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Prospects for the Implementation of a Water Management Regime in the Brahmaputra River Basin: An Assessment of the Guiding Principles

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Abstract

The management of transboundary water resources is generally known for its complexity and large number of interconnected social, environmental, economic, and political aspects. The increasing threat of the impact of climate change and water scarcity, combined with the ongoing 'dam racing' in the Brahmaputra River Basin, have the potential to sharpen territorial and resource feuds, and trigger greater regional instability. Even though China and India have already signed several bilateral cooperation agreements, the existing institutional arrangements are still weak or even inadequate. Therefore, a new water management regime with strong but flexible norms accepted by all actors must be established. Such transboundary regime should be compatible with the principles of adaptive water management in order to reduce uncertainties or surprises, and improve information sharing, while paying special attention to social and cultural uniqueness of the regions involved. This paper examines the social and environmental implications of China's and India's ongoing natural resource quest. It analyses the impact of ongoing dam building activities on the livelihood of downstream river-dependent population and, in particular, addresses whether and how water can become a source of international cooperation and shared prosperity rather than a source of conflict. It argues that the implementation of an effective water management regime that focusses on an adaptive, holistic and mutually beneficial approach is the imperative for future existence and coexistence within the Brahmaputra basin, and should play a key role in preventing and combating the contemporary challenges such as climate change, water scarcity, a damaged ecosystem, and displaced peoples.

Keywords

Brahmaputra River Basin, Water Management Regime, Adaptive Approach, Hydropower, Dams, China, India, Bangladesh

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Introduction

The Tibetan Plateau, the world's third pole, is the water tank of the Asian continent and the source of all major rivers; it supplies water for at least two billion people who live downstream.[1] In fact, up to ninety percent of the surface runoff from rivers originating in the Tibet Autonomous Region (TAR), flows downstream into China, India, Bangladesh, Vietnam, Cambodia, Laos, Thailand, Myanmar, Nepal, Bhutan, and Pakistan (Buckley, 2014). One of them is called the Brahmaputra, meaning the 'Son of Brahma' in Sanskrit, but also has various other different names depending on the region. The Brahmaputra is the world's highest-altitude river and is shared by three Asian countries.[2] The river originates in Tibet where its local name is Yarlung Tsangpo, then passes through two Indian states of Arunachal Pradesh and Assam, where it is most often called the Brahmaputra, and finally flows into the Bay of Bengal in Bangladesh, known as the Jamuna.

For consistency, this paper uses the term 'Brahmaputra' for the river both inside and outside Indian territory. The river is part of a larger Ganga-Brahmaputra-Meghna (GBM) transboundary basin, one of the world's largest hydroelectric systems inhabited by about ten percent of the world population (Chaturvedi, 2013). The Brahmaputra basin itself is home to various unique ethnic groups and tribal communities who have a strong connection with the land and the river, both for economic and cultural reasons. In India, for instance, where the river flows through the states of Arunachal Pradesh and Assam, the concentration of tribal population is among the highest in the whole country.

The three riparian countries — China, India, and Bangladesh — of the Brahmaputra basin have very different political systems and are characterised by a heterogeneity in terms of culture, religion, ethnicities, climate, and vulnerability to environmental risks. Moreover, the natural character of the basin is prone to climate change and natural disasters such as floods, landslides, and earthquakes, these events heavily impact the ecosystem and often lead to drastic changes in the living conditions of people. In view of this reality, and also in view of the threat of increasing water scarcity and social tension, several authors predict that the Brahmaputra will most likely cause a

[1] Chinese name for Tibet, Xizang, was created by Chinese authorities in 1965 and reflects the natural wealth of the entire area. Thus Xizang is usually translated as 'western treasure house' (Watts, 2010).

[2] Despite the fact that the Brahmaputra basin spans four countries — China (50 percent), India (34 percent), Bangladesh (8 percent), and Bhutan (8 percent), this paper only deals with the three major riparian countries — China, India, and Bangladesh.

serious discord among the three riparian countries, especially with regards to water allocation and river development projects (Chellaney, 2009, 2011, 2013; IANS, 2016; Ramachandran, 2015; Samaranayake et al, 2016; Wuthnow, 2016).

Figure 1. The Brahmaputra River

Source: Samaranayake, Limaye, & Wuthnow, 2016

As a matter of fact, water can easily become a source of conflict, especially in transboundary river basins, where the water is shared and claimed by several densely populated and water-stressed countries. Today, India and China are the world's most water-stressed and most populated countries and are building more dams than any other country on earth (WCD, 2000). Elizabeth Economy & Michael Levi (2014) stress that if someone wants to find "potential water wars involving China, the

natural place to look is its face-off with India over the Brahmaputra" (p. 160). Indeed, the ongoing 'dam racing' between the two countries has the ability to at least "deepen mutual distrust and discord, sharpen territorial and resource feuds, and trigger greater regional instability, which can be overcome only through implementation of strong norms on dam building" (Chellaney, 2013, p. 262).

For instance, some Indian analysts fear that the ongoing large-scale Chinese hydropower development projects, such as a planned 38 gigawatt dam on Motuo (which is discussed in greater detail in section 3.1), are linked to a much bigger plan that would divert significant quantities of water from the upper course of the Brahmaputra River in Tibet in order to help alleviate water shortages and acute energy needs in Northern China (Economy & Levi, 2014). In his book, Michael Buckley (2014) says that China plans to divert water from some major rivers in Tibet to feed its "desperate thirst for clean water" (p. 13). Another author, Brahma Chellaney (2009), assumes that the diversion of the Brahmaputra's water is a matter China does not discuss in public, because the project "implies environmental devastation of India's northeastern plains and eastern Bangladesh, and would thus be akin to a declaration of water war on India and Bangladesh" (see "The Sino-Indian Water Divide").

The idea of hydropower development on the upper stream of the Brahmaputra, which in fact was one of the world's last undammed rivers until China began constructing a series of dams (Chellaney, 2013), most likely originated from the 'Open Up the West' campaign launched in 2000, aimed at encouraging economic development of western China (Samaranayake et al, 2016). On the Indian side, the Brahmaputra accounts for about 30 percent of the country's water runoff and also constitutes a major source of potential hydropower (Chaturvedi, 2013). However, the water flows coming from China and India are even more important for the lowest riparian country, Bangladesh, due to the fact that the main sources of the river catchment area for the country come from outside its borders (Samaranayake et al, 2016).

The territoriality of water resources is usually at the core of any issues relating to water allocation, as people and governments tend to consider that all resources located on their territory belong to them. In practical terms, this means that if an upstream state pollutes or limits the water flow, the

downstream states will always have difficulties using the water resource efficiently and fairly. Today, the uneven and irregular distribution of water is a global challenge and several initiatives such as the International Office for Water, the World Water Forum, the United Nations Program for Water, the United Nations World Water Assessment Programme, UNESCO's International Hydrological Programme, and the European Union Water Initiative have been dealing with this issue for some time now. The objective of these bodies is to make water a global issue and to challenge local or national governance, ensuring water is available for all — a resource that is managed at an intergovernmental or cross-border level.

In 2000, China and India signed a Memorandum of Understanding (MOU), under which China agreed to share information concerning the water level and rainfall, and to warn India before the execution of any diversion plans (Economy & Levi, 2014). In 2006, the two countries signed another agreement on sharing transborder season data, and from 2006 to 2009, both India and China participated in a series of Abu Dhabi dialogues focusing on water cooperation in South Asia (Economy & Levi, 2014). Few years later, in 2015, China (Hu Jintao) and India (Manmohan Singh) approved a new hydropower development plan to construct three hydropower facilities on the middle reaches of the Brahmaputra River in Tibet (Economy & Levi, 2014). However, despite the fact that China and India signed several bilateral agreements to ease the political tensions, the danger of water-related conflicts in the Brahmaputra basin is still present.

Both climate change and water diversion activities are large-scale problems that no country can solve on its own, most of these problems are transnational by nature and "require interstate cooperation in order to develop sustainable solution" (Litta, 2012, p. 14). However, even though the majority of existing basin-specific agreements relate to multilateral river basins (i.e., rivers shared by three or more states), most countries tend to prefer bilateral treaties to multilateral treaties (Zawahri & Mitchell, 2011). Therefore, to address the issue of the Brahmaputra River effectively, and to prevent tensions between nations over shared resources, new measures and rules with a basin-wide recognition must be adopted and formalised in a functioning agreement. Such measures should, among other things, increase state's capabilities to prevent or remediate environmental damage; deepen the understanding of cultural sensitivities in certain districts; strengthen the cooperation among the upstream and downstream countries; and enhance the center-region

collaboration within the individual riparian countries. This working paper assumes that a new set of guiding principles, focusing on an adaptive approach, would lead to more equitable and sustainable water management in the future of the Brahmaputra basin. Plus, because adaptive management must always be shaped by the governance structure (Pahl-Wostl, 2008), the establishment of a new regime is necessary to coordinate future water management activities efficiently and safely.

Theoretical framework

Methodology

The paper seeks to identify areas to improve water resource management in the Brahmaputra River Basin. Secondary literature consists of previous research, relevant academic journals, reports, and local newspapers. The contemporary water situation in the Brahmaputra River Basin is used as a case study, and provides a comprehensive analysis of the issue for those interested in transboundary river management in South Asia.[3] However, there is still a need for more detailed research on sustainable water management in this area, including better data and more detailed case studies. The theoretical framework of the working paper is based on theories and definitions presented by Oran R. Young (1989), Henriette Litta (2012), and Claudia Pahl-Wostl (2008). Section 5 of this paper provides an overview of guiding principles that, if applied, would lead to more equitable and sustainable outcomes that are in line with the general principles of the United Nations Watercourses Convention (UNWC), the Water Commission on Dams' (WCD) seven strategic priorities (2000), the South Asia Water Initiative's (SAWI) four key principles, the CNA recommendations, and Pahl-Wostl's (2008) advocacy for adaptive water management regime.

Regime theory

The most commonly used definition of a 'regime' comes from Krasner (1983), who defines it as "implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations" (p. 2). According to Keohane and Nye (1977), regimes represent "sets of governing arrangements, that include networks of rules, norms, and procedures that regularise behaviour and control its effects" (p. 19). Robert Jervis demonstrates that the purpose of regimes is to imply "not only norms and expectations that facilitate

[3] Although there are still some controversies concerning the definition of South Asia, in this paper, the region consists of eight countries — Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. Despite the economic growth of 7,1 percent over the last decade, South Asia remains one of the least economically integrated regions, reflecting historical political tensions and mistrust. ("South Asia Regional Integration," 2016).

cooperation, but a form of cooperation that is more than the following of short-run self-interest" (Jervis, 1982, p. 357). Contrary to temporary or 'one shot' agreements that change with every shift in power or interests, the objective of regimes is to facilitate agreements (Krasner, 1983). Regimes can also be defined as "more specialised arrangements that pertain to well-defined activities, resources, or geographical areas and often involve only some subset of the members of international society" (Young, 1989, p. 13).

Henriette Litta (2012) characterises regimes as a specific form of cooperation between different actors (i.e., sovereign states). The author further explains that transnational environmental problems do not necessarily trigger regime creation, and points out that what is really essential in creating and sustaining regimes is "the constellation of interests among all involved actors" (p. 14). In fact, states cannot be legally bound (except by their own consent) and, when faced with transnational problems, they can either collaborate with one another to resolve issues, or decide not to do so, meaning that regimes are voluntary agreements based on common interests of involved state parties (Litta, 2012).

Regarding South and Southeast Asia, several international regimes have been created, among which the following can be highlighted: the Association of Southeast Asian Nations (ASEAN); the Mekong River Commission (MRC); the South Asian Association for Regional Cooperation (SAARC); the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC); the South Asian Growth Quadrangle (SAGQ); the South Asia Subregional Economic Cooperation Program (SASEC); the Ganges Treaty between India and Bangladesh (the Joint River Commission); the Mekong-Ganga Cooperation (MGC); and the Indian Ocean Rim Association (IORA). The Mekong River Commission (MRC)[4] is a basin-wide river management organisation in Southeast Asia established twenty-two years ago that aims to protect the Mekong River's ecosystem, promote sustainable management and people's well-being.

[4] The Mekong River is a major river in Southeast Asia that runs through China (Tibet), Myanmar, Laos, Thailand, Cambodia, and Vietnam.

In terms of South Asia, the only regional organisation where all South Asian countries are members, is the South Asian Association for Regional Cooperation (SAARC).[5] Similarly, in terms of the Brahmaputra basin, the only regional, multilateral framework where the three major riparian countries are members of equal status, is the Bangladesh-China-India-Myanmar (BCIM) initiative, which seeks to promote and expand regional connectivity (Samaranayake et al, 2016), but does not explicitly address the Brahmaputra issue. In fact, the Brahmaputra basin still lacks an institution capable of promoting effective cooperation on water management between the riparian countries; unresolved bilateral conflicts within the region thus hinder potential collaboration.

In this paper, 'regime' will be used in line with the definitions from Young (1989), Litta (2012), and Pahl-Wostl (2008), who all emphasise geographical and environmental aspects of regimes. Oran Young (1989), a major contributor to regime theory, uses different cases through which he demonstrates the role of regimes as determinants of cooperation in international society. The notion of 'water management regime', presented by Pahl-Wostl (2008), refers to "the whole complex of technologies, institutions (i.e., formal and informal rules), environmental factors and paradigm that together form a base for the functioning of the management system targeted to fulfill a societal function" (p. 5).

Despite the fact that some experts are skeptical about the effectiveness of regimes in the real world, this paper claims that an effective water management regime that focusses on an adaptive approach would play an essential role in coordinating actors' behaviour and ensuring that desired outcomes in the Brahmaputra basin would be achieved. Pahl-Wostl (2008) defines the adaptive management approach "as a systematic process for improving management policies and practices by learning from the outcomes of implemented management strategies," while emphasising "the role of actor platforms and processes of social learning in multi-level governance regimes" (p. 1). She points out that, contrary to international regimes that have been assumed to unfold around a single institution such as UN Convention on Biological Diversity, Convention on Long-Range Transboundary Air Pollution, and The Kyoto Protocol, a water management regime is assumed to unfold around a societal function by giving priority to, for instance, water supply and flood protection. Pahl-Wostl

[5] At present, South Asia remains one of the least integrated regions in the world. Compared to ASEAN, for instance, where intra-regional trade accounts for 25-26 percent, in the case of South Asia's total trade, it accounts for only 5 percent. There is also a little cooperation within the region on managing shared natural resources and disaster risks that threaten sustainable growth. ("South Asia Regional Integration," 2016).

(2008) and those who advocate for a radical change in water resources management usually highlight some of the following arguments: (1) environment must be explicitly incorporated in management goals; (2) manage root cause of the problem, not its effects; (3) implement decentralised and more flexible management approaches; (4) pay more attention to management of human behaviour through 'soft' measures; (5) encourage shift towards participatory management and collaborative decision making; (6) create open and shared information sources (including linking science and decision making).

The dominant arguments are summarised in the following assumptions (Pahl-Wostl et al, 2008):

- *Sustainable management of water resources cannot be realised unless current water management regimes undergo a transition towards more adaptive water management;*
- *Adaptive management is needed as a systematic process for improving management policies and practices by learning from the outcomes of implemented management strategies;*
- *The systems to be managed are too complex to accurately predict the outcome of management interventions and to know and control all relevant processes;*
- *The implementation of new policies is to some extent an experiment as these policies may have different outcomes when applied in practice.*

Pahl-Wostl (2008) adds that the successful implementation of adaptive management requires transparency, providing all actors with clear and concise information. The author also stresses that, "an appropriate framework of analysis must include the relationship between structure (water management regime) — process (adaptive water management) — outcome (sustainability of water system)" (p. 5), because adaptive management is always shaped by the governance structure and thus represents an integral part of water governance. An essential feature of adaptive water management is the interdependence of all elements that guarantees the functioning of a regime.

Adaptive approach to water management regime

The word 'adaptation' or 'adaptive capacity' can be described as "the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences" (Pahl-Wostl et al, 2008, p. 8). In this context, adaptation can occur as a result of expected or unexpected climate change. The table below

summarises some of the main features of adaptive water management regime outlined by Pahl-Wostl (2008).

Table 1. Main features of adaptive water management regime

Management Paradigm	management as learning in complex adaptive systems
Governance Style	polycentric, horizontal, broad stakeholder participation
Sectoral Integration	cross-sectoral analysis that identifies emergent problems and integrates policy implementation
Scale of Analysis and Operation	transboundary issues addressed by multiple scales of analysis and management
Information Management	comprehensive understanding achieved by open, shared information sources that fill gaps and facilitate integration
Infrastructure	appropriate scale, decentralised, diverse sources of design, power delivery
Finances and Risk	financial resources diversified using a broad set of private and public financial instruments

Source: Pahl-Wostl et al, 2008, p. 9

In practical terms, an adaptive water management regime tends to rely strongly on participatory processes and active involvement of all actors. It suggests that polycentric governance that integrates bureaucratic hierarchies, markets, and network governance is more flexible and efficient than centralised governance systems, particularly in terms of the allocation of scarce resources in uncertain environments (Pahl-Wost, 2008). A water management regime consists of active interaction between actors, formal connections (e.g. rules and regulations), and informal influence such as the political culture of participation (Pahl-Wostl et al, 2008). The adaptive approach is especially important when it comes to increased uncertainties of climate change as the "conditions under which such regulations were passed may no longer be fulfilled," meaning that new "risks need to be negotiated in participatory processes rather than being prescribed by law" (Pahl-Wostl et al, 2008, p. 11). Most importantly, however, a key requirement for adaptive water management in combatting the impact of climate change is transboundary cooperation. In terms of the Mainland Southeast Asia[6], for instance, the Mekong River Commission (MRC) successfully brought national,

[6] The Mainland Southeast Asia is divided into the countries of Cambodia, Laos, Myanmar (Burma), Thailand, Vietnam, and the small city-state of Singapore at the southern tip of the Malay Peninsula; Cambodia, Laos (the Lao PDR), and Vietnam, which occupy the eastern portion of the mainland, are often collectively called the Indochinese Peninsula (Leinbach & Frederick, 2009).

provincial and district authorities together. In 2008, the countries that line the Mekong River approved a new Flood Management and Mitigation Centre in Phnom Penh, Cambodia, which symbolised "another milestone in the history of cooperation in the Lower Mekong Basin" and demonstrated the "solidarity and will of Cambodia, Laos (the Lao PDR), Thailand and Vietnam to continue their cooperation in the development and preservation of water resources and natural resources in the Mekong River Basin" ("20 Years of Cooperation," 2016, p. 42). The four Lower Mekong countries developed rules covering the exchange of information, monitoring water use and, most importantly, how to consult each other on water diversion activities. But for this to happen in the Brahmaputra basin, parties (i.e., China, India, and Bangladesh) must first foster mutual trust, provide open access to information, and be willing to clearly discuss potential uncertainties.

Research questions and assumptions

Based on the increasing need to improve the water resource management of the Brahmaputra River and its tributaries, the research questions and objectives of this paper are as follows:

- *How to overcome 'the competitive approach' of upstream countries and achieve sustainable management and equitable allocation of shared water resources in the Brahmaputra basin?*
- *What conditions are required in order to turn water into a source of cooperation rather than a source of conflict between upstream and downstream users?*
- *What is the social and environmental impact of the ongoing dam constructions in Tibet and Arunachal Pradesh; and what are the limits of 'climate-friendly' hydroelectric industry?*

Development of 'dam mania' in the Brahmaputra Basin: China's perspective

Before 1949, China only had 22 large dams on its territory and there was no strategic plan to construct any more dams at all (Ghassemi & White, 2011). China's water resource quest and the South-to-North Water Diversion Project (SNWDP), a broadly discussed water transfer plan, originated from a comment by Mao Zedong: "The south has plenty of water, but the north is dry. If we could borrow some, that would be good" (Kaiman, 2014, p. X). The SNWDP was officially approved in 2002 (Kaiman, 2014) and consists of three — Eastern, Middle, and Western — routes, that transfer water from the Yangtze River to the water-stressed North China Plain, especially to the megacities of Beijing and Tianjin (see Annex I). However, the construction of the Western Route, which could one day link the headwaters of the Yangtze river and the Yellow river across the high-altitude Tibetan Plateau (Kaiman, 2014), has been postponed due to its complexity, multiple geotechnical problems and high cost. Since the approval of the SNWDP, the face of China's countryside has changed dramatically, particularly due to the large-scale infrastructure development, which represents a crucial part of the most "ambitious inter-river and inter-basin transfer program ever conceived in the world" (Chellaney, 2013, p. 238). Moreover, due to multiple environmental and social issues linked to the SNWDP project, China will have to resolve displacement of at least 275,000 people (Ghassemi & White, 2011).

The Brahmaputra River, which originates in Tibet as Yarlung Tsangpo, is considered one of the two greatest concentrations of river energy on earth (along with the Congo River at Inga falls) that was long thought impossible to access due to its rugged, high-altitude terrain and the risk of water-related conflict with neighbouring countries (Watts, 2010). This is also one of the main reasons why the Brahmaputra River has fewer dams than the other two major river basins in South Asia — the Indus and the Ganges (Samaranayake et al, 2016). However, since the "waterways of mainland China are already packed with dams, a new resource of hydropower could come from only one place: the rivers of Tibet," because "rivers gushing through deep canyons at the edges of the Tibetan plateau hold the highest hydropower potential in the world" (Buckley, 2015). In addition, the hydropower development in Tibet is also an essential part of China's campaign to 'Open Up the West' — launched in 2000 — its main goal has been to encourage economic development in Western China (Samaranayake et al, 2016).

The Brahmaputra Canyon, often labelled the 'Yarlung Tsangpo Great Canyon' by China, holds Asia's greatest untapped water reserves, making it a powerful magnet for Chinese investors and water planners. "In the 400 kilometres from the top of the Brahmaputra Canyon, the river twists around the mountain of Namcha Barwa (known as the Great Bend) and loses more than 2,000 metres in altitude, forming powerful waterfalls" and creating huge energy potential (Yong, 2014). In fact, the Brahmaputra was one of the world's last undammed rivers until China began constructing a series of dams on sections upstream from the Brahmaputra Canyon (Chellaney, 2013). China has already built its first hydroelectric dam on the Brahmaputra, known as the Zangmu Dam, and plans to construct several more in the near future. Besides the Zangmu, Tibet's largest existing hydropower project which became fully operational in October 2015, China has announced plans to construct at least three more dams (see Figure 2) along the Brahmaputra in Tibet (Samaranayake et al, 2016). Yong (2014) says that at least eleven hydropower stations are planned on the Brahmaputra River (the Yarlung Tsangpo), three along the middle reaches from Sangri to Gyaca, and nine at the canyon up to the Great Bend, where the river makes a U-turn from east to west just before the river enters Arunachal Pradesh (Economy & Levi, 2014).

Ignoring protests from downstream nations and populations, China's ambitions have recently shifted from building large dams to building mega-dams. One of such dams is a planned 38,000 megawatts (MW) (Lewis, 2013) project at Metog (known as Motuo in Chinese) on the upper reaches of the Brahmaputra in Tibet. This dam would, if created, represent the world's biggest hydroelectric project that could perhaps save about 200 million metric tonnes of carbon dioxide, but would most likely lead to conflict over downstream water supply (Watts, 2010). The planned mega-dam project will be nearly double the size of the Three Gorges Dam on the Yangtze River in Hubei province (see Annex I), the "length of whose reservoir is longer than North America's Lake superior" (Chellaney, 2013, p. 235). China claims that a massive dam on the great bend of the Brahmaputra "would benefit the world, despite the likely concerns of downstream nations, India and Bangladesh, which access water and power from the river" (Watts, 2010). On the other hand, those who are skeptical about such claims (Lewis, 2013) argue that although hydroelectric dams produce considerably fewer carbon emissions than coal-fired power plants, China's assertion that dams provide clean energy is substantially untrue. For example, the rotting of inundated trees and vegetation in reservoirs emits greenhouse gasses, carbon dioxide and methane, that rise from

reservoir surfaces. Moreover, the project at Metog would pose a serious threat not only to the Tibetan Plateau, but also to India and Bangladesh (Lewis, 2013).

Most of China's hydropower projects in Tibet are planned in a seismically active region, which will most likely result in serious environmental damage and sociopolitical tensions, particularly with regard to the Great Bend area (Watts, 2010). The location of dams and reservoirs is often in close neighbourhood with large population centers. Due to its tendency to destroy farmland, infrastructure, people's habitats, and even entire cities (Chellaney, 2013), the human costs of China's massive water projects have always been high (Lovell, 2016). Since 1949, China has relocated a total of 22,9 million Chinese — mostly poor villagers — to make way for its water projects. This means that more than a thousand citizens have been involuntarily uprooted for these water projects every day in the last six decades (Chellaney, 2013). Moreover, China holds a record number of the world's worst dam-related disasters. As pointed out by Chellaney (2013), at least 83,000 Chinese were killed and millions left homeless in serial dam collapses after a typhoon hit Henan province in 1975.

Figure 2. China's current and planned dams on the Brahmaputra (the Yarlung Tsangpo)

Source: Samaranayake, Limaye, & Wuthnow, 2016

In spite of this, China continues to build more mega-dams in remote areas, "even at the risk of damaging the last sanctuaries of biological and ethnic diversity and diminishing cross-border flows" (Chellaney, 2015, p. 238). In addition, dams planned in Tibet will not benefit those who live there, because the energy generated will be transferred to power-hungry and water-stressed industrial cities (Beijing and Tianjin) farther east, and many Tibetans will be forcibly deprived of their land (Buckley, 2015). Moreover, when protests against hydropower projects occur, they are prohibited or violently suppressed (Buckley, 2015).

For many years now, the population in Tibet has been facing the "reckless destruction of their fragile high-altitude environment" (Buckley, 2014, p. 13). However, in view of the total number of China's population, an estimated 2,7 million Tibetans living inside the TAR will not play a major role in decision-making processes. Nowadays, a planned 38-gigawatt dam project concerns many Tibetans who "consider Metog a sacred region, and environmental activists who warn against building such a huge project in a seismically active and ecologically fragile area" (Watts, 2010). While some scholars like Tashi Tsering (cited in Watts, 2010) claim that the dam at Metog would be mainly for hydropower, not water diversion because "the laws of physics will not allow water diversion from the Great Bend," others are convinced that the creation itself would most likely change living conditions dramatically. For instance, Peter Bosshard (cited by Watts, 2010) claims that blocking the upper reaches of the Brahmaputra could devastate the fragile ecosystem of the Tibetan plateau and withhold the river's sediments from the fertile floodplains of Assam in Northeast India and Bangladesh. Moreover, the dam will be located close to the McMahon Line,[7] a disputed and militarised border with India.

Today, China and its state-run companies represent the largest global producer of hydropower and their objective is to further increasing this capacity to at least 450 gigawatts by 2030. China is the biggest financier and builder of dams (both at home and abroad) and boasts a greater number of

[7] The McMahon Line (see Figure 1) constitutes a border between India and China, extending from east Bhutan to Myanmar. Historically, the Line is based on a British colonial claim, drawn as the frontier between British India and Tibet at the Shimla Conference in 1914. In 1949, however, the newly formed People's Republic of China refused to accept the McMahon Line as well as other agreements concluded between previous Chinese governments and foreign powers. India, on the other hand, regarded the McMahon Line as a permanent international border. This discord became a major cause of tension between China and India in the 1950s and one of the main reasons for the Sino-Indian war of 1962. During the war, fighting occurred mostly along the McMahon Line in Tawang and Aksai Chin (another disputed area of the border). Today, the border is known as the Line of Actual Control that separates Indian-ruled land from Chinese-controlled territory. (Mitra, Wolf, & Schöttli, 2006; Florcruz, 2013).

large dams on its territory than the rest of the world combined. If dams of all sizes are counted, the total number of dams in China is close to 90,000, the majority of which was built during the post-Mao period (Chellaney, 2013).

India's perspective

India's 'dam mania' started in the 1960s with the construction of the Bhakra Dam in northern India, this became the symbol of India's green revolution[8], and was hailed by the then Prime Minister Jawaharlal Nehru as a 'Temple of Modern India' (Bosshard, 2015). Despite initial successes and high expectations, badly managed irrigation schemes have resulted in waterlogged, saline soils and diminishing harvests, in response to which Nehru described the situation as the 'disease of giganticism' in dam building (Bosshard, 2015). However, India's most controversial dam project is the Sardar Sarovar Dam[9] on the Narmada River initiated in 1979 (Mitra, Wolf, & Schöttli, 2006). The project resulted in the displacement of more than 250,000 — primarily indigenous — peoples (Bosshard, 2015). Across South Asia, minority voices and those who hold traditional knowledge and rely upon the rivers, both culturally and economically, have generally been ignored, leading to increased conflict over rivers (Price & Mittra, 2016).

In spite of the threats that large dams pose, India and China continue to construct new projects on their precious rivers. Today, Arunachal Pradesh — located in the northeastern part of India — is considered a new hotspot of global dam building and the future powerhouse of the country. India, along with China, is now building more dams than any other country on the globe (WCD, 2000). Not surprisingly, China is concerned about New Delhi's efforts to construct dams in Arunachal Pradesh as it could further strengthen India's 'actual control' (see footnote 5) over the disputed region (Samaranayake et al, 2016). The Northeast of India is known for its geographical, linguistic, religious, and ethnic diversity, the dominant majority living in Arunachal Pradesh, Nagaland, Meghalaya, and Mizoram are tribal people. Arunachal Pradesh is the most geographically isolated

[8] In the Indian context, the Green Revolution refers to the period from 1967 to 1978, during which an economic and agricultural development strategy introduced by Western aid organisations was applied to make India self-sufficient in food grains (Mitra, Wolf, & Schöttli, 2006).

[9] The Sardar Sarovar Dam was first envisaged in the 1940s by Jawaharlal Nehru to control the immense Narmada River system. The World Bank financed the dam construction even though the project did not comply with the government's conditional environmental clearance. In the mid-1980s, the Narmada Bachao Andolan (Save the Narmada Movement), a coalition of social movements and NGOs, created strong international public pressure to stop the dam. As a result, the World Bank had to withdraw from the project in 1994 after an independent review found systematic violations of its social and environmental policies. (See Mitra, Wolf, & Schöttli, 2006; Bosshard, 2008; 2015)

state in India and is home to more than 20 indigenous tribal groups, the largest of which, the Nishi, totals around 300,000 people (Overdorf, 2012).

However, overall, fewer than 1,5 million sparsely distributed people reside in Arunachal Pradesh, making it "an attractive prospect for dam builders" (Overdorf, 2012). According to the Central Electricity Authority, more than 150 sites for large hydropower projects are located directly in the Brahmaputra basin, out of which more than 80 are in Arunachal Pradesh.[10] The largest dam is currently planned in India's most seismically active region; the 2,000 MW Lower Subansiri Hydroelectric project on the Subansiri River in Arunachal Pradesh is to be located near North Lakhimpur, a town situated on the border of Assam and Arunachal Pradesh (see Annex II). (Overdorf, 2012). These high-risk projects caused the opposition to dam-building to keep growing. Besides the Lower Subansiri, other major hydroelectric power plants of more than 1,000 MW capacity are planned for the Brahmaputra's tributaries, such as Dibang, Siang, Siyom, and Lohit (Overdorf, 2012). Opponents of this project argue that it could "wipe out thousands of acres of breathtaking forest, dozens of fascinating tribal cultures and some of the world's best whitewater for adventure tourism" (Overdorf, 2012).

Protests against mega-dams that threaten the local environment and communities are usually barely reported in the media (Sharma, 2012), both in China and India. Demonstrations are either organised against domestic projects, or against the upper riparian actors that pose a threat to communities living downstream and could lead to discord among states. In particular, protests against China's hydropower projects that threaten livelihoods in downstream countries (Lewis, 2013) deserve increased attention. In 2014, for instance, several anti-dam organisations in Assam raised their voices against the reported completion of a major hydropower project by China on the upper reaches of the Brahmaputra in Tibet; some activists even threatened to lay siege to the Chinese embassy in New Delhi (Karmakar, 2014).

Besides the protests against the upper riparian's dam building activities, there are also multiple demonstrations against large dams within Arunachal Pradesh itself. For example, during a recent

[10] According to Yong (2014), both public and private companies have proposed 168 massive dams in total, to produce 57 gigawatts of hydropower in Northeast India.

protest in Tawang,[11] a small town in Arunachal Pradesh located in the Eastern Himalayas near India's border with China and Bhutan, at least two participants were killed by the police during a protest against the construction of large dams in an ecologically, culturally, and strategically sensitive district (The Third Pole, 2016). Recently, the government of Arunachal Pradesh signed a Memorandum of Understanding (MOU) with various private companies on hundred big and small hydroelectric projects in Arunachal Pradesh. Of those hundred, thirteen were meant to be located directly in the Tawang district. Several groups concerned with the ongoing hydropower development have been protesting against these projects, claiming that the upcoming hydroelectric power projects would have a devastating impact on the Eastern Himalayan ecosystem, mostly due to its seismic vulnerability (Kashyap, 2016).

In December 2012, for instance, a massive protest occurred in downstream Assam against the above mentioned Lower Subansiri project, a mega dam which is expected to be the largest hydroelectric project in India. In the same year, protesters from the Idu Mishmi tribe from the Roing district in Arunachal Pradesh blocked a public hearing for Dibang Multipurpose project "preventing the company from satisfying a mandatory condition needed to obtain environmental clearance" (Overdorf, 2012). Another tribe, known as the Adi, protested against dams on the Siang (or Dihang) River, the main stem of the Brahmaputra, that is joined by the Dibang River and the Lohit River near the borders with Assam (Overdorf, 2012). In November 2016, during a meeting in Itanagar — the capital of Arunachal Pradesh — on 'Policy Dialogue for Governance of the Brahmaputra River', a group of anti-dam leaders confronted government officials and all those who favoured dams of the Siang River (Duarah, 2017). Vijay Taram, an anti-dam activist, recently explained that they do not protest against small dams on tributaries of Siang or against dams as such, but they cannot agree with the construction of large dams that have the potential to spoil their lives and livelihoods (Duarah, 2017). The protesters argue that the planned large dams will most likely flood all fertile agricultural land and destroy the flora and fauna of the entire Siang belt. This would result in the displacement of thousands of inhabitants of the Siang Valley and tribal men will lose their traditional hunting grounds, a crucial link to their cultural identity (Duarah, 2017).

[11] Tawang is one of the unresolved border issues between India and China. To the north it borders Tibet and to the south west it lies next to Bhutan (Mitra, Wolf, & Schöttli, 2006). This region was occupied by Chinese troops in 1962 and, together with the rest of Arunachal Pradesh, China continues to claim this entire area and considers it part of South Tibet. (See also footnote 5.)

Furthermore, many tribal people who lost their land due to development projects have been denied compensation years after displacement (Chakma & Shimray, 2016).

Nowadays, India is facing various anti-dam and anti-development protests not only in its northeast, but also in other parts of the country. In April 2015, for instance, Akku Kharwar, a tribal leader, and many others protesting against the land acquisition for the project, were seriously injured when police opened fire on those gathered at the construction site of the Kanhar dam in Sonbadhra district of Uttar Pradesh (Chakma & Shimray, 2016). Another example of displaced tribal people who never received proper compensation is a tribal community from Jawhar in Thane district of Maharashtra. In December 2015, more than 75 affected tribal people walked four days to reach Mumbai and demand compensation for their land that was acquired for the Lendi Irrigation project in 2007 (Chakma & Shimray, 2016). Following their displacement, those who cultivated the land were forced to move out and work as labourers in the cities of Bhiwandi and Kalyan (Deshpande, 2015).

Bangladesh's perspective

Bangladesh, one of the most densely populated nations in the world, is the lowest riparian state and faces the biggest climate threat from the upper riparian countries' activities. Bangladesh is especially worried because only one percent of China's, three percent of India's, but up to seventy percent of Bangladesh's population resides in the Brahmaputra River Basin (Samaranayake et al, 2016). Moreover, the country often deals with natural challenges such as floods, riverbank erosion, diminished water flow and groundwater availability in the dry season (Samaranayake et al, 2016). Although several Brahmaputra embankments for flood-control are running west of the Brahmaputra (known as the Jamuna in Bangladesh) from north to south (Ahmad & Lodrick, 2014), climate change projections forecast even more floods and stronger cyclones in the near future (McVeigh, 2017). Hence, Bangladesh is the strongest and most vocal advocate promoting multilateral cooperation on the Brahmaputra River. The Brahmaputra is Bangladesh's largest water system (followed by the Ganges and Meghna Rivers) and provides approximately sixty-five percent of the country's river water per year.

Figure 3. Main rivers of Bangladesh

Source: Samaranayake, Limaye, & Wuthnow, 2016

However, despite the challenges that arise from the Brahmaputra river basin, Bangladesh is more focused on the Ganges basin, mainly because of India's consumption of water resources from the Ganges River and the impact this has on the living conditions in southwestern Bangladesh (Samaranayake et al, 2016).

In addition, one of the main tributaries of the Brahmaputra, the Teesta River, which flows through northern parts of Bangladesh before it merges with the Brahmaputra (see Figure 3.), is at the centre of political dispute between India and Bangladesh. In September 2011, the promising Teesta water-sharing agreement was set to be signed during the then Prime Minister Manmohan Singh's visit to Bangladesh, but it was postponed due to objections by Mamata Banerjee, the Chief Minister of the Indian state of West Bengal (Bhuiyan, 2017).[12]

Bangladesh's relations with neighbouring India are one of the most complex bilateral relations in the subcontinent (Chowdhury, 2017). Despite India's role in the Bangladesh Liberation War in 1971, the signing of the Treaty of Peace and Friendship in 1972, and despite ratification of the Land Boundary Agreement (LBA) in 2015 (Chowdhury, 2017), the relationship between the two countries are rather complicated (Mitra, Wolf, & Schöttli, 2006), as decades-old issues concerning land, water, illegal migration, and border security remain (Chowdhury, 2017). With regard to water-

[12] This would have been only the second water-sharing agreement between India and Bangladesh (Samaranayake et al, 2016).

related issues, the Ganges water-sharing dispute over the allocation of water from the Ganges that is flowing through the Farakka Barrage[13] for irrigation and other activities (Siddhanta, 2015), is one of the long-standing sources of tensions between India and Bangladesh (Mitra, Wolf, & Schöttli, 2006). Even though negotiations on sharing of the Ganges waters at Farakka started as early as 1960[14], there has only been a little progress (Mitra, Wolf, & Schöttli, 2006). Another example of remaining problems is the question of unresolved ownership of the South Talpatti Island located in the Bay of Bengal, which is claimed by both India and Bangladesh. Besides the water-related disputes, another source of tensions between the two countries is the uncontrolled movement of people, mostly refugees, smugglers, and even militants who have been flowing into India from Bangladesh trough the northeastern Indian region.

Recently, however, despite the remaining issues, there have been some positive signs that indicate improvement. During a tour to Bangladesh in June 2015, Prime Minister of India Narendra Modi said, "Our rivers should nurture our relationship, not become a source of discord. Water sharing is, above all, a human issue. It affects life and livelihood on both sides of the border" (Siddhanta, 2015). In April 2017, Prime Minister of Bangladesh, Sheikh Hasina visited India for the first time in seven years (Basu, 2017), but even though the two countries agreed that peace, security (cooperation between the countries' armed forces) and development will remain central to their engagement, there was no progress on the issue of sharing of the water of some of the common rivers that flow between the countries (Basu, 2017). Nonetheless, during Hasina's visit, India announced a 500 million dollar credit line to Bangladesh, aimed at defence procurements. Both sides also signed 22 agreements, including a Memorandum of Understanding (MOU) on defence cooperation, peaceful uses of outer space, peaceful uses of nuclear energy, bilateral judicial cooperation, and cyber security (Basu, 2017).

[13] The Farakka Barrage was completed in 1971 by the Indian government to serve the twin purpose of regulating the amount of water from the Ganges River to flow out from the Indian territory into Bangladesh and to ensure that a sufficient amount of water is diverted to Hooghly River. In 1977, a first agreement between India and Bangladesh was signed for five years, at the end of which it was replaced by an MOU (valid until 1988). Between 1989 and 1996, no agreement existed between the two countries, until December 1996, when the Prime Ministers of both countries signed a treaty on the sharing of the Ganges waters for 30 years (Mitra, Wolf, & Schöttli, 2006).

[14] When the Indus water-sharing treaty between India and Pakistan was signed in September 1960.

Social and environmental implications of the hydropower development: Forced migration flows and diminishing cultures

As mentioned earlier, large hydropower projects combined with the effects of climate change may often result in serious social and environmental issues that often spur new migration or refugee flows, "Filling the cities with relentlessly growing multitudes of human beings who have no skills, no jobs, and no resources, causing even more environmental degradation, misery, and social tension" (Chaturvedi, 2013, p. 6). The Brahmaputra basin and its (mainly) agricultural economy is a good example of how human interference affects the environment and fragile ecosystems and may lead to a large-scale displacement of people from their rural habitats. Despite the fact that, in many cases, we have no data regarding the exact number of people affected by dam constructions, the 2000 Report of the World Commission on Dams included a few calculations from China and India. In India, for instance, the estimates of the number of displaced people ranges from twenty-one million to thirty-three million people (see footnote 44 in WCD). Furthermore, estimates show that dams account for thirty-four percent of all displaced people in China and up to seventy-seven percent in India (see footnote 44 in WCD, 2000).

Recently, China has shifted its "dam-building focus from dam-saturated internal rivers in the Han heartland to international rivers[15] that originate in the Tibetan Plateau as part of an ever more desperate quest to exploit water resources in remote, ecologically sensitive regions" (Chellaney, 2013, p. 234). However, to do research on Tibet where "information does not get in and it does not get out" (Buckley, 2014, p. 18) is usually extremely difficult. In addition, reporting on a protest in Tibet amounts to leaking state secrets, and Tibetans face harsh responses by the Chinese government and the People's Liberation Army (PLA) (Buckley, 2014). However, despite the lack of data from Tibet, some information related to other existing Chinese dams are accessible to the public. For example, the world's biggest existing hydropower project, the Three Gorges Dam on the Yangtze River in the Central China region, caused the displacement of at least 1,7 million Chinese and is still causing persistent environmental problems (Chellaney, 2013). This project alone has submerged 13 cities, 140 towns, and 1,350 villages (Lewis, 2013). Furthermore, during the record-breaking flood in the summer of 2010, the Three Gorges Dam caused the deaths of some 968 people

[15] Besides the Tibetan Plateau, China's interest has shifted also towards Xinjiang, Inner Mongolia, and Manchuria (Chellaney, 2013)

downstream, 507 more were missing and the economic losses totaled 26 billion dollars (Lewis, 2013).

Moreover, as mentioned earlier in this paper, populations of the Brahmaputra River Basin share many characteristics with indigenous peoples and thus make up a significant part of the unique identity of the basin. In India, the largest concentrations of indigenous communities are found in the country's northeast, which is the continuation of the so-called 'central tribal belt' stretching from Rajasthan to Assam (Chakma & Shimray, 2016). In particular, Northeast India is inhabited by indigenous communities[16] of Mon-Khmer, Tibeto-Burman lineage, and various other groups that are not classified as tribes but that are also considered 'indigenous' (McDuie-Ra, 2015). Tibetans, on the other hand, who consider themselves an occupied nation rather than an indigenous people also share many characteristics with indigenous populations (Mathiassen, 2012). In Bangladesh, eighty percent of the indigenous population of the country,[17] commonly known as 'Jummas', lives in the North and South-East districts of the country (Dhamai, 2016). However, constructions of large dams can destroy or irreversibly change the unique identity of the whole Brahmaputra basin. At this time, the implementation of laws that aim to protect the indigenous peoples and local cultures in all three countries is still far from satisfactory, because their voices are often ignored, especially when making decisions on strategic projects.

Both China and India voted in favour of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP),[18] a document adopted by the General Assembly in September 2007 that promotes full and effective participation of indigenous peoples in all matters that concern them and pursue their own visions of economic and social development. Although it is not legally binding under international law, countries should always interact with these communities when making

[16] In the Indian context, indigenous peoples usually refer to Scheduled Tribes (STs), groups of people defined by its tribal origin, isolated location, distinctive way of life or its 'general backwardness in all respect'. STs can also refer to the notion of 'adivasi', representing a particular, though distinctive culture or a way of life. Common alternative names to STs are: 'Aboriginal people'; 'hill tribes'; 'forest tribes'; 'first inhabitants' or 'indigenous people' (Blackburn 2012; Kapila 2008).

[17] Officially, the Government of Bangladesh does not recognise indigenous peoples as 'indigenous', but rather classify them as people with distinct ethnic identities other than the mainstream Bengali population. The Small Ethnic Groups Cultural Institution Act 2010 uses the term 'khudro nrigosthi' (small ethnic groups) or 'adivasi' to refer to indigenous or aboriginal peoples. A 2011 amendment to the Constitution refers to the indigenous peoples of Bangladesh as 'tribes'. Despite all these changes, however, issues related to indigenous peoples' economic and political rights in Bangladesh remain ignored (Dhamai, 2016).

[18] Unlike China and India, Bangladesh along with ten other countries abstained when the UN Declaration on the Rights of Indigenous Peoples was voted on in the General Assembly in 2007.

decisions on new projects to avoid tarnishing the countries' image abroad and preventing conflict at home. In this context, the Article 32(2) of the UNDRIP is of particular importance as it declares the following:

> *"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources"* ("UNDRIP : the General Assembly Resolution," 2007, p. 10).

In the case of Arunachal Pradesh, the displacement of local tribes from their ancestral lands due to the construction of these large dams, would most likely devastate entire tribal communities such as the Idu Mishmi in the Upper and Lower Dibang Valley district (Overdorf, 2012).

Environmental impacts of dams and alternative solutions

Another important issue that arises when building these great dams, is the destruction of the ecosystem. (Lewis, 2013) Although the Brahmaputra's natural features (powerful flow, long course and large drop in altitude) indicate there is great potential for 'climate-friendly' hydropower development, the scale of dam building planned by China and India could nevertheless have disastrous ecological consequences (Yong, 2014). In his article published at the Yale School of Forestry & Environmental Studies, Charlton Lewis (2013) argues that the damage that dams cause to river ecosystems is immense, "Turning free-flowing waterways into lifeless lakes, killing plants and trees, blocking fish migration and breeding, driving species to extinction, and devastating established patterns of human life." Today, it is becoming evident that large hydropower projects located in these areas are a potentially serious threat to the environmental security of the whole of South Asia and have the capacity to redraw the future hydrology of the subcontinent.

The Brahmaputra basin is home to hundreds of species of birds, plants and animals that are threatened, mainly by dam building activities. In the case of Arunachal Pradesh, it is expected that more than 50,000 acres of forest will be submerged by the proposed hydroelectric projects, gutting "India's wilderness and flooding its lungs" (Overdorf, 2012). Similarly, various animal species are at risk, for example, the red panda is already classified as 'vulnerable species' by the International

Union for Conservation of Nature (Overdorf, 2012) and could face extinction. A freshwater dolphin, known as the baiji or the 'Goddess of the Yarlung Tsangpo', has already been declared extinct due to the overexploitation of the Brahmaputra (Chellaney, 2013).

Although the Chinese government has declared that its dams are safe, avoid pollution, address future climate change, control floods and droughts, and enhance human life, the country's mega-dams block the flow of rivers, increase the chances of earthquakes, destroy ecosystems and affect the lives of millions of people (Lewis, 2013). Moreover, dams pollute the environment as their reservoirs capture chemicals, fertilizer runoff, human waste and all kinds of trash (Lewis, 2013). These reservoirs also trap silt, decreasing storage capacity and reducing power generation of the dams. Moreover, trapped silt no longer carries nutrients down the rivers, salt water encroaches on estuaries, damages croplands, and may lead to a sea level rise (Lewis, 2013).

On the other hand, in some circumstances, dams can play an important role in supporting the economic development of a country and its people (see "Dam Solutions"). Therefore, to make the right decisions, all possible options must be explored and considered to find out whether a large dam is the best alternative (see "Dam Solutions"). According to Peter Bosshard (2015), for instance, renewable energy (i.e., collected from sunlight, wind, tides) rather than mega dams and fossil fuels should be a better option and takes into account all life in the basin. The World Wildlife Fund (WWF) also assumes that alternative energy sources or upgrading existing hydropower facilities may provide more overall benefit, as nature is often better at flood management than any dam could be (see "Dam Solutions").

Guiding principles for water management of international river basins

This section sets forth four sets of principles and approaches to sustainable water management that are relevant for the management of water resources from the Brahmaputra River and its multiple tributaries. It mainly includes principles put forward by the United Nations Watercourses Convention (UNWC), World Commission on Dams (WCD), the South Asia Water Initiative (SAWI)[19], and CNA[20] research study (2016). The idea of comparing various sets of the guiding

[19] The South Asia Water Initiative (SAWI) is a joint World Bank-UK-Australia-Norway partnership. Its predecessor was the Abu Dhabi Dialogue.

[20] CNA is not an acronym and is correctly referenced as 'CNA'. It is a nonprofit research and analysis organisation located in Arlington, Virginia.

principles was partly inspired by Mark Everard (2013), who outlined a general sixteen-point framework for water management by using the existing international guidelines. This paper demonstrates that the creation and subsequent implementation of a new set of principles would be relevant to water governance in the Brahmaputra basin and hence should impact the future of water governance and formation of new agreements on transboundary water management in the basin.

The United Nations Watercourses Convention (UNWC) is a global framework convention adopted by the UN General Assembly in 1997 that aims to govern international watercourses. In the context of the Brahmaputra basin, the factors mentioned in Article 6 of the UNWC should be taken into account in future decision-making processes to achieve equitable and reasonable utilisation: (a) Geographic, hydrological, climatic, and ecological factors; (b) Social and economic needs of the watercourse States concerned; (c) The population dependent on the watercourse in each watercourse State; (d) The effects of the use of the watercourses in one watercourse State on other watercourse States; (e) Existing and potential uses of the watercourse; (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect; (f) The availability of alternatives, of comparable value, to a particular planned or existing use. All States concerned shall always enter into consultations in a spirit of cooperation and all relevant factors shall be considered together, so that an effective conclusion can be reached on the basis of the whole (Rieu-Clarke, Moynihan, & Magsig, 2012). Moreover, Articles 7, 8, and 9 declare the obligation not to cause significant harm, the obligation to cooperate, and the obligation to exchange data and information on a regular basis are of equal importance.

The World Commission on Dams (WCD) was established in May 1998, with support from the World Bank and the International Union for Conservation of Nature (IUCN), in response to growing opposition to large dam projects. The objective of the Commission was to review the development effectiveness of dams, and to develop standards and comprehensive guidelines for future dams and dam building activities ("The WCD Framework," 2008). The WCD's seven 'strategic priorities'[21] focus on: (1) Gaining Public Acceptance of Key Decisions (i.e., recognising rights, addressing risks, and safeguarding the entitlements of all groups of affected people, particularly indigenous and tribal peoples, women and other vulnerable groups); (2) Comprehensive

[21] See also Annex III.

Options Assessment (i.e., exploration of possible alternatives, participatory impact assessment;[22] social and environmental aspects have the same significance as economic and financial factors); (3) Addressing Existing Dams (i.e., post-project monitoring and evaluation process — new mechanisms are developed with affected communities to remedy them); (4) Sustaining Rivers and Livelihoods (i.e., protection and restoration of ecosystems, avoidance of significant impacts on threatened and endangered species); (5) Recognising Entitlements and Sharing Benefits (i.e., joint negotiations with adversely affected people, successful mitigation and resettlement); (6) Ensuring Compliance (i.e., public trust and confidence, incorporating incentives and sanctions, regulatory and non-regulatory measures); (7) Sharing Rivers for Peace, Development and Security (i.e., mutual self-interest for regional co-operation and peaceful collaboration)

The South Asia Water Initiative's (SAWI) main objective is to increase regional cooperation in four major geographic areas and Himalayan river systems (Indus Basin, Ganges Basin, Brahmaputra Basin, and Sundarbans Landscape) to deliver sustainable water management and to adapt to climate change. SAWI proposes four guiding principles: (1) Integrated water resources management (IWRM) approach encompassing adaptation to climate change; (2) Enhancing transboundary cooperation in water resource management to deliver mutual benefits; (3) Inclusive and Multidisciplinary approach; (4) Participation and Deliberation (posing questions, guiding analyses, and ensuring transparency, legitimacy and accountability). According to SAWI, improving water management in the Brahmaputra basin shall be achieved through strengthening of shared understanding, knowledge and capacity building, investment planning, and reducing vulnerability to flood and erosion.

The CNA research study seeks to involve all countries in the Brahmaputra basin, using both bilateral and multilateral agreements, and shows how the management of Brahmaputra's resources could be improved on a domestic, bilateral, and basin-wide level (Samaranayake et al, 2016). Additionally, the CNA research study provides recommendations for the international community regarding the long-term security implications of discord among Brahmaputra riparians. The

[22] Impact Assessment includes all people in the reservoir, upstream, downstream and in catchment areas whose properties, livelihoods and non-material resources are/were affected. It also includes those affected by dam related infrastructure.

following list of the CNA recommendations consists of selected points that were considered essential for the subject matter of this SADF working paper:

Domestic recommendations

- *China should expand access to more detailed information regarding its dam construction plans on the Brahmaputra to improve trust (p. 90);*
- *The Indian government should enhance coordinated hydrological data sharing between the center and northeast India state governments; and should consider how to improve consultation with northeast governments on the implementation of major dam construction projects in the region (p. 90);*
    - *Central and state governments should also collaborate on the production of a clear, updated, and comprehensive report on India-China relations regarding the Brahmaputra River that could incorporate northeast Indian views of concerns posed by China's actions (p. 91);*
- *Bangladesh should include all relevant domestic stakeholders (i.e., those living along the banks) when making policies for the basin; Bangladesh should also seek assistance from the international community to conduct evidence-based assessments of human security impacts in the Brahmaputra basin (p. 91).*

Bilateral recommendations

- *China should consider hydropower as a potential area of cooperation with India, including sharing of hydrological data with India, humanitarian and ecological cooperation related to the Brahmaputra (p. 92);*
- *India should clarify its plan for the construction of dams on the Brahmaputra River and its tributaries — If India seeks clarification on China's plans for dam construction and their potential impacts, India should be willing to provide the same information about its own plans (p. 93);*
- *India's government should clarify plans for the river-linking project as they apply to impacts on Bangladesh; and, in order to improve relations with Bangladesh, India should continue to try and implement the Teesta River Agreement with Bangladesh as quickly as possible by working closely with the West Bengal state government (p. 94);*

- *Bangladesh should seek water flow and rainfall data from India and China year-round, not only in monsoon season (in order to avert disasters downstream), and request site visits to dams and barrages in both upper riparians (p. 94);*
- *Bangladesh should formalise its 2015 Memorandum of Understanding (MoU) with China to ensure the consistent provision of water data and encourage Beijing to improve transparency with India for the benefit of other multilateral issues (p. 95).*

Basin-wide recommendations

- *China should convene a further dialogue (Track II) with India and Bangladesh to discuss shared water challenges (p. 95);*
- *India should apply the elements of ecosystem management and ecological protection into discussions of cooperation with China, along the lines of the efforts between India and Bangladesh (p. 96);*
- *Bangladesh should encourage dialogue with India and China on basin-wide management of the Brahmaputra (p. 96); Dhaka should also utilize the capabilities of its active think tank community to analyse specific aspects of basin-wide management of the Brahmaputra with upper riparian counterparts (p. 97).*

Assessment of the principles in the context of the Brahmaputra

The principles and rules put forward by the UNWC, the WCD seven strategic priorities (2000), the SAWI four key principles, the CNA recommendations, and Pahl-Wostl's (2008) advocacy for an adaptive water management regime (see sections 2.2 and 2.3) listed in this paper, were selected based on their relevance to this specific case study. A new synthesis of principles shall be a reflection of a balanced combination of all four sets, but particular importance should be attached to region-focused principles such as those outlined by SAWI and CNA. In addition, when drafting a new basin-wide agreement, the rules must be based on the work of experts in the field, including teams of anthropologists, natural scientists, NGOs, and those who hold traditional knowledge.

It is believed that a basin-wide institutional baseline based on a synthesis of the above mentioned principles and recommendations would lead to more equitable and sustainable outcomes in the future of the Brahmaputra basin. It is assumed that increasing the reactive capabilities when

detecting and preventing environmental damage; deepening the understanding of culturally sensitive districts; strengthening cooperation among the upstream and downstream countries; sharing of learning; and enhancing the center-region collaboration within the individual riparian countries are the core elements that are necessary for a process to successfully address not only the Brahmaputra case but also other transboundary river basins. Therefore, based on these assumptions, a new water management regime should emphasize the following areas:

Firstly, what is sorely needed, is a shared vision for future water sharing projects and an improved mutual understanding of the individual needs of all the actors involved. As mentioned before, states shall be obliged to meaningfully interact with tribal communities on projects that affect their lands. Secondly, real-time information exchange between upstream and downstream countries will be necessary in order to prevent natural disasters and catastrophic consequences. Thirdly, in coping with extreme events from climate change, states are required to implement adaptive management practices to resolve these often unpredictable events and changes. The resilience and flexibility that such an approach provides, especially when floods, hurricanes or other unforeseen events occur, will be crucial as it enables communities to rebound from disaster and reduce long-term vulnerability. Moreover, resilience is strengthened by sharing innovative approaches developed in one country that can be adopted by others, especially during times of emergency and recovery. Fourthly, decision-making processes and planning shall always focus on long-term impacts and its interlinked aspects, especially in regard to indigenous or tribal peoples, who shall always participate in decision-making processes. Fifthly, when the negative impact (displacement of people due to the dams constructions) cannot be avoided, relevant compensation measures must be put in place to lessen or offset the suffering.

Major hindrances to implementation of water management regime

Today, there is no institution capable of promoting effective and basin-wide cooperation due to various unresolved issues. First of all, the issues of the Brahmaputra basin are both complex and unique. Unlike the vast majority of existing agreements and negotiations on river sharing, these usually focus on the allocation of physical units of water (Ansink, 2015), in the case of the Brahmaputra basin, actors must first create and sustain an atmosphere of trust in order to find an effective solution and build an adaptive water governance regime. Moreover, the principles put

forward by UNWC and WDC will need to be complemented by more region-focused principles and recommendations such as the ones provided by SAWI and CNA research.

Although both India and China aim to improve stability along the disputed northern border of Arunachal Pradesh, both sides continue to be suspicious of each other due to remaining disputes. Up until today, the territorial dispute over Indian-administered Arunachal Pradesh and the general lack of trust with regards to ongoing dam constructions in Tibet and Northeast India are major hindrances to cooperation. China is concerned about the planned Indian hydropower projects along the Brahmaputra in Arunachal Pradesh and vice versa. Similarly, several issues between India and Bangladesh remain unresolved. It is thus believed that, to effectively resolve these challenges, both Beijing and New Delhi must overcome their preference for bilateralism and consider tighter collaboration with their downstream neighbour, Bangladesh (Wuthnow, 2016) which faces the biggest threat from the upper riparian countries' activities.

Interestingly, despite sharing more than 40 transboundary waters[23] with its 14 neighbours, China did not sign the UN Watercourses Convention (UNWC), and is one of the three states (Burundi, China, Turkey) that voted against this global instrument at the UN General Assembly in 1997 ("South and East Asia: UNWC's Global Relevance," 2017). So, rather than adopting a multilateral approach with its neighbouring countries, China prefers bilateral agreements. Despite the number of watercourses China shares with other countries, it has very few treaties, all of which are bilateral ("South and East Asia: UNWC's Global Relevance," 2017). In fact, China has never entered in basin-wide transboundary water agreement and is clearly inclined to stick to bilateral accords. Yet, China continues to build dams without consulting its downstream neighbours (Lewis, 2013).

Nowadays, such approaches seem to be threatening the Brahmaputra basin's prospects for a peaceful future, as many tributaries of the river are already running out of fish and thus reducing food security and increasing social, environmental and economic tensions. Improving transparency and enhancing responsibility[24] towards downstream countries and the livelihoods of the people it

[23] Within China, only the Yellow River and the Yangtze River are wholly domestic. Outside of China, the Mekong, Salween, and the Brahmaputra (the Yarlung Tsangpo) flow through several countries of Southeast Asia, India, and Bangladesh (Lewis, 2013).

[24] In case of Tibet, for instance, although China claims that the planned hydroelectric dams in Tibet are being built primarily to raise the standard of living for local populations and to promote clean energy, the country has announced no plans to attempt to divert the course of the river to satisfy domestic demands of Tibetans (Samaranayake et al, 2016).

affects are therefore things China must address. In addition, the heterogeneity of the Brahmaputra's population in terms of culture, religion, ethnicities, and climate will be another challenge and will thus require an interdisciplinary approach and assistance of specialists from various scientific fields. Plus, to make the right decision when planning new projects, all possible options must be explored and considered to find whether a large dam is the best alternative. These are, however, complex tasks that will require substantial amounts of time and patience.

Conclusion

This SADF working paper aimed to discover whether and how water management can become a trigger for cooperation in the context of the Brahmaputra River Basin in South Asia. It claimed that a new synthesis of principles inspired by rules and recommendations put forward by UNWC, WDC, SAWI, CNA, and Claudia Pahl-Wostl, would lead to more equitable and sustainable outcomes. A new basin-wide strategy and water management regime based on such synthesis must be implemented to improve the water governance in the Brahmaputra basin and future existence of the basin's fragile ecosystem and the livelihoods of the people. These principles should impact future governance practices, especially with regard to creating a formal agreement(s) on water management.

In regions characterised by a wide range of political systems and heterogeneity in terms of culture, religion, ethnicities, climate, and vulnerability to environmental risks, the universal principles set forth by UNWC and WDC can only succeed if complemented by region-focused principles and recommendations such as the ones outlined by SAWI and CNA. The essence of an effective basin-wide water management regime in the context of South Asia consists of adaptive approach; ecosystem and cultural preservation; and participatory consultation with communities and local district officials. All these elements must play a role in the decision-making processes and in coordinating actors' behaviour and their responsibilities towards the environment and local communities.

However, a necessary precondition for achieving this goal is the obligation of the three riparian countries — China, India, and Bangladesh — to build and maintain mutual trust and a stable relationship; and ensure open access to information. Moreover, they need a shared vision to face different cross-national challenges, such as increasing water scarcity, a damaged ecosystem, climate

change, and displacement of people. This paper argues that an open and clear discussion will help ease current or future political and social tensions, both on a national and an international level. The biggest challenge of current negotiations is to focus primarily on a multilateral and basin-wide approach in order to overcome the limitations of 'selective' bilateral agreements. Despite lingering disputes and other unresolved issues, the implementation of an effective water management regime with focus on adaptive and region-sensitive approach should now be the main imperative for the Brahmaputra's three major riparian countries, particularly because of the need to prevent and combat common challenges that every country, without exception, will soon have to face.

It is crucial that all actors recognise and respect the importance of the basin's fragile environment that is prone to natural disasters and, when drafting an agreement, one must keep in mind that new rules and norms must be compatible with flexible and adaptive water management practices in order to reduce potential uncertainties such as floods, landslides, earthquakes, or other unpredictable events. Furthermore, to prevent potential intrastate and/or interstate tensions, all aspects and potential consequences of upcoming projects must be assessed and discussed in public and in advance. Respective authorities shall therefore be obliged to meaningfully interact with local populations and tribal communities on projects that affect their lands.

Due to the complexity of the basin area and the transboundary relations, cooperation within the Brahmaputra basin still has a long way to go to successfully implement and maintain an effective basin-wide governance regime or a 'Brahmaputra Commission'. However, despite all the difficulties, the three countries should aim to speed up the process of the regime formation in view of the alarming threats presented by climate change, the irreversible impact of water diversion activities, and large dams constructions that were described in detail in this working paper.

Bibliography

Ahmad, N., & Lodrick, D. O. (2014). Brahmaputra River. *Encyclopædia Britannica*. Retrieved January 27, 2017, from https://www.britannica.com/

Ansink, E. (2015, May 19). Axiomatic Solutions to Transboundary River Conflicts. *E-International Relations*. Retrieved March 28, 2017, from http://www.e-ir.info/

Basu, N. (2017, April 8). Spotlight on connectivity in Modi-Hasina talks. *The Hindu Business Line*. Retrieved April 8, 2017, from http://www.thehindubusinessline.com/news/

Bhuiyan, H. K. (2017, April 7). History repeats itself. *The Independent*. Retrieved April 8, 2017, from http://www.theindependentbd.com/home/printnews/88995

Biswas, S. (2016). Is India facing its worst-ever water crisis? *BBC*. Retrieved January 10, 2017, from http://www.bbc.com/news/

Blackburn, S. (2012). The formation of tribal identities. In *The Cambridge companion to modern Indian culture* (pp. 30-48). Cambridge University Press.

Bork, E. (2015, June). Caught in the Middle: India, China, and Tibet. *World Affairs*. Retrieved February 20, 2017, from http://www.worldaffairsjournal.org/article/

Bosshard, P. (2008, June 11). New Independent Review Documents Failure of Narmada Dam. *International Rivers*. Retrieved April 8, 2017, from https://www.internationalrivers.org/

Bosshard, P. (2015, January 12). 12 dams that changed the world. *The Guardian*. Retrieved April 8, 2017, from https://www.theguardian.com/environment/blog/2015/jan/12/12-dams-that-

Brahmaputra Focus Area Strategy: 2013-2017 (2017). *South Asia Water Initiative*. Retrieved March 15, 2017, from https://www.southasiawaterinitiative.org/brahmaputra

Buckley, M. (2014). *Meltdown in Tibet: China's Reckless Destruction of Ecosystems from the Highlands of Tibet to the Deltas of Asia* (Illustrated ed.). New York: St. Martin's Press.

Buckley, M. (2015, March 30). The Price of Damming Tibet's Rivers. *The New York Times*. Retrieved March 28, 2017, from https://www.nytimes.com/2015/03/31/

Chakma, T., & Shimray, G. A. (2016). South Asia: India. In *The Indigenous World 2016* (pp. 328-341). Copenhagen: International Work Group for Indigenous Affairs.

Chaturvedi, M. C. (2013). *Ganga-Brahmaputra-Meghna waters: advances in development and management*. Boca Raton: CRC Press.

Chellaney, B. (2009, August 3). The Sino-Indian Water Divide. *Project Syndicate*. Retrieved January 16, 2017, from https://www.project-syndicate.org/commentary/

Chellaney, B. (2011). *Water: Asia's new battleground*. Washington, D.C.: Georgetown University Press.

Chellaney, B. (2013). *Water, peace, and war: confronting the global water crisis*. Lanham: Rowman & Littlefield, Inc.

China blocks tributary of Brahmaputra in Tibet to build dam. (2016, October). *The Indian Express*. Retrieved December 15, 2016, from http://indianexpress.com/article/

China Justifies Dam On Brahmaputra, Says It Won't Affect India. (2016, October). *NDTV*. Retrieved December 15, 2016, from http://www.ndtv.com/india-news/

Chowdhury, T. (2017, February 14). A new dawn in Indo-Bangla relations? *The Hindu Business Line*. Retrieved April 7, 2017, from http://www.thehindubusinessline.com/opinion/

Cooke, K. (2014). The dams of India: boon or bane? *The Guardian*. Retrieved November 25, 2016, from https://www.theguardian.com/environment/

Dam Solutions: Options assessments, easing pressures, and standards. (2017). *WWF*. Retrieved April 8, 2017, from http://wwf.panda.org/what_we_do/footprint/water/dams_initiative/

Deshpande, A. (2015, December 30). 8 years on, ray of hope for people displaced by Lendi project. *The Hindu*. Retrieved March 27, 2017, from http://www.thehindu.com/news/

Dhamai, B. M. (2016). South Asia : Bangladesh. In *The Indigenous World 2016* (pp. 314-320). Copenhagen: International Work Group for Indigenous Affairs.

Duarah, C. K. (2017, January 12). Protests Against Dams on the Siang Continue in Arunachal Pradesh. *The Quint*. Retrieved February 27, 2017, from https://www.thequint.com/

Everard, M. (2013). *Hydropolitics of Dams: Engineering or Ecosystems?* London, UK: Zed Books.

Economy, E., & Levi, M. A. (2014). *By all means necessary: How China's resource quest is changing the world*. Oxford: Oxford University Press.

Florcruz , M. (2013, March 5). Line Of Actual Control: China And India Again Squabbling Over Disputed Himalayan Border. *International Business Times*. Retrieved April 10, 2017, from http://www.ibtimes.com/line-actual-control-china-india-again-squabbling-over-disputed

Ganges River dolphin. *WWF*. Retrieved February 09, 2017, from http://wwf.panda.org/

Garg, I. S. (2016). Dam on Xiabuqu, concerns for India. *The Shillong Times*. Retrieved November 25, 2016, from http://www.theshillongtimes.com/2016/

Ghassemi, F., & White, I. (2011). *Inter-basin water transfer : Case studies from Australia, United States, Canada, China, and India*. Cambridge, UK: Cambridge University Press.

IANS. (2016, September 23). With thousands of dams upstream, China has water as weapon against India. *The New Indian Express*. Retrieved April 7, 2017, from http://www.newindianexpress.com/nation/2016/sep/23/

Jervis, R. (1982). Security Regimes. *International Organization*, 36(2), pp. 357–378.

Kaiman, J. (2014, December 12). China's water diversion project starts to flow to Beijing. *The Guardian*. Retrieved April 7, 2017, from https://www.theguardian.com/world/2014/dec/

Kapila, K. (2008). The measure of a tribe: The cultural politics of constitutional reclassification in North India. *Journal of the Royal Anthropological Institute*, 14(1), pp. 117-134.

Karmakar, R. (2014, November 25). Assam protests China dam on upper Brahmaputra. *Hindustan Times*. Retrieved April 7, 2017, from http://www.hindustantimes.com/india/

Kashyap, S. G. (2016, May). In fact: Behind the firing and deaths in Tawang, anti-dam protests and abbot-lama tussle. *The Indian Express*. Retrieved December 15, 2016, from http://indianexpress.com/article/

Keohane, R. O. & Nye, J. S. (1977). *Power and Interdependence*. Boston: Little, Brown and Co.

Krasner, S. D. (1983). *International Regimes*. Ithaka, New York: Cornell University Press.

Leinbach, T. R., & Frederick, W. H. (2009, February 20). Southeast Asia. *Encyclopædia Britannica*. Retrieved April 6, 2017, from https://www.britannica.com/place/Southeast

Lewis, C. (2013, November 4). China's Great Dam Boom: A Major Assault on Its Rivers. *The Yale School of Forestry & Environmental Studies*. Retrieved April 8, 2017, from http://e360.yale.edu/features/chinas_great_dam_boom_an_assault_on_its_river_

Litta, H. (2012). *Regimes in Southeast Asia: an analysis of environmental cooperation*. Wiesbaden: VS Verlag für Sozialwissenschaften.

Lovell, S. (2016, January 25). China's Mega Hydro-Projects are Coupled with Devastating Impacts. *Pulitzer Center*. Retrieved April 7, 2017, from http://pulitzercenter.org/

Mathiassen, Ch. (2012). East and South East Asia : Tibet. In *The Indigenous World 2012* (pp. 260-265). Copenhagen: International Work Group for Indigenous Affairs.

McDuie-Ra, D. (2015). Adjacent identities in Northeast India. *Asian Ethnicity*, 17(3), pp. 400-413.

McVeigh, K. (2017, January 20). Bangladesh struggles to turn the tide on climate change as sea levels rise. *The Guardian*. Retrieved March 28, 2017, from https://www.theguardian.com/

Mitra, S. K., Wolf, S. O., & Schöttli, J. (2006). *A political and economic dictionary of South Asia: an essential guide to the politics and economics of South Asia* (1st ed.). London: Routledge.

Northeast India. *International Rivers*. Retrieved February 20, 2017, www.internationalrivers.org

Overdorf, J. (2012, April 23). Part 1: How many dams can one state hold? *Public Radio International*. Retrieved February 24, 2017, from https://www.pri.org/stories/

Pahl-Wostl, C., Kabat, P., & Möltgen, J. (2008). Requirements for adaptive water management. In *Adaptive and integrated water management : coping with complexity and uncertainty* (pp. 1-22). Berlin: Springer.

Price, G. & Mittra, S. (2016). *Water, Ecosystems and Energy in South Asia : Making Cross-border Collaboration Work ; the Research Paper of the Chatham House*. London: The Royal Institute of International Affairs.

Private dam builders back out of Brahmaputra dams (2016, February). *The Third Pole*. Retrieved December 15, 2016, from https://www.thethirdpole.net/

Ramachandran, S. (2015, April 03). Water Wars: China, India and the Great Dam Rush. *The Diplomat*. Retrieved March 28, 2017, from http://thediplomat.com/2015/

Rieu-Clarke, A., Moynihan, R., & Magsig, B. (2012). *UN Watercourses Convention : User's guide*. S.l.: IHP-HELP Centre for Water Law, Policy and Sciences (under the auspices of UNESCO).

Samaranayake, N., Limaye, S., & Wuthnow, J. (2016, May). Water Resource Competition in the Brahmaputra River Basin: China, India, and Bangladesh. *CNA*. Retrieved November 16, 2016, from https://www.cna.org/

Sharma, T. (2012, March 9). Fighting India's mega-dams. *Chinadialogue*. Retrieved April 7, 2017, from https://www.chinadialogue.net/article/show/single/en/4799

Siddhanta, P. (2015, June 17). Farraka Barrage: The tale of two countries and one river. *The Indian Express*. Retrieved April 7, 2017, from http://indianexpress.com/article/india/

South and East Asia : UNWC's Global Relevance (2017). *UN Watercourses Convention*. Retrieved March 15, 2017, from http://www.unwatercoursesconvention.org/

South Asia Regional Integration (2016, November 8). *The World Bank*. Retrieved April 10, 2017, from http://www.worldbank.org/en/programs/south-asia-regional-integration

Strengthening River Basin Management in the Brahmaputra Basin : Lessons and Best Practices from the Mississippi River Study Tour (Vol. 1, pp. 1-16, Working paper No. 103350). (2015). Washington, D.C.: World Bank Group. Retrieved March 20, 2017, from http://documents.worldbank.org/

Tarr, M. A., & Blackburn, S. (2008). *Tribal cultures in the Eastern Himalayas : Through the eye of time : Photographs of Arunachal Pradesh, 1859-2006* (1). Boston, NL: Brill.

The World Commission on Dams Framework - A Brief Introduction. (2008, February 29). *International Rivers*. Retrieved March 28, 2017, from https://www.internationalrivers.org/

Tilt, B. (2014). *Contemporary Asia in the world : Dams and development in China : The moral economy of water and power*. New York, US: Columbia University Press.

United Nations adopts Declaration on Rights of Indigenous Peoples (2007, September 13). *United Nations News Centre*. Retrieved March 22, 2017, from http://www.un.org/

United Nations Declaration on the Rights of Indigenous Peoples : the General Assembly Resolution ; the Report of the Human Rights Council (pp. 1-12, Rep. No. 07-49830). (2007). UN Human Rights Council. Retrieved March 27, 2017, from http://www.iwgia.org/

Watts, J. (2010, May 24). Chinese engineers propose world's biggest hydro-electric project in Tibet. *The Guardian*. Retrieved February 20, 2017, from https://www.theguardian.com/

Watts, J. (2010). *When a billion Chinese jump: how China will save mankind — or destroy it*. New York: Scribner.

Wolf, A. T., & Newton, J. T. (2007). Case Study of Transboundary Dispute Resolution : the Nile waters Agreement. *The Program in Water Conflict Management and Transformation*. Retrieved March 28, 2017, from http://www.transboundarywaters.orst.edu/research/

World Commission on Dams (2000). *Dams and development: a new framework for decision-making*. London, UK: Earthscan Publications Ltd.

Wuthnow, J. (2016). Water war: this river could sink China-India relations. *The National Interest*. Retrieved January 05, 2017 from http://nationalinterest.org/

Yong, Y. (2014, March 5). World's largest hydropower project planned for Tibetan Plateau. *Chinadialogue*. Retrieved February 19, 2017, from https://www.chinadialogue.net/article/

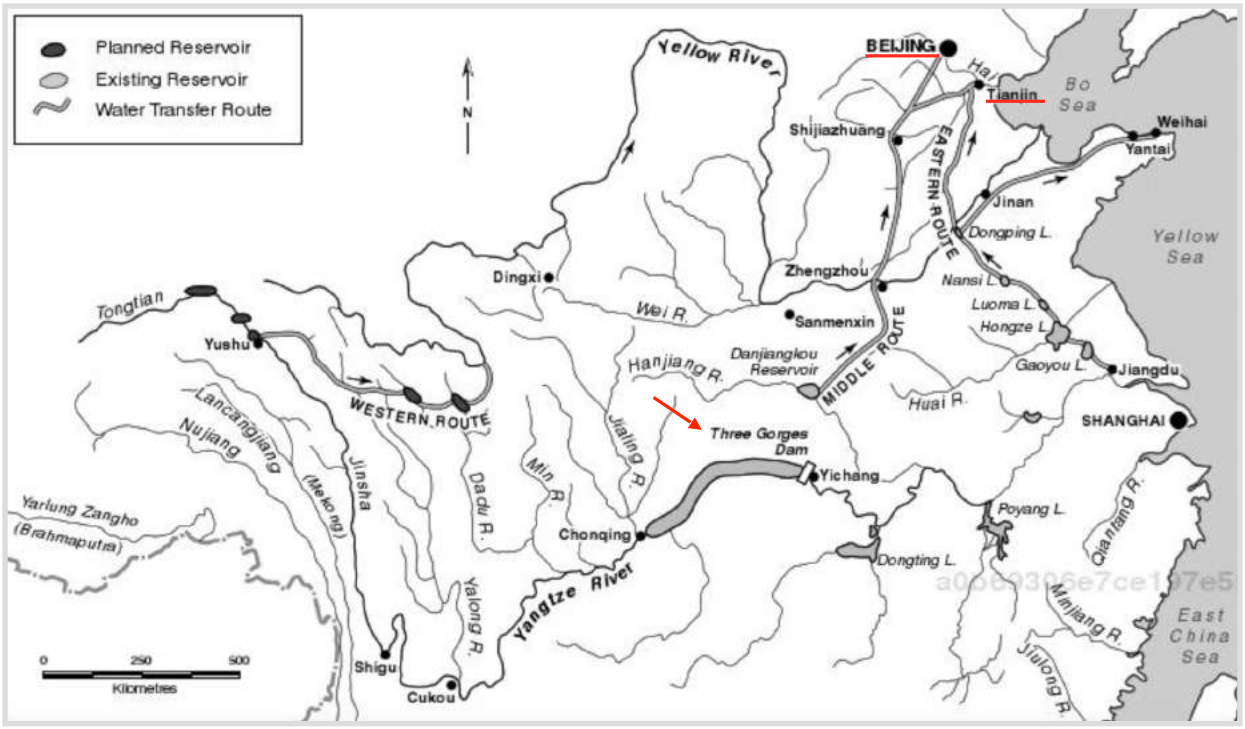
Young, O. R. (1989). *International cooperation: building regimes for natural resources and the environment*. Ithaca, New York: Cornell University Press.

Zawahri, N. A., & Mitchell, S. M. (2011). Fragmented Governance of International Rivers: Negotiating Bilateral versus Multilateral Treaties. *International Studies Quarterly*, 55, p p . 835-858.

20 Years of Cooperation. (2016). Mekong River Commission. Retrieved April 6, 2017, from http://www.mrcmekong.org/assets/Publications/20th-year-MRC-2016-.pdf

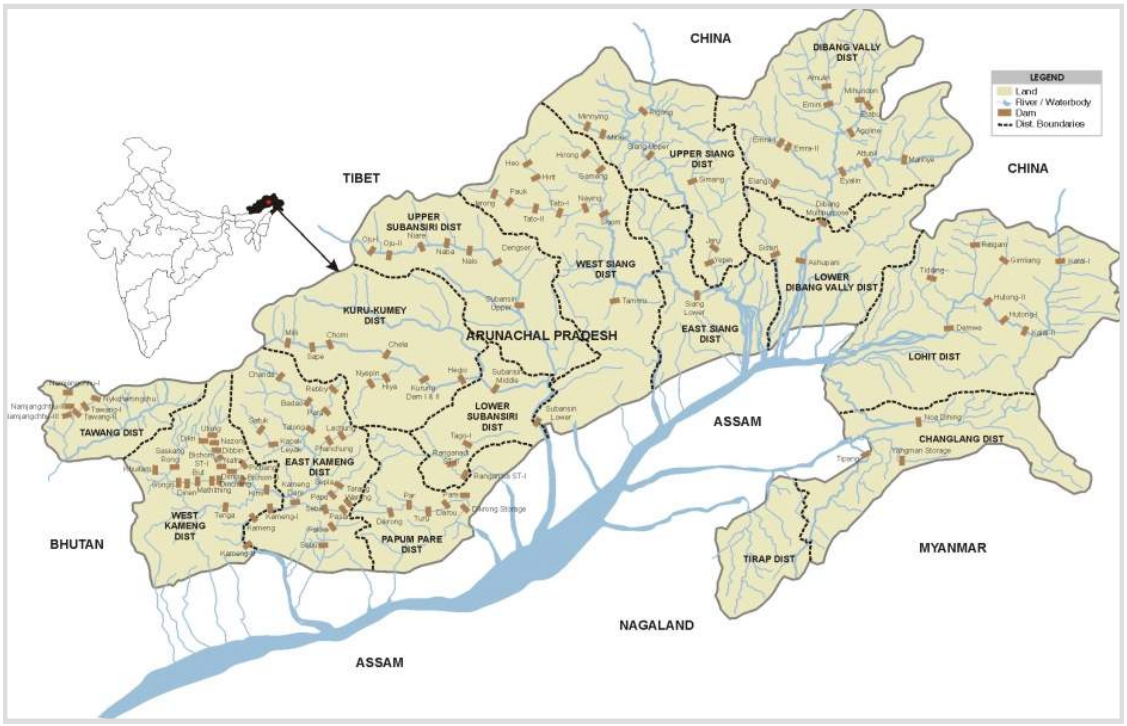
Annex I: Major water transfer projects in China

South to North Water Diversion Project (SNWDP)



Source: Ghassemi & White, 2011

Annex II: Dams in Arunachal Pradesh (India)



Source: International Rivers. Retrieved from https://www.internationalrivers.org/resources/

Annex III: The WCD strategic priorities and policy framework

a) The WCD seven strategic priorities

Source: WCD, 2000, p. 214

b) The WCD policy framework

Source: WCD, 2000, p. 202