risk management can be a powerful instrument for development—not only by building people's resilience and thus reducing the effects of adverse events but also by allowing them to take

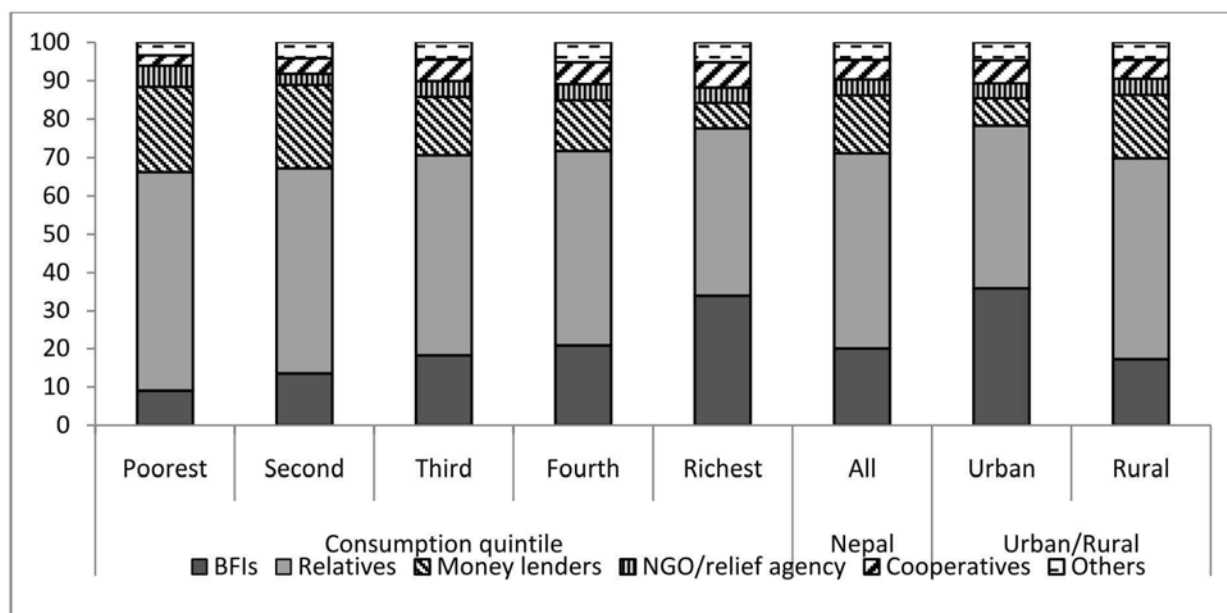
advantage of opportunities for improvement. The establishment of a national risk board to assess and manage risks in an integrated way may be considered. This is important because cross-country evidence proves that if risks are not adequately hedged, disasters such as earthquakes can affect the households' decision on the long term investment in human development, particularly education. Women's education seem to be affected relatively more by such changes in economic behavior.

Access to facilities

Table1 showed the "access index" of the districts, which is based on the average time taken by a household to reach the nearest public facility such as roads, markets, schools, colleges, health posts etc.¹². The index is on a scale of 1-100, 100 being the best. The national average is 61.7. Over half of the districts fall below the national average in terms of access, which has a direct implication for service delivery related to relief and rehabilitation. The national average for the household wellbeing index is 33.38. Most of the districts are in the vicinity of the national average (Western, Mid-Western and Far-Western districts are the ones with the lowest well-being index, and not severely affected by the earthquake). This again reiterates the point on HDI made before: the task is to prevent human well-being of affected districts from falling, while continuing to try and lift those of the unaffected but lagging districts.

Financial access and inclusion

Access to financial services will be particularly critical in rebuilding shelter, and, productive assets destroyed by the earthquake. The following chart shows the existing distribution of household credit by provider. It is clear that the poorer quintiles rely on informal sources of borrowing, often with high interest rates. During the rebuilding process, it is essential to ensure that the access to formal sources of finance for such people improves vastly. It should be kept in mind that access does not imply financial inclusion: *financial literacy* for the poorer sections of the population in remote areas need to be improved to encourage them to use formal financial services.



¹²"Nepal Human Development Report: Beyond Geography, unlocking human potential", 2014

Youth ownership

Both the effect and the impact of the earthquake straddles some existing complications in the society. These include mainly certain persistent inequities along various socio-economic dimensions, the yet-to-be-resolved political transition such as the promulgation of a constitution with an agreement on the federal structure. The latter may affect relief and long term recovery due to the absence of elected local bodies throughout the country. In his address to the nation on the eve of the 8th Republic Day on May 28, 2015, President Dr Ram Baran Yadav emphasized that the “efforts to complete the constitution-drafting process and reconstruction efforts” should go hand in hand.

One cannot lose sight of the fact that Nepal is an exceptionally young country, demographically. A new constitution will most certainly have a therapeutic effect on the devastated psyches of the people of Nepal and act as a much-needed stimulus to guide their personal decisions and incentives – shaping the future course of human development - in an informed and optimal manner. A constitution and the much-awaited federal structure will go a long way in revitalizing the youth and make them full owners of the rebuilding process. One can hardly over-emphasize that the evolution of human development and human capital depends critically on youth-ownership of the rebuilding process and relatedly, the future of its children.

Resilient transformation

The fact that Nepal will live with the risk of earthquake cannot be changed. Therefore, a resilience-oriented approach to rebuilding and transformation. We may think of resilience as “the ability of Nepal to absorb the shock and maintain its structure and functions with minimum loss and resume pre-event functionality in a relatively short time.” Saying it slightly differently, resilience shortens the period of time between the earthquake and full recovery of a system. In the present context of Nepal, “system” referred above is an inter-twined fabric of social, environmental, and economic elements. Thus, resilience is a comprehensive characteristic that captures the sustainability of both natural and anthropogenic systems. Resilience is achieved through the complete life cycle of a disaster, beginning with mitigation, continuing with rescue and relief, and moving on to short-term, and long-term recovery. For this to happen, the service delivery mechanism, especially at local levels, will have to be strengthened

Focus on human capital

As there is no predictable limit that can be caused to physical infrastructure by a major disaster, it would be prudent to strengthen human capital first. Essentially, this means enabling people to be able to use their own resources first to cope with the disaster. It takes time for rescue and relief to be operational. Having savings/cash-in-hand is critical. Being healthy is important. And being educated and informed can only help. Finally, long run growth, and hence the reduction of poverty and improvement in all dimensions of HD, depends on the quality of human capital.

Resource mobilization

Nepal with its beautiful landscape, majestic mountains and warm people attracts tourists from all walks of life. Tourism is not just a source of livelihood for its people: it is a source of immense happiness to everyone who visits, offering adventure, peace, natural beauty, cultural heritage, spiritual strength and more. Nepal needs help to rebuild itself and continue to be the same source of happiness it used to be. There could not be a more relevant time than now to demonstrate one’s love for the country by augmenting the financial resources to build back better.

ⁱ Source: <http://countrymeters.info/en/Nepal>

ⁱⁱ Source: The Himalayan, “Labour shortage hits businesses”, 5 June 2015

ⁱⁱⁱ Ibid

Annex 1: Definitions of Enterprises by size

Definitions extracted from: Government of Nepal, Ministry of Industry: *Industrial Policy 2010*.

Microenterprises: a micro enterprise means the enterprise having met the following conditions: Where investment is up to two hundred thousand rupees as fixed capital except the house or land; where the entrepreneur himself/herself engaged in management; where there are up to nine workers including the entrepreneur; where the annual financial transaction is less than two million rupees; and if an instrument with engine is used, the electric motor or other oil engine capacity has to be less than ten kilowatt

Traditional and other cottage industries: An industrial enterprise that uses traditional skills and technology, the instruments and machinery based on local raw materials and associated with art and culture of the country and that uses electric power up to 10 kilowatts as referred to in schedule-6

Small scale industries: An industrial enterprise other than those of micro enterprises and traditional and other cottage industries having the fixed assets of up to 50 million rupees

Medium scale industries: An industrial enterprise having the fixed assets more than fifty million to one hundred fifty million rupees.

Large scale industries: An industrial enterprise having the fixed assets of more than one hundred fifty million rupees.

^{iv} Sarah Bradshaw and Maureen Fordham 2013: Women, Girls and Disasters; A review for DFID

^v National Commission 2013: Nepal Thirteenth Periodic Plan 2013

^{vi} UNDP 2014: Human Development Report

^{vii} International Centre for Research on Women 2015: Child Marriage Facts and Figures: <http://www.icrw.org/child-marriage-facts-and-figures>

^{viii} Nepal National Population and Housing Census data 2011

^{ix} Neumayer Eric and Thomas Plumper 2007. 'The Gendered Nature of Natural Disasters: the impact of catastrophic events on the gender gap in life expectancy, 1981-2002.' London School of Economics and Political Science, [http://eprints.lse.ac.uk/3040/1/Gendered_nature_of_natural_disasters_\(LSERO\).pdf](http://eprints.lse.ac.uk/3040/1/Gendered_nature_of_natural_disasters_(LSERO).pdf)

^x FAO 2015: Field assessment Report on 22/05/2015.

^{xi} Dalit Civil Society Organizations' Coalition for UPR, Nepal And International Dalit Solidarity Network (IDSN) 2015: Human Rights Situation of the Dalits Community

^{xii} NMIP 2014; WASH Status Report 2014

^{xiii} Nepal Demographic and Health Survey 2011

^{xiv} UNFPA, UN Women and UK Aid 2013: Tracking Cases for Gender-Based Violence in Nepal: Individual, institutional, legal and policy analyses

^{xv} Chiai Uraguchi 2010: Current Trends of Human Trafficking in Nepal

^{xvi} Reuter News 2015: <http://www.reuters.com/article/2015/05/26/us-quake-nepal-trafficking-idUSKBN00B12Z20150526>

^{xvii} UNICEF 2015: State of World Children:

http://www.unicef.org/publications/files/SOWC_2015_Summary_and_Tables.pdf

^{xviii} Dalit Civil Society Organizations' Coalition for UPR, Nepal And International Dalit Solidarity Network (IDSN) 2015: Human Rights Situation of the Dalits Community

^{xix} Nepal disaster risk reduction portal : <http://drrportal.gov.np>; MoHA

^{xx} Based on field visits in Kavre, Kathmandu and Nuwakot, 31 May 2015

^{xxi} Ghimire, M. Review of Studies on Glacier Lake Outburst Floods and Associated Vulnerability in the Himalayas. The Himalayan Review 35-36 (2004-2005) 49-64

^{xxii} Discussion with Department of Seismology Department May 2015