

Integrating Border Regions

Connectivity and Competitiveness in South Asia

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Abstract

Deeper regional integration can be beneficial especially for regions along international borders. It can open up new markets on opposite sides of borders and give consumers wider access to cheaper goods. This paper uses data from five contiguous districts of India, Nepal, and Bangladesh in the northeast of the subcontinent to measure the degrees of trade complementarity between districts. The paper illustrates that the regions are underexploiting the potential of intraregional commerce. Price wedges of up to 90 percent in some important consumption products along with measures of complementarity between households' production and consumption suggest the potential

for relatively large gains from deeper trade integration. Furthermore, an examination of a specific supply chain of tea highlights factors that help industries scale up, aided by institutions such as an organized auction and decent physical and legal infrastructure. However, districts alike in geography but located across international boundaries face different development prospects, suggesting that gains from reduced "thickness of borders" would not accrue automatically. Much rests on developing intrinsic industry competitiveness at home, including the reform of regulatory and business practices and infrastructural bottlenecks that prevent agglomeration of local economies.

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Integrating Border Regions: Connectivity and Competitiveness in South Asia *

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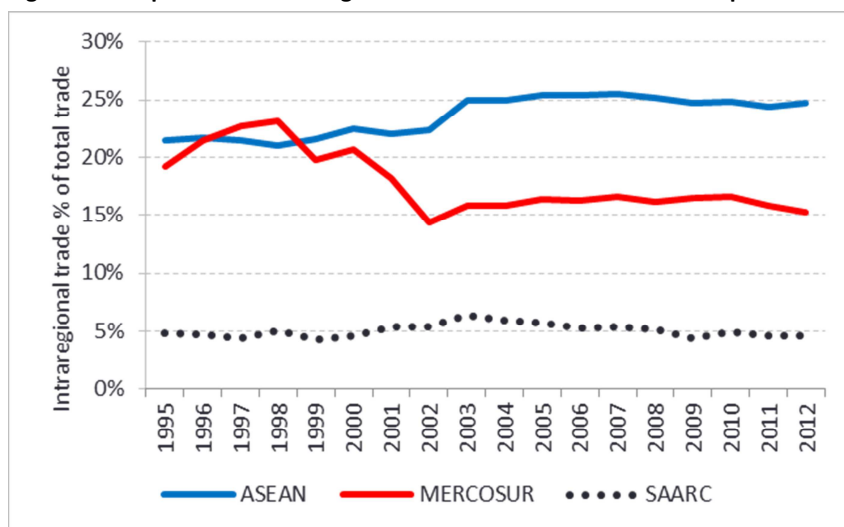
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1. Introduction

In recent years, South Asia has been one of the world's most economically dynamic regions. But economic growth has been associated with increasing spatial inequality, with metropolitan regions often expanding much more rapidly than peripheral regions. In South Asia, low-income areas often coincide with border regions. In India, for example, the majority of low-income states are border states.³

International evidence shows that border regions often flourish as gateways for cross-border trade. But in South Asia weak regional integration along with often difficult terrain (much of it deserts or mountainous) blocks this crucial source of growth. Figure 1 shows how limited intra-regional trade is in South Asia relative to other developing country trading blocs – just 5% of South Asia's trade takes place within the region. While the large relative size of India naturally limits the share of intra-regional trade in South Asia (relative to the ASEAN block), this share is also considerably lower than MERCOSUR where Brazil is far larger than the other members. ; In addition in high income regions, trade integration is much more advanced – nearly 50% in NAFTA; above 50% in East Asia; and over 60% in the EU.

Figure 1: Comparison of intra-regional trade shares in South Asia compared to other regions



Source: Author's calculation based on data from UN Comtrade

Thus, deepening integration in South Asia may contribute not only to driving higher growth overall but also to reducing spatial inequalities. That is especially the case to the extent that this increased integration can improve access to markets and to trading opportunities for the border regions. Deeper integration may allow firms to expand sales opportunities, deepen specialization, and join regional and international value chains. For farmers, improved market access may allow them to diversify the range of markets to serve and reduce the volatility of the prices of their goods. Consumers may benefit too from deeper regional integration as it may expand the range of products for consumers at reduced cost, and moderate volatility in prices especially for border regions in South Asia that are typically far from the countries' main economic centers.

Of course, deepening regional integration alone is not likely to be sufficient to address the challenges of border regions. Taking advantage of these opportunities is also likely to require addressing weaknesses in the regional environment, including infrastructure, firms' productive

³ See World Bank (2013) for the classification of low income states.

capacity, institutions, and the investment climate, that may prevent firms from exploiting the new potential. Moreover, integration also introduces new competition into weakly competitive regional markets, so challenges of adjustment to structural change will also determine the outcomes of deeper integration.

In this context, this study sets out to assess the potential benefits of deeper market integration for border regions in South Asia as well as illustrate some of the bottlenecks that would need to be addressed to enhance integration. In order to do so the study focuses on one of the key border areas in South Asia, i.e. the strip of land bordering Nepal, India and Bangladesh. The area of the study comprises five contiguous districts across the three countries and it is illustrative of some of the challenges underlying the process of market integration in the region.

First we show various indicators which suggest the extent of the potential gains from deeper integration for the districts in each country. We then focus on an important commodity for the area of study, tea (*Camellia Sinensis & Assamica*), to gather evidence on the structure and nature of value chains in selected cross-border districts in South Asia. This analysis helps understand the scale and scope of current trade, the barriers to deepening integration (including border-specific barriers, as well as barriers caused by market structures and by other factors in the business environment), and the potential scale of benefits that could accrue to firms, farms, and households from deeper integration.

We also find that there exists a considerable degree of complementarity in production and consumption, presenting opportunities for mutually beneficial cross-border trade. The presence of price wedges – of up to 90% -- in similar products suggests that trade can also help narrow cross-national divergences. The paper highlights the importance of factors that help industries scale-up, aided in part by innovative institutions (such as an organized auction) and decent physical and legal infrastructure (such as protection of intellectual property). However, benefits do not seem to spread across national boundaries by default. Districts that are comparable in geography, but located across international borders face quite different development prospects. To optimize gains from the removal of cross-border restrictions, much would still rest on honing intrinsic competitiveness of home industries.

The paper is organized as follows: The next section describes the methodological approach of the study; section 3 provides the socio-economic profile of the case study districts, including also the extent to which they can be considered low-income relatively both to the countries' and the regional averages; section 4 describes the likely gains from deeper trade integration for border regions in light of existing theory and evidence, illustrating the potential size of these gains for the study regions using measures based on secondary data; section 5 zooms into the tea case study and assesses the organization of the supply chains in each region and tests the degree of spatial integration of tea markets.

2. Methodology

The analysis uses a case study approach. It focuses on two sets of adjoining, cross-border regions – on the India-Nepal and the India-Bangladesh borders. Table 1 outlines the specific geographical coverage of the case studies. Specifically, we focus on the geographical area near where all three borders converge – the northern part of West Bengal state in India (comprising Darjeeling and Uttar Dinjapur) being the common region (see Map 1).

Table 1: Case study locations

	Country	State/Region	District(s)
India-	India	West Bengal	Darjeeling
Nepal	Nepal	Mechi	Ilam, Jhapa
India-	India	West Bengal	Uttar Dinajpur
Bangladesh	Bangladesh	Rangpur	Panchagarh

Source: Authors' elaboration

Map 1: Map of case study regions and districts



Source: Authors' elaboration

This focus is justified by a number of reasons. First these regions fulfill the criteria of being relatively remote from the core in each of the three countries, and they share some common production structures (notably pronounced agricultural specialization, with a large tea production) that allow for

useful comparisons across all three countries. In addition, their specific locations are useful for assessing the potential impacts of cross-border integration⁴. For example, borders aside, producers in the Jhapa district in Nepal may find it easier to reach markets in Siliguri or even Kolkata in India than they would Kathmandu.

The analysis is composed of two parts. First we carry out desk-based research to profile the case study districts in terms of demography, education and employment outcomes, poverty, economic structures, and infrastructure. Much of this analysis relied on detailed micro-data, including household and labor force surveys, regional economic accounts and industrial census. The main sources for this analysis are summarized in Table 2. Additional data came from national government reports, the state government in West Bengal, the Tea Board of India, FAO and others.

Table 2: Summary of main secondary data sources: India and Nepal

Country	Data sources	Purpose
<i>India</i>	Census	Population
	IndiaStat	Output, value added, wages, employment
	NSS	Employment, wages, sectoral employment
	Meso Dataset	Population, road and rail networks
	ASI (panel data)	Real wages, output, employment, value-added by sector
	Labour Bureau of India	Prices
<i>Nepal</i>	Census	Population
	Living Standards Survey	Education, production, consumption, poverty
	Census of Manufacturing Establishments; National Planning Commission	Output, employment, and value-added by sector
	estimates for 2014 Human Development Report	
<i>Bangladesh</i>	Census	Population
	Living Standards Survey	Education, poverty, production, consumption, prices

We use these data also to assess the extent to which deeper integration could lead to economic gains for the various districts. We use two sets of measures to that end. The first set consists of indices of complementarity in employment as well as in production-consumption between bordering districts. These measures provide some indication of the potential trade that may occur should barriers to trade be lowered. The second type of measures is the price differential in some of the main consumption items across the borders. These differentials are rough proxies for the ‘thickness’ of the borders.

The second part of the analysis focuses specifically on the value chain for tea within and across these regions. This focus is due to several reasons:

- The primary economic activity in all the regions is agriculture – within the agricultural sector, tea is common across all these regions and is one of the most important (but not always the main) cash crops in all of them.
- It is among the most widely traded crops in the region, locally, nationally, and internationally and in fact it is the only major agricultural product that is essentially only traded as its local consumption is negligible relative to production.

⁴ There are also practical reasons for this approach – the logistics for undertaking the field research is made easier by concentrating on nearby locations across the three countries.

- It is a relatively complex value chain and one whose trade tends to be regulated in several ways, making it potentially an interesting example of where and to what extent enhanced integration may promote the development of cross-border value chains.

From a methodological perspective, by focusing on a single commodity we are able to control for product/sector heterogeneity in comparing the dynamics between individual regions across the borders as well as between the regional pairs. For example, it is generally considered that the border between Nepal and India is more open than the border between Bangladesh and India. Therefore, by identifying the differences in how tea is traded in the different border areas (of course, confirming first and specifying the scale and nature of border barriers in each regional pair), we are more likely to be able to link outcomes with border effects.

The case studies are based primarily on field research, complemented with desk-based analysis of secondary data. The *field research* focused on implementing a detailed survey (with more than 100 discrete questions) designed to capture the structure, trading processes, and challenges facing participants in the tea value chain, covering growers, traders, processors, and other participants in the value chain. In total, some 150 individual interviews were completed (30 in Bangladesh, 61 in India; 59 in Nepal) during the period from April 11 to May 5, 2013. These interviews were complemented by semi-structured interviews with 20-30 stakeholders in each region, including growers, traders, and processors, as well as transporters, customs officials, and other government and industry representatives.

3. Profile of targeted districts

Location and demography

The *Darjeeling district*, at the foothills of Mt. Kanchanjanga, the third highest mountain in the world, with a geographical area of 3,149 square km, shares its international boundaries with Nepal, Bhutan and Bangladesh and state boundaries with Sikkim and Bihar. There are four subdivisions of Darjeeling district: Darjeeling, Kalimpong, Kurseong and Siliguri. The district has two different topographic characteristics: the plains (Terai) and the hills, which also correspond to the two different types of tea produced in the region.

Jhapa and Ilam belong to Mechi zone of eastern Nepal, covering an area of 1,606 square km and 1,703 square km, respectively. Jhapa district shares its international boundaries with West Bengal (India) to the east and Bihar to the south, and with Nepal's Morang district to the west and Ilam district to the North. With administrative headquarters at Chandragadi, the district has three municipalities and 47 Village Development Committees (VDCs), all of them lying in the Terai plains. Ilam district has its boundaries as Panchthar in the North, Morang in the South West, Jhapa in the South and Darjeeling District of India in the East. The district is connected to Charali and the neighboring districts Panchthar and Taplejung in Nepal as well as to Darjeeling via a road from Fikkal through Pashupati Nagar (Government of Nepal, 2011). Ilam covers only mountain terrain lying at 140 meters above sea level. With Ilam bazaar as the district headquarters and only municipality, the district has 48 VDCs.

The entire region is densely populated, yet also highly rural (Table 3). The Indian districts have densities much higher than their national averages with the density in North Dinajpur almost three times as large as the whole of India. The district with the lowest population density (as well as overall population) is Ilam, whose density is in line with that of the Nepalese average. In 2011, Ilam had about 290,000 residents and Jhapa had about 813,000. The combined population of Jhapa and Ilam exceeds 1.1 million, which is more than half that of neighboring Darjeeling. The population is

overwhelmingly concentrated in rural areas with higher share of rural population than the national average in Bangladesh and India, except in Darjeeling, which is slightly below the national average. Despite the relatively high density, there are few significant towns – across the districts in the three countries studied, the only settlements with a population above 100,000 are Siliguri and Darjeeling (India). This population distribution is likely to reflect the agricultural nature of the districts. At the same time it is also likely to affect the future economic specialization of the district: the absence of large centers may make it difficult to achieve those economies of agglomeration needed for many non-primary resource based sectors to develop. Thus, these regions are likely to be failing to take advantage of the benefits of agglomeration for growth and development.

Table 3: Population in the districts

	2001	2011	2001	2011	2001	2011	
	Pop ('000)		Density (pop/km ²)		% rural		Area (km ²)
Panchagarh	874	1,026	622	731	91%	90%	1,405
Bangladesh	130,523	144,044	884	976	76%	72%	147,570
Darjeeling	1,609	1,842	511	585	68%	61%	3,149
Uttar Dinajpur	2,442	3,001	777	955	88%	88%	3,142
India	1,027,015	1,210,193	312	368	72%	69%	3,287,263
Ilam	283	290	166	174	n/a	n/a	1,703
Jhapa	688	810	428	505	n/a	n/a	1,606
Nepal	23,151	26,494	157	181	86%	83%	147,181

Sources: Population census data: Indiatat; Nepal Central Bureau of Statistics; Bangladesh Bureau of Statistics

Table 4: The education profile in Indian and Nepalese districts

	Period	Literacy rate	At least primary	At least higher secondary	Graduate
Darjeeling	2004-05	59.7%	41.0%	9.3%	4.6%
	2009-10	76.1%	56.1%	14.9%	8.9%
Uttar Dinajpur	2004-05	36.2%	29.7%	4.1%	1.9%
	2009-10	59.7%	39.5%	4.8%	1.1%
India	2004-05	61.8%	51.8%	12.8%	5.7%
	2009-10	68.3%	59.5%	16.6%	7.3%
Ilam	1998		24%	1.3%	0.3%
	2008	65.7%	46.9%	4.6%	1.0%
Jhapa	1998		34%	4.4%	2.0%
	2008	58.9%	46.8%	6.5%	0.9%
Nepal	1998		24.4%	3.0%	1.1%
	2008	52.9%	41.7%	6.0%	2.0%
Panchagarh	2010	50.4%*	38.5%	5.6%	3.3%
Bangladesh	2010	50.4%*	38.6%	5.6%	3.3%

* literacy is measured according to whether the individual has passed at least one class as the non response rate to the question on literacy is high.

Sources: Nepal LSS; India NSS; Bangladesh HIES

The districts suffer from substantial illiteracy (between 41% in Jhapa to 24% in Darjeeling), although there has been some rapid progress on this front over the past years (Table 4). Despite the progress, the majority of the adult population has not completed primary education in all districts but Darjeeling. Uttar Dinajpur has a much lower rate of at least primary educated population than the rest of India. Panchagarh has the lowest rate of primary school attainment in 2010 across all districts, a reflection of the low rate for Bangladesh relatively to Nepal and India. The share of secondary educated population is low everywhere and that of graduates negligible except in Darjeeling. This type of education profile along with the population figures suggests a pattern of comparative advantage in these districts skewed towards unskilled labor intensive activities. The only partial exception may be Darjeeling district, which has a record of slightly better education achievements. Nepalese districts, particularly Jhapa, may have some advantage in more land intensive agriculture given the relatively higher land-labor ratio.

Development and poverty

Available data paint a mixed picture about the level of economic development and poverty across the districts under analysis. Overall the data suggests that, while not amongst the poorest in South Asia, these districts - with the exception of Darjeeling - are poor relatively to the South Asian average. This picture is consistent with low levels of intra-regional trade, which do not help border districts flourish as the most direct beneficiaries of the potential gains from trade. On the other hand these districts – with the exception of Uttar Dinajpur - are also not poorer than the national average. In fact in the case of Darjeeling and Jhapa, they are considerably better-off than their countries' average, underscoring the importance of the tea production and trade in their economic achievements.

In Bangladesh, the district of Panchagarh has a poverty rate below the national average but it is above the Indian poverty rate (Table 5). On the Indian side, the case study districts of West Bengal are quite different. In the last decade Darjeeling has been catching up with the rest of the country in terms of GDP and poverty and has eventually achieved better indicators than the average around the end of the past decade (table 5).⁵ On the other hand in Uttar Dinajpur the poverty rate is higher and the wages and income per capita lower than the Indian average. In particular, over one in three residents of the district were poor in 2011-12, a rate 50% higher than the Indian one.

In Nepal, Ilam and Jhapa rank among the leading districts in the country on a number of measures of output and welfare, including components of the Human Development Index in which both are in the top quartile among Nepal's 75 districts. Life expectancy is higher in Ilam than Jhapa, but literacy, mean years of schooling and income per capita are higher in the better connected Jhapa. Jhapa is also the fourth richest district in terms of aggregate output among Nepal's 75 districts, compared to Ilam which stands at 27th; however, in per capita terms, Ilam's GDP per capita is higher at US\$780 than Jhapa's US\$759. Both districts rank in the second quartile among the country's 75 districts, and they are just above the national average (Table 5). The poverty rate in both districts is also not severe by national standards: it is almost one-third the national average in Ilam. However, the level and the growth of wages in the two districts are lower than the national average.

Comparing the data for districts on the India-Nepal border, it is worth noting that while Jhapa and Ilam score above average among Nepali districts, they lag on most indicators in comparison to their cross-border neighbors, and Darjeeling in particular. In relative rankings, Jhapa and Ilam fare better because the most backward districts in terms of development are located in Nepal's remote mid-

⁵ The Indian poverty data use the latest Tendulkar poverty lines, which are considered more reliable to measure poverty than the older Lakdawala poverty lines (Government of India, 2009).

and far-west, not the more accessible central or eastern regions. By regional standards, however, Jhapa and Ilam are both low-income (as is the rest of Nepal).

Table 5: Economic welfare across Indian and Nepalese districts

	GDP p/cap (current USD)		Annual wages (current USD)		Poverty rate	
	Year	Value	Year	Value	Year	Value
Darjeeling	2004-05	640	2004-05	552	2004-05	24.8%
	2007-08	954	2009-10	760	2009-10	22.8%
	2010-11	1443			2011-12	8.5%
Uttar	2004-05	327	2004-05	398	2004-05	57.1%
Dinajpur	2007-08	497	2009-10	567	2009-10	32.2%
	2010-11	680			2011-12	33.5%
India	2004-05	612	2004-05	740	2004-05	37.7%
	2007-08	997	2009-10	958	2009-10	29.9%
	2010-11	1348			2011-12	22.0%
Ilam	2001	223	1998	482		
	2011	780	2008	759	2010-11	11%
Jhapa	2001	239	1998	300		
	2011	759	2008	819	2010-11	28%
Nepal	2001	240	1998	390		
	2011	718	2008	1521	2010-11	31%
Panchagarh					2011	26.5%
Bangladesh					2011	30.7%

Sources: World Development Indicators; UN Human Development Report 2004; Planning Commission, India; India National Sample Survey (various years); Nepal LSS; Bangladesh poverty mapping, World Bank (forthcoming); National Planning Commission, Nepal.

Economic structure

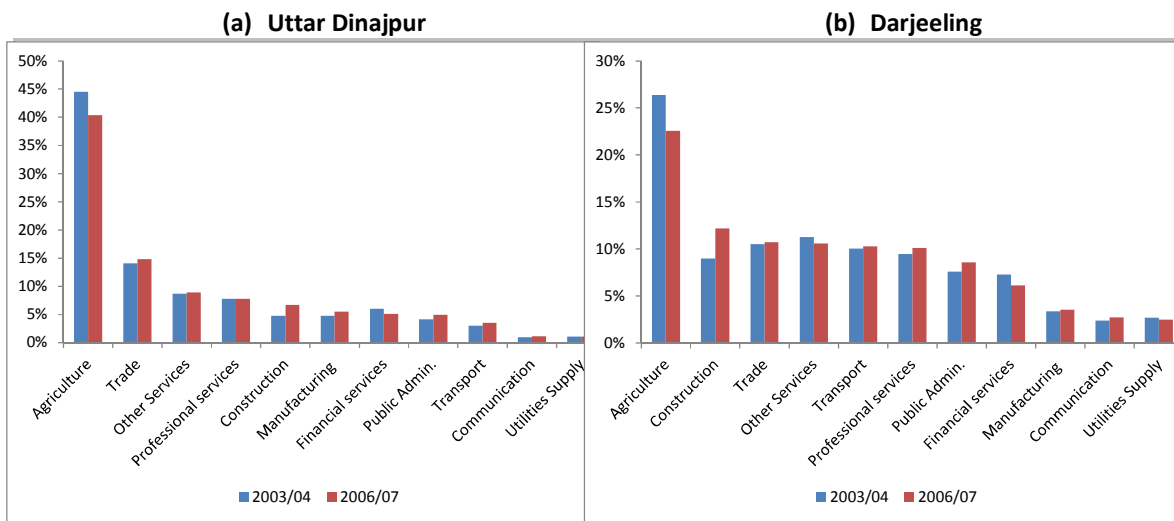
Agriculture dominates production and employment in all of the districts. That is due to the combination of the relatively low levels of development and the importance of tea production for the entire region. However there are also some relevant differences between districts. Consider for example the composition of output in Darjeeling (on the India-Nepal border) and Uttar Dinajpur (on the India-Bangladesh border). Agriculture is substantially more important in the latter where it accounted for 40% of GDP in 2006/07, while it accounted for only half of that in Darjeeling – the production structure in Darjeeling is more spread across sectors, with construction, trade, other services and transport accounting for at least 10% of GDP.⁶ Interestingly agriculture is becoming slightly less important in both districts, with construction and to a less extent manufacturing, increasing their share especially in Darjeeling.

Agriculture (including fisheries and mining) is the dominant activity in both Ilam and Jhapa, followed by a range of services including construction, trade and travel; manufacturing contributes less than 5% in both districts (Figure 3). According to the latest Agricultural Census (CBS 2012), Ilam and Jhapa ranked first and second among the 75 Nepali districts in terms of land area devoted to vegetable farming (more than 4,000 hectares each). They also rank in the top five in the farming of potatoes and spices (such as cardamom and ginger). Earlier production data (from 2001, the latest available to us) show that agriculture accounts for over half of the production value and in Jhapa the share is just below 50%. The other sectors are therefore relatively marginal with the exception of trade (in both districts) and transport, storage and communications in Jhapa (but not in Ilam). The importance of

⁶ In particular the importance of the transport sector is significant in Darjeeling, where its share is the highest in West Bengal districts after Kolkata. That may be related at least in part to the importance of the tea trade.

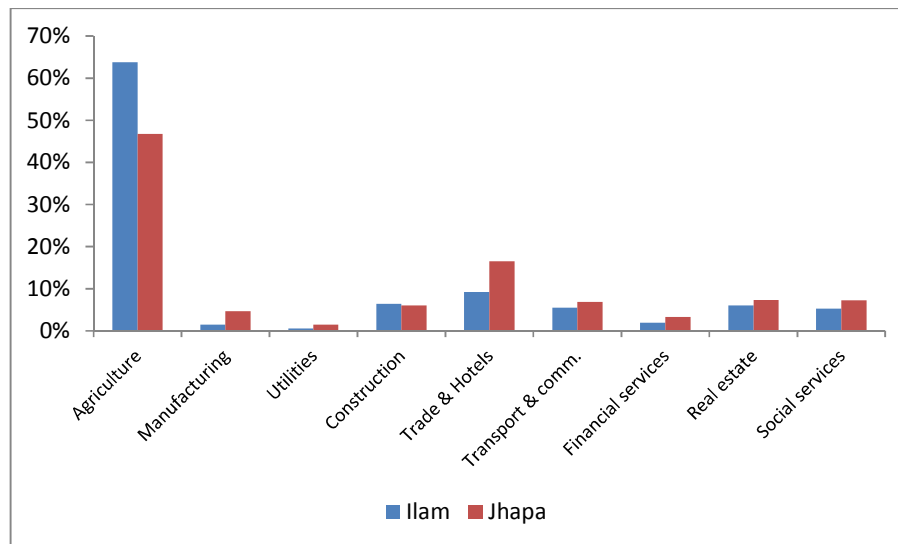
the latter sector in Jhapa may be related to the substantial tea production, which is the largest in the district (as shown below) and one of the largest in the country.

Figure 2: Production structure in Indian districts (share of district's GDP)



Source: Indian Planning Commission (<http://planningcommission.nic.in/plans/stateplan/index.php?state=ssphbody.htm>)

Figure 2: Production structure in Nepalese districts (share of district's GDP), 2011



Source: National Planning Commission estimates for 2014 Nepal Human Development Report (forthcoming)

While we do not have comprehensive production data for Panchagarh, the employment data from the most recent household survey is also consistent with a production structure dominated by agriculture. In the next section we will try to use production (and consumption) data to assess the extent to which gains from trade could potentially materialize.

District Transport Connectivity

The three countries are connected by a trade route and border infrastructure that intersect with the so-called Siliguri Corridor, a major trade route linking the mainland and NE States of India. Siliguri is

the main commercial city in the northern part of West Bengal. Located strategically at state and international borders, Siliguri has become an important regional hub, with good connectivity to Kalimpong in Darjeeling district and Sikkim by road, as well as with Darjeeling and Jalpaiguri by rail; it also includes the only airport in the region, in Bagdora. There is a north-south route that intersects with the Siliguri Corridor running between the Kakarbhitta (Nepal)/Panitanki (India) and the Fulbari (India)/Banglabandha (Bangladesh) border posts. All three countries therefore have access to Siliguri.

The road from Fulibari to Panitanki is in a fair condition, but in need of an upgrade and widening. In Nepal the route links to the recently renovated Nepal East-West highway. The Siliguri Corridor handles more than 40m tonnes of traffic per year most of it east bound between mainland India and the North-East States. Nepal/Bhutan – India/Bangladesh traffic passing through the corridor is close to 1m tonnes per year. There is therefore some potential for the trade traffic flows between the three countries to interact with and benefit from the larger flows passing through the corridor.

The Kakarbhitta/Panitanki border station pair between Nepal and India handles approximately 100 to 150 trucks per day. In 2012 Kakarbhitta handled 3 percent of Nepal’s imports and 11 percent of exports. Exports are dominated by construction materials and processed foodstuffs while imports are dominated by machinery and petroleum products (Table 6). In Nepal there is a road based inland container depot at Kakarbhitta. The border stations on both sides are open seven days a week, except one Saturday per month. India is building a new four-lane bridge across the river that forms the boundary line to relieve the current, overcrowded, two-lane bridge. However, generally, there are no obvious infrastructure constraints to trade between the two countries through this point.

Table 6: Volumes through Kakarbhitta/Panitanki Land Border Crossing Point

	Export		Import	
	%	Tonnes	%	Tonnes
Agriculture	10.1	9844	6.8	52076
Mining & Minerals	4.3	4214	3.5	26551
Construction	26.3	25613	4.8	36983
Machinery	0.0	0.0	42.5	325430
Petroleum product	0.0	0.0	38.6	295291
Goods still required processing	8.7	8464	0.5	4136
Processed food	49.8	48545	2.6	20171
Clothing	0.1	139	0.1	605
White goods	0.0	0.0	0.0	0
Fast moving consumer goods	0.7	660	0.5	3628
TOTAL	100	97477	100	764872

Source: Mott MacDonald (2013)

At Banglabandha-Fulbari is the land border crossing point on the shortest route between Bangladesh and Nepal. There is a modern facility on the Indian side, with two "warehouses" (one of which is refrigerated), and a large car park (used for trans-loading purposes) among other infrastructure. The Bangladesh side is far less elaborate in terms of infrastructure, but offers sufficient space to process existing traffic and any growth in the medium term.

There are special arrangements to allow informal interactions within the border region. As there are settlements adjacent to the border, the inhabitants are allowed to utilize a strip of land along the border, within defined hours. In India the residents as well as their livestock have to be registered with the Border Security Force in India. The arrangement is based on a realization that the border is not always clearly delineated.

The land border crossings between the three countries therefore allow both formal and informal trade exchanges to take place.

4. The potential gains from trade integration

4.1. The gains from trade for border regions

The gains from trade integration are one of the most studied topics in the economics literature. The classic Heckscher-Ohlin and Ricardian models predict a country's gains from trade to be proportional to the difference in factor endowments or in production technology vis-à-vis the rest of the world. According to these models the amount of trade generated in moving from autarky to an open trade regime will be increasing in these differences. This basic insight has been confirmed by recent developments in the trade literature (Krugman, 1980; Eaton and Kortum, 2002; Melitz, 2003) that have further highlighted additional gains that are associated with: i) the "love of variety" through intra-industry trade; ii) allocative efficiency through shifting of labor and capital from less productive to more productive firms, and iii) productive efficiency through trade-induced innovation (Melitz and Trefler, 2012).

In fact Arkolakis et al. (2012) show that in these models the welfare gains from trade integration are an increasing function of the change in the share of imports in the economy and the elasticity of trade with respect to trade costs.⁷ This powerful insight is intuitive: the higher the increase in imports relative to domestic consumption, the higher the benefits for consumers and producers that can access a wider variety of goods at lower prices relative to autarky.

While these gains from trade integration are typically considered at the national level, their implications should carry over to the within-country regional level as well. In particular, in this paper we are concerned on how the potential gains from deeper integration may apply to border regions (as opposed to the country's average). There are at least two ways in which these regions differ from the rest of the country, which are relevant in computing the gains.

First, price changes due to deeper integration (i.e. reduction in prices of traded goods) tend to be more pronounced in border regions than in the rest of the country. That is due to the incomplete price pass-through of the international prices especially in locations remote from where the goods enter the country. Using data on Ethiopia and Nigeria, Atkin and Donaldson (2014) show that these elasticities are decreasing with the distance to the goods' port of entry. Similarly Nicita (2009) finds that part of the reason why the effects of the North American Free Trade Agreement (NAFTA) on households' welfare in Mexico were more pronounced in regions bordering the US was due to the decaying effects of the price changes following NAFTA. Cali (2014) also shows that the reduction in prices of traded goods following trade liberalization in Uganda in the 1990s was higher in districts hosting or close to a major border-post. This stronger price reduction in border regions following trade integration should yield larger benefits for these regions as their share of imported goods in total expenditures should increase by more than in the other regions.

⁷ The authors show that for a large class of trade models these gains are equal to: $\frac{W'}{W} = \left(\frac{\lambda'}{\lambda}\right)^{1/\epsilon}$ where the first term is the change in real income associated with international trade integration; the term $\left(\frac{\lambda'}{\lambda}\right)$ is the change in the share of domestic expenditures and ϵ is the trade elasticity with respect to variable trade costs.

In addition trade integration expands the market for domestic production, which tends to move progressively to the border regions as they become closer to the economic core.⁸ That is the story of Mexico after NAFTA, which induced a flurry of domestic and foreign investments towards the regions near the US border (Hanson, 2004). Similar findings apply also to the case of Austria following the fall of the Iron Curtain in 1990. This event was particularly beneficial for the regions close to Austria's eastern border, where employment grew more than elsewhere as these regions were closer to the newly accessible markets of Eastern Europe (Brühlhart et al., 2012).

This production effect may go beyond the goods' sector and extend to services as well. Indeed the increased trade flowing through the border regions increases the demand for incidental services, such as storage, transport and logistics, which are often supplied by contractors located in these regions. Consistent with this hypothesis Hanson (1998) finds strong positive employment effects of NAFTA in the transportation and wholesale trade industries for the small US cities bordering Mexico. Interestingly for our setting, the author also finds that in large US border cities, the employment effects are strongest for the manufacturing industry. This finding confirms that integration alone is not sufficient to generate large gains via the production side. Without agglomeration economies several manufacturing industries would not be attracted to the border regions regardless of how close these regions are to the new markets. The regions in this study are dominated by agriculture. Thus, this caveat may have limited application in the short run. But it is an important one as these regions may try to move up the value chain to penetrate agro-processing and manufacturing industries which require agglomeration economies.

4.2. Assessing the size of the possible gains in the study region

This brief review confirms that border regions stand to gain from deeper integration. But what is the size of this potential gain? The discussion above suggests that the answer depends on the size of the trade expansion across the border regions following trade integration as well as the increase in the share of imported goods in the regions' expenditure.

The objective of this section is to present measures that - we argue – may predict at least in part the possible size of these two parameters and thus the gains from trade integration our study regions. These measures are based on available secondary data and are complemented by the findings from the tea case study, which provides a more granular picture of the possible gains and the nature of such gains for an important commodity produced in the region.

We compute two types of measures. The first set consists of measures of complementarity between district economies on each side of the border. These measures hinge on the simple idea that higher complementarity would provide more opportunities to trade. Constraints in data availability induce us to rely mainly on household production and consumption data to compute these measures.

The second type of measure consists of price differentials between important consumption items across the borders. Comparing price data provides a complementary way to assess potential trade expansion following the elimination of trade barriers across the borders. Equivalently these differentials proxy the thickness of trade barriers which prevent the price equalization (net of transport costs) predicted by the law of one price (LOP). This exercise is similar in spirit – although more basic - to Brenton et al. (2013), who assess the effects of the border on the deviation of the LOP in three commodities between 25 pairs of contiguous countries in Sub-Saharan Africa.

⁸ This production effect could still be subsumed in the simple formula of the welfare gains computed by Arkolakis et al. (2012) by noting that export industries have higher share of expenditures on imported goods. Therefore that raises the overall share for the regions hosting this new production.

Measures of complementarities

The typical way to measure complementarity between countries is to compare one country's import flows with the other country's export flows at disaggregated sectoral level. The closer the sectoral composition of the two flows, the higher the complementarity -- and potential gains from trade. However these data are not available at the district level for our countries.

The next best alternative would be to use data representative of the overall district's production. Unfortunately the production data – reported in tables 5 and 6 above - are not really suitable for a comparison of districts across the border. They are relatively outdated and refer to different time periods. More importantly they are highly aggregated and use different sectoral classifications.

Therefore we try to compare the districts on each side of the borders through their employment composition. As shown in Table 7, in the case of the Indian districts this composition reflects to a large extent that of production, albeit with some relevant differences – for example, sectors like mining (in Darjeeling) and manufacturing appear to be far more important in employment than in the production structure.⁹

Table 7: Employment structure in Indian districts (share of total), 2009/10

Darjeeling		Uttar Dinajpur	
Sector	Share	Sector	Share
Agriculture, hunting and related service activities	18.1%	Agriculture, hunting and related service activities	34.7%
Retail trade	13.4%	Construction	12.2%
Other mining and quarrying	10.0%	Manufacture of textiles	9.1%
Wholesale trade and commission trade	8.4%	Land transport; transport via pipelines	6.7%
Hotels and restaurants	7.8%	Manufacture of food products and beverages	5.5%
Manufacture of food products and beverages	7.4%	Retail trade	5.4%
Land transport; transport via pipelines	6.8%	Manufacture of wood and cork	4.6%
Construction	6.6%	Education	4.3%
Public administration and defense	6.3%	Wholesale trade and commission trade	3.9%
Manufacture of basic metals	3.3%	Manufacture of other transport equipment	2.5%
Education	2.9%	Other service activities	1.8%
Private households with employed persons	2.8%	Private households with employed persons	1.7%
Manufacture of wearing apparel	2.2%	Manufacture of wearing apparel	1.7%
Manufacture of wood and cork	1.1%	Manufacture of fabricated metal products	1.3%
Financial intermediation	0.8%	Health and social work	1.1%
Supporting and auxiliary transport activities	0.7%	Manufacture of non-metallic mineral products	0.8%
Manufacture of chemicals and chemical products	0.5%	Hotels and restaurants	0.6%
Manufacture of coke, refined petroleum products	0.4%	Manufacture of furniture; manufacturing	0.5%
Manufacture of furniture	0.4%	Computer and related activities	0.4%
Other service activities	0.2%	Supporting and auxiliary transport activities	0.3%
		Other business activities	0.2%
		Public administration and defense	0.2%
		Tanning and dressing of leather	0.2%
		Manufacture of machinery and equipment	0.2%
		Sale, maintenance and repair of motor vehicles	0.1%
Total	100%	Total	100%

Source: Indian National Sample Survey, 2009-10

⁹ This issue may be due to the mobility of people, who may work in other districts despite maintaining the residence in their original one. Thus the employment structure may not reflect the production structure as accurately as we would like.

Comparing this with the employment structure in the Nepalese districts, reported in Table 8, we see greater dominance of agriculture in both Ilam and Jhapa. Two-thirds of employment in Jhapa and more than 80% in Ilam is in agriculture; moreover, manufacturing sectors account for only around 8% of employment in Jhapa and just over 1% in Ilam, far below the levels in the Indian districts. These data suggest that the economies of the Nepalese districts are much less diversified than their West Bengal counterparts (particularly Darjeeling) and suggest some complementarity in production structures and hence opportunities for trade.

Table 8: Employment structure in Nepalese districts (share of total), 2008

Ilam		Jhapa	
Sector	Share	Sector	Share
Agriculture and related service activities	80.6%	Agriculture and related service activities	65.5%
Construction	5.8%	Retail trade	8.2%
Retail trade	2.9%	Construction	4.9%
Education	2.0%	Land transport	3.0%
Land transport	1.5%	Manufacture of textiles	2.8%
Health and social work	1.2%	Manufacture of food products and beverages	2.0%
Public administration and defense	1.1%	Education	2.0%
Forestry, logging and related service activities	1.1%	Hotels and restaurants	1.9%
Manufacture of wood and cork	0.5%	Manufacture of wearing apparel	1.9%
Post and telecommunications	0.5%	Forestry, logging and related service activities	1.5%
Manufacture of wearing apparel	0.4%	Health and social work	1.3%
Mining of coal and lignite; extraction of peat	0.4%	Manufacture of furniture	1.0%
Other mining and quarrying	0.4%	Private households with employed persons	0.8%
Wholesale trade and commission trade	0.4%	Other business activities	0.7%
Hotels and restaurants	0.4%	Public administration and defense	0.6%
Manufacture of furniture	0.1%	Sale, maintenance and repair of motor vehicles	0.3%
Manufacture of textiles	0.1%	Manufacture of wood and cork	0.3%
Manufacture of food products and beverages	0.1%	Activities of membership organizations	0.2%
		Wholesale trade and commission trade	0.2%
		Manufacture of non-metallic mineral products	0.1%
		Manufacture of basic metals	0.1%
		Activities auxiliary to financial intermediation	0.1%
Total	100%	Total	100%

Source: Nepal labor force survey 2008

We assess the extent to which the Nepalese and Indian districts may benefit from integration by comparing more formally their employment structures. To do so we use a simple cosine index of similarity between Nepal and Indian districts' employment. That is essentially defined as the ratio of the covariance between the two variables and the product of each variable's variance:

$$\cos(y^{js}) = \frac{\sum_{i=1}^N [(y_i^j - \bar{y}^j) \times (y_i^s - \bar{y}^s)]}{\sqrt{\sum_{i=1}^N (y_i^j - \bar{y}^j)^2} \times \sqrt{\sum_{i=1}^N (y_i^s - \bar{y}^s)^2}}$$

where y is employment (in districts j and s), \bar{y} is the average employment in the relevant district; i is the tradable sector and N is the number of tradable sectors. The index varies between -1 (perfect complementarity) and 1 (perfect similarity).

Given the importance of agriculture, especially among the tradable, it is unsurprising that the values of the index are close to 1 for all pair-wise combinations (Table 9). Ideally we would need more

disaggregated data to draw stronger inferences on the similarities between the local economies, as districts trade in specific agricultural products. In the absence of such disaggregated data, we can still infer from the index that overall similarity across districts is relatively high; however Darjeeling is less similar to its Nepalese counterparts than Uttar Dinajpur. And Ilam and Darjeeling, despite being geographically alike, seem to be economies most different among the four district pairs, suggesting greater gains from new trade opportunities.

Table 9: Cosine index of employment similarity between Indian and Nepalese districts

	Ilam	Jhapa
Uttar Dinajpur	0.946	0.960
Darjeeling	0.812	0.821

Source: Authors' elaboration based on India NSS and Nepal Labor Force Survey

To some extent the employment data at this level of aggregation suffers from similar problems to the production data. As the agricultural sector dominates tradable sector's employment across districts, the absence of employment disaggregated data within this sector masks any potential differences in employment structures. Therefore, we complement this index with one which relies on the similarity in households' production in one district with consumption in the other. For the Indian districts we only have data on consumption, thus we use data on production for the districts in Nepal and Bangladesh and match them with the adjoining Indian districts.

More formally, the cosine index is computed as:

$$\cos(x^{js}) = \frac{\sum_{i=1}^{N_{js}} [(P_i^j - \bar{P}^j) \times (C_i^s - \bar{C}^s)]}{\sqrt{\sum_{i=1}^{N_{js}} (P_i^j - \bar{P}^j)^2} \times \sqrt{\sum_{i=1}^{N_{js}} (C_i^s - \bar{C}^s)^2}}$$

where P is total households' sales of product i in district j , \bar{P}^j is average sales across products in j ; C is total consumption of product i in district s , \bar{C}^s is average consumption across products in s ; N is the total number of products for the district pair.

Such an index has two main advantages over the employment structure index. First, it relies on product level information thus capturing much of production (and consumption) structure within the agricultural sector. Second, it provides a closer measure of trade potential as it captures potential supply and potential demand by looking at current production and consumption patterns.

The use of this measure also comes at a cost. The main one is that it disregards non-household production and consumption, including the firm and the public sector, which are important especially in the non-agricultural sectors. Households essentially produce only agricultural and related products, while they consume all sorts of goods. Therefore an index that used all households' consumed goods would underestimate the true complementarity between economies. Because of that we compute the index only for agricultural and animal products, which are consumed, produced or both produced and consumed by the households across districts. So it is effectively an index of complementarity in agriculture. Given the prominence of the sector in the overall economic structure of these districts, this limitation may not be so severe at least when evaluating the trade potential in the short term. Tea may in fact be the exception to this rule as much of the local production is not consumed by households – as explained below - but rather sold to intermediaries and processors. This may generate a downward bias in the index as production would not match household consumption.

We use an average of 84 products by district pair with the majority of products recording nil in either consumption or production value (the products' details along with their production and consumption values are reported in Tables A1-A6 in the Appendix). Table 10 presents the cosine index for each contiguous district pairs along with the number of matched products that have non zero values on each side of the border. The indices are always positive, which suggests that some degree of complementarity exists for all the district combinations. This result confirms that the trade potential (at least in agriculture) is promising in the entire study region.

The degree of complementarity varies markedly across district pairs. In particular, it is very high between Panchagarh and the Indian districts, with values of the index close to 0.7. Part of the reason for this high value is the importance of rice production in Panchagarh and in consumption in Indian districts, which signals a trade opportunity. In addition, Panchagarh's production is generally more in line with Indian consumption than in the case of Nepalese districts with a higher number of non-zero matches.

Complementarity between the Nepalese and the Indian districts is lower, with Ilam having the lowest cosine index with both Uttar Dinajpur and Darjeeling. Part of the reason for these lower values is due to the greater importance of tea production in Nepalese districts than in Indian households' consumption, as explained above. However for a number of products Nepalese districts' production and Indian districts' consumption are well above the average, such as milk, meat, potato (for Ilam). These are additional to the potential in tea trade discussed in the next sections.

Table 10: Cosine index of production-consumption complementarity

		Ilam	Jhapa	Panchagarh
Uttar Dinajpur	Index	0.112	0.250	0.694
	non 0 match	25	23	32
Darjeeling	Index	0.144	0.202	0.676
	non 0 match	19	20	29

Note: the index uses consumption data for Indian districts and production data for the other districts

Price differentials

Another way to look at potential trade gains from deeper integration is to examine price differentials of homogeneous products across-bordering districts. Such differentials would indicate potentially large spatial arbitrage opportunities if barriers were reduced. In that case increased trade would tend to bring prices of the same commodities more in line with each other.

We use three different sources for price data, one for each country. For India, we rely on the data from the Government of India's Labour Bureau, which collects district-level consumption price data for industrial workers. The data are available only for Darjeeling. For Nepalese and Bangladeshi districts, we were unable to find price data at the district level, thus we compute unit values from the household surveys. We keep only those products with values that have a small dispersion. After this procedure we are able to match 7 products between Nepalese districts and Darjeeling and 6 products between Panchagarh and Darjeeling. We then convert Indian prices into the other currency using the average exchange rate for the year of the relevant survey (which happens to be 2010 for both Nepalese and Bangladeshi surveys).

It is important to note at least three limitations, which should induce caution when interpreting the results of such comparisons. First, unit values are subject to measurement error as the household has to recall both the price and the quantity of purchases (Gibson and Rozelle, 2005). Second, while

we have made efforts to use the same commodities across districts, unobserved differences in quality may still be present and capitalized in the prices. With this caveat, researchers have used unit values to estimate price differences across space as an alternative when market prices at the local level are not available (Coondoo et al., 2004; Majumder et al., 2012). In addition certain crops, such as rice, are subsidized to poor households through the Public Distribution System thus creating an artificially low price. Unfortunately the data available do not allow us to net out the effect of the subsidy from the price. Therefore the Indian prices of rice should be taken as a lower bound of the true market price.

The price comparisons for both sets of districts, presented in Tables 11 and 12, indicate large price differentials across the border. In the case of Darjeeling versus the Nepalese districts, prices are generally higher in the latter, suggesting large potential gains from deeper trade integration for Nepalese consumers as well as for Indian producers. These potential gains would be complementary to those estimated through the cosine index above, as the latter were based on Nepalese production and Indian consumption. In addition to the “border effect,” the generally poor transport infrastructure within Nepal creates large wedges in prices of similar products across districts. Ilam is linked to Jhapa by a narrow (two-lane) winding road (Mechi Highway) up the Chure mountains from the plains, frequently beset by hazards, both natural (landslides) and manmade (political agitations and *bandhs*). Unlike the Indian side, there is no railway connecting the plains with the hills in Nepal.

The price differences – varying between 2% to 49% of the price in the high-price district - are usually larger than any reasonable estimates of transport and distribution costs between bordering regions. Therefore for most of the products considered, reducing barriers to trade between districts would likely generate a trade flow from the cheaper Indian district (Darjeeling) to the more expensive districts in Nepal. Such trade should bring about a convergence in prices across districts (net of transport and marketing costs).

Take the case of rice, the most important item (in value) in households’ consumption basket across the districts. The price of both fine rice and coarse rice recorded by Ilam consumers is higher than the consumption price of rice in Darjeeling by 37% and 26% respectively. Given that fine rice accounts for 4.7% and coarse rice for 19% of total household expenditures in Ilam, the potential gains for Ilam households of bringing the price down to the level of Darjeeling would be 2.7% and 6.5% of total expenditures respectively. Similar figures apply to Jhapa as well. These estimates should be taken as upper bound estimates of the potential gains as they do not consider that some price differences would remain even after eliminating all the barriers to trade due to transport and distribution costs. In addition they are likely to be biased from measurement errors and quality differences in price data as explained above. In particular pure market prices for rice may be higher in Darjeeling due to the subsidy scheme. Finally, these price differences do not account for possible substitution effect across items as relative prices change (which should bias the gains downward). However, these estimates are suggestive of some potential gains from trade integration even on the consumer side.

And the gains would apply to Indian consumers as well. For example, milk is 22% cheaper in Ilam than in Darjeeling. As this product accounts for 2.5% of total households’ expenditures in Darjeeling, a price reduction would yield monetary benefits for Indian consumers close to 1% of their total expenditures. Similar price differences, although generally smaller in magnitude, exist also between Darjeeling and Jhapa.

The comparison of prices in Darjeeling and Panchagarh reveals even larger differences. Prices for most products are lower in Panchagarh than in Darjeeling. For rice, wheat, onion and gur, prices are

between 73% and 93% higher in Darjeeling.¹⁰ In the case of rice alone these figures yield an upper bound of the potential consumption gains from the elimination of trade barriers as high as 8% of total expenditures. In fact consumer prices computed from households' expenditure data are suspiciously low in Panchagarh. For rice, wheat and onion we are able to complement these data with producer prices from a different module of the same survey. The differences are still quite large, varying between 19% for wheat and 69% for gur. The upper bound of the potential gain from trade integration for rice is also substantial at 3% of total expenditures. These results resonate with the high production-consumption complementarity between Panchagarh and the Indian districts described above, providing confirmation of the potential large gains for Bangladeshi producers and Indian consumers from trade integration.

Table 11: Price differentials across bordering districts for selected products, Darjeeling vs. Nepalese districts (2010)

	Darjeeling vs. Ilam				Darjeeling vs. Jhapa			
	diff. (NPR)	% diff.	Cons. % in total	Potential savings (% cons.)	diff. (NPR)	% diff.	Cons. % in total	Potential savings (% cons.)
Fine rice/Kg	-14.9	-37%	4.7%	1.7%	-16.1	-39%	7.0%	2.7%
Coarse rice/Kg	-8.8	-26%	19.0%	4.9%	-6.6	-20%	15.9%	3.2%
Wheat Whole/KG	-14.0	-42%	0.8%	0.3%	-9.9	-34%	1.1%	0.4%
Milk/Litre	6.3	22%	2.5%	0.6%	2.3	8%	2.5%	0.2%
Pure Ghee/Litre	103.6	23%	0.1%	0.02%	-25.5	-5%	3.0%	0.2%
Onion/KG	-10.4	-23%	0.8%	0.2%	0.6	2%	0.8%	0.01%
Sugar/Kg	-18.7	-27%	1.3%	0.3%	-10.9	-17%	1.9%	0.3%
Gur/Kg	-57.4	-49%	0.03%	0.01%	-12.1	-17%	0.1%	0.02%

Source: Authors' elaboration based on Government of India's Labour Bureau, India NSS 2009-10; Nepal LSS 2010. Prices are converted using the average Indian Rupee-Nepalese Rupee exchange rate in 2010. The price differential is computed as the difference between Darjeeling consumer prices and Nepalese districts' consumer prices as estimated from the NLSS. Rice is not differentiated by type in the data for Darjeeling. 'Cons. % in total' indicates the share of the product in total households' expenditures in the more expensive district; 'potential gains' are the potential savings as a share of total households' expenditures in the expensive district obtained by equalizing the price with that of the cheaper district.

For some products the gains from trade integration are also likely to be appropriated by Indian producers and Bangladeshi consumers. In particular chillies and tea leaf have lower prices in Darjeeling than in Bangladesh, a result consistent with the importance of these goods in the production in Darjeeling. The relatively low relevance of these products in Panchagarh households' consumption basket makes the magnitude of the potential gains from integration low.

Taken together the analyses above suggest the presence of important opportunities to trade across borders which are currently underexploited. This finding is subject to a number of caveats mentioned above that may reduce the real extent of these potential opportunities. On the other hand data limitations may also have prevented to identify other gains. For example the analysis has focused on agricultural products, which are likely to compose a large share of the trading basket across districts in case of deeper trade integration. However, these gains may extend well beyond agriculture. Taking the case of tea, the next part of the study will illustrate some of the factors that may prevent these gains from materializing as well as on the nature of some of the gains.

¹⁰ Contrary to the India-Nepal case, the rice subsidy in India should artificially reduce the price gap in the case of the Bangladesh-India comparison.

Table 12: Price differentials across bordering districts for selected products, Darjeeling vs. Panchagarh (2010)

	Consumer prices				Producer prices		
	Diff. (TK)	% diff.	Cons. % in total	Potential gains (% cons.)	Diff. (TK)	% diff.	Potential savings (% cons.)
Rice	17.8	73%	11.0%	8.0%	6.7	27%	3.0%
Wheat Whole	16.4	89%	1.5%	1.3%	3.4	19%	0.3%
Onion	30.5	93%	0.6%	0.6%	22.7	69%	0.4%
Gur	51.6	90%	0.1%	0.0%			
Chillies Dry	-2.7	-16%	1.0%	0.2%			
Tea Leaf	-7.1	-20%	0.1%	0.01%			

Source: Authors' elaboration based on Government of India's Labour Bureau, India NSS 2009-10; Bangladesh HIES 2010. Prices are converted using the average Rupee-Taka exchange rate in 2010. Rice is not differentiated by type in the data for Darjeeling; in the case of Bangladesh fine rice is taken for consumers and the average across the varieties for producers. The price differential is computed as the difference between Darjeeling consumer prices and Panchagarh consumer or producer prices as estimated from the HIES. Cons. % in total indicates the share of the product in total households' expenditures in the more expensive district; potential gains are the potential savings as a share of total households' expenditures in the expensive district obtained by equalizing the price with that of the cheaper district.

5. Cross-border value chains in the tea sector

Two main types of tea are grown in the region – Chinese variety in the hilly region of Darjeeling and Assamese in the Terai and Dooars region. In addition, the way in which tea is processed varies. In most cases, the hilly “orthodox” tea, which is of higher quality, is hand-processed or rolled using machinery (in a way that mimics hand-rolling). Most Terai tea is machine-processed, through a method called CTC (crush, tear, curl). The tea grown in Jhapa is exclusively CTC, while in Ilam there is also orthodox variety. The dynamics of the industry vary dramatically between the two types, with the high-quality Darjeeling (orthodox) tea recognized as a Geographical Indication (GI).¹¹ The orthodox tea is auctioned in Kolkata, while tea from the Terai is auctioned at the regional center in Siliguri.

In Darjeeling, the tea industry consists of both big growers (those who cultivate more than 25 acres) and small growers. There are 336 large growers registered and estimates for the number of small growers range between 22,000 and 40,000. Evidence from the field surveys suggests that small growers are the main suppliers in tea trade, with local collectors and traders also accounting for a significant share. The role of cooperatives in the Indian tea sector is negligible.

In Nepal, Jhapa and Ilam dominate the tea industry – in 2010-11, they produced 87% and 10% of the country's total output, respectively (Government of Nepal, 2012). In Jhapa, major portion of the land area reported for tea cultivation is occupied by gardens, while 84 percent of the tea production comes from small farmers. In Ilam, small farmers constitute the major portion (67.5 percent) of the area for tea cultivation, accounting for about 69% of production. The ranking based on the field survey shows that farmers are the main suppliers of tea produce in Jhapa and Ilam, as was the case in Darjeeling, followed by local collectors and cooperatives. There is no role for traders in Nepal unlike that of India. Tea is a key production for households especially in Jhapa, being responsible for

¹¹ Unlike other forms of IP like patents, which are rewards for new creations, GIs are not newly *created*, but only *recognized*. There are three inter-related properties of GIs: first, they confer a right to exclude producers from outside the designated geography from using the indication; second, the right to exclusion often attracts a commercial premium; and third, GIs are aimed at protecting consumers and producers from products that convey misleading claims about origin or reputation (Wagle, 2007).

35% of all agricultural sales (Table 13). It is also a non-negligible product in Ilam where it accounts for over 5% of agricultural sales. These figures underscore the importance of tea production for households' welfare in Nepalese districts.¹² Comparing the production with the consumption data suggest that most of the local tea production is not for local consumption and is either traded across the districts' borders or sold on the market to tea processors.

Box 1: Governance of tea and Geographical Indications in India

Tea is one of the industries, which by an Act of Parliament comes under the control of the Union Government. The genesis of the Tea Board India dates back to 1903 when the Indian Tea Cess Bill was passed. The Bill provided for levying a cess (service tax) on tea exports, the proceeds of which were to be used for the promotion of Indian tea both within and outside India. The present Tea Board was constituted in 1954 under the Ministry of Commerce and Industry. With headquarters in Kolkata, Tea Board has 21 zonal, regional and sub-regional offices. The Tea Board has a monopoly on the production of tea. Its permission is needed for planting tea in India. All the tea factories, regardless of size, must be registered with the Tea Board. From 1998, there are bought leaf factories where the tea leaves are purchased from the small growers and are processed. The Tea Board gives license to form self-help groups (cooperatives) with subsidies of 40 percent of the unit cost (maximum of Rs. 25 lakh). However, setting up of factories is not restricted to cooperatives, as is the case in Kenya.

According to the Tea Board, a comprehensive certification scheme is based on the Geographical Indications of Goods (Protection and Registration) Act in 1999. Out of the 120 tea gardens in the Darjeeling district, 87 that are registered with the tea board conform with criteria that qualify them to brand their tea as Darjeeling. The word "Darjeeling" has been patented, and registered as a GI, by the Tea Board. It has a distinct logo. The Terai or Dooars tea are not recognized as a GI. The Indian Act defines GIs more broadly than the WTO's TRIPS Agreement, and has two key characteristics: i) protection of producers against counterfeiting and misleading commerce, and ii) striking of balance between trademark and GI protection (Ravi 2003). Domestic protection of GIs, such as that enforced by India since 2003, is important because unless products are appropriately protected at home, the case for protection abroad becomes difficult. Paragraph 9 of Article 24 of TRIPs only obligates members to protect a GI if it is protected in its country of origin. Indeed, India was propelled into protecting its GIs after having to fight off patenting of some of its traditional products (like Basmati rice) abroad.¹³

On the other hand, household data suggest that tea does not appear to be an important product in Panchagarh, where rice accounts for two-third of households' agricultural sales.

Marketing Channels for Tea

Sales under the Siliguri Tea Board office consists of three parts: private sales (50 to 60%); auctions (35 to 40%); and exports (10 to 20%). All exporters must be registered with the Tea Board and are required to file online their monthly returns. In the case of auctions and private sales, the Tea Board has only indirect control. In the case of private sales, it is bilateral and no problem is reported in marketing. Packaging is a part of the private sale. Ultimately most (70 percent) Darjeeling tea is

¹² Unfortunately we do not have the same data for Indian districts.

¹³ In September 1997, the Texas-based Rice Tec Inc. was awarded Patent number 5663484 on Basmati rice lines and grains by the United States Patent Office (USPTO). Following a challenge by India, RiceTec withdrew four of its 20 claims. In March 2001, the USPTO told RiceTec that of its 20 claims only three were approved, issuing it a "varietal patent" to market the types of Basmati developed by itself, and not cultivated and bred traditionally by farmers in India and Pakistan.

exported, although much of this comes not directly from the farmers but through auctions or through traders.

Table 13: Agricultural sales by households in Nepalese districts (share of total agri sales), 2010

Ilam		Jhapa		Panchagarh	
Product	Share	Product	Share	Product	Share
Milk	29.4%	Tea	35.1%	Rice	65.1%
Ginger	27.6%	Main paddy	26.9%	Wheat	8.5%
Other cash crops	13.1%	Milk	6.9%	Jute	4.2%
Cardamom	5.4%	Spring/winter maize	6.6%	Sugarcane	3.1%
Tea	5.2%	Early paddy	6.2%	Tomato	3.0%
Winter potato	4.1%	Meat	4.9%	Tumeric	2.8%
Meat	3.0%	Wheat	3.3%	Oilseed	2.1%
Orange	2.0%	Summer maize	1.7%	Maize	2.1%
Summer vegetables	1.9%	Curd	1.5%	Green chilli	2.1%
Black gram	1.6%	Winter vegetables	0.9%	Other Fruits	1.6%
Winter vegetables	1.0%	Summer vegetables	0.8%	Pulses	1.4%

Note: The totals exclude sale of live animals

Source: Nepal Living Standards Survey 2010 and Bangladesh Household Income and Expenditure Survey 2010

Most of the tea in India and Nepal is sold through captive markets: more than 80% of producers sell their product to a single market. Bangladesh is different in that more than half of the farmers sell to two or more markets (Table 14). Indian and Nepalese producers, therefore, do not have much choice on where to sell whereas those in Bangladesh appear to have greater options. The availability of choice on where to sell products is important to how logistics systems are organized in the different markets – where there is little choice this can be a function of state intervention in agricultural markets or the influence of transport and market infrastructure, or both. For instance, where the authorities organize auctions then the market outlets can be limited. On the other hand where choice is available, there can be competition between markets which could result in poor coordination especially between small scale producers to enable them to reduce unit logistics costs.

Table 14: Number of markets served (%)

	Bangladesh	India	Nepal
1	47	82	80
2	33	18	13
3	13		5
>3	7		2

Source: Field Survey

The main markets for Siliguri tea (95 percent) are inside India, mainly Bihar, West Bengal and Madhya Pradesh, according to the response of the officials interviewed. There is no outsourcing of tea from Nepal. This can be seen in Table 15, which shows that tea is purchased mainly in farmgate, own premises and district markets while none of the respondents purchase them across borders in Darjeeling. This is very much the same pattern in Nepal.

Table 15: Distribution of Tea Markets (%)

Quantity (kg)	India	Nepal	India	Nepal	India	Nepal	India	Nepal
	Farmgate		On own premises		Local market		District market	
<1500	14.3	29.4	33.3	28.6	0	18.2	0	0
1500 to3000	28.6	29.4	44.4	0	0	18.2	14.3	0
3001 to 4500	14.3	5.9	11.1	28.6	0	9.1	28.6	0
4501 to6000	14.3	17.6	11.1	0	0	9.1	42.9	0
6001 to 7500	0	0	0	0	0	0	14.3	0
7501 to 9000	0	0	0	0	0	27.3	0	0
9001 to 10500	0	11.8	0	0	0	9.1	0	0
10501 to 12000	0	0	0	14.3	0	0	0	0
12001 to 13500	0	0	0	0	0	0	0	0
13501 to 15000	28.6	0	0	0	0	0	0	0
15001 to 16500	0	0	0	0	0	0	0	0
>16500	0	5.9	0	28.6	0	9.1	0	0

Source: Field Survey

In Siliguri, tea auctions are conducted by auctioneers who include brokers, sellers and buyers. In auction, sampling needs to be done three weeks ahead. Money is received within 45 days. It is mandatory that only buyers registered with the Siliguri Tea board can buy tea from the auction. Darjeeling tea is auctioned in Kolkata and all the other tea are auctioned in Siliguri. There are 7 brokers, and about 300 sellers and buyers each in Siliguri. The sellers include plantation owners as well as factories unattached to plantations that source in all tea.

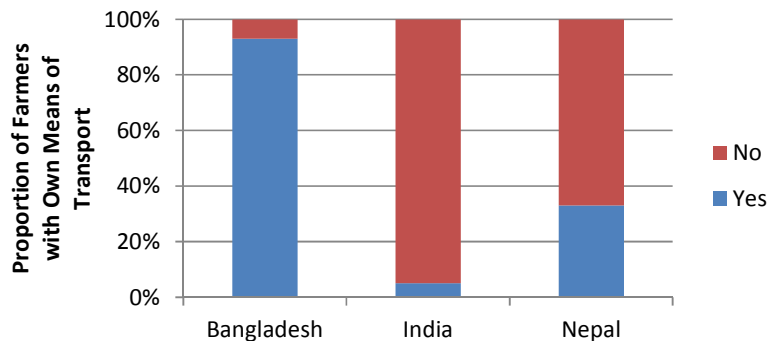
There are no auctions in Nepal and Bangladesh. Private sales are the main sales option for tea in Nepal, with most going to processors. There are 2-4 large producers who export directly. There is a feasibility study underway in Nepal on establishing an auction system for tea. The opinion of the officials interviewed in Nepal is that allowing auction system can facilitate tea trade in Nepal.

Tea being sold in the Siliguri auction goes immediately into warehouses, which are organized through the Tea Board (with strict specifications). There are 20 warehouses in Siliguri registered with the Tea Board, and an additional 10 that are rented to cope with high demand during the on-season (June to December). In Nepal, after the blending of CTC and orthodox tea, it is taken by small buyers. There is only one packaging unit for CTC, and no major warehousing in Nepal. Generally, across all three case study countries most farmers (two thirds) do not own any storage facilities. They have to rely on state or third party facilities. Specially built storage facilities can be optimally located to exploit economies of scale taking into consideration hinterland and downstream market connectivity.

Brokers arrange for the transportation of tea in Darjeeling. The commission is paid to the middlemen in the market, who are the commission agents. The transporters contact the brokers and the brokers contact the vehicle owners. There are two types of payment system for the transporters: paid, and Freight on Delivery (FOD). In the first case, the seller pays the transporter directly. In the second system, the margins are decided by the customers and thus there is a sales agreement with the buyer. In Nepal, for the transport, 5 to 6 farmers get together and organize transport, the cost of

which is reimbursed by the buyer. Bangladeshi farmers own their own means of transport (whereas those from India and Nepal predominantly do not).

Figure 3: Ownership of Means of Transport



Source: Field Survey

In India, farmers typically pay for delivering produce to market (DAP terms) whereas in Bangladesh and Nepal it tends to be the buyer or processor (C&F). In the latter case there are two methods of payment for the transport: 1) one farmer may own transport and the others pay per kg; 2) negotiate with the manufacturer for transport prices. Generally, the transporters own their own trucks unlike those in India who interact through brokers.

One of the major differences between the three markets is in the timing of payments to farmers, where 90% of Bangladeshi and three quarters of Indian farmers are paid within 2-3 weeks of delivering product to market. However, in Nepal almost 90% of farmers in the sample were found to be paid after more than three weeks of having delivering their product (Table 16).

Table 16: Length of Time for Payment (%)

	Bangladesh	India	Nepal
Less than 2 weeks	-	29	-
2-3 weeks	90	44	11
3-4 weeks	9	18	83
More than 4 weeks	1	6	6
<i>Total number surveyed</i>	<i>30</i>	<i>61</i>	<i>59</i>

Source: Field Survey

Overall, in Darjeeling middlemen like brokers play a great facilitating role at each stage of tea trade. In Nepal, however, middlemen do not play any significant role. In Darjeeling, the markets (auctions) are the primary node of the supply chain, while in Nepal it is the processors.

Degree of Tea Market Integration

In integrated and competitive agricultural markets, price differences between the regions should equal transfer costs while price differences between regions that do not trade with each other will be less than or equal to transfer costs. The relationship between spatial market integration and price differences was established in the Takayama and Judge formulation of 1971 and can be tested statistically for a perfect economic system, often a theoretical one as in Faminow and Benson (1990). The model can be used to explore the extent to which two or more sites trade with each other especially if they produce similar products whose only differentiation is location.

Underlying the most commonly used spatial equilibrium models is the assumption that an area is organized into a discrete number of regions. This assumption is relevant to South Asian countries. As argued above, they do not trade much with each other, except India and Nepal where the former is the latter's largest trading partner. Thick borders in South Asia result in distinct production and trading regions.

Market integration is how price interdependence can be assessed. In this instance, it can be assessed using a model of oligopsonistic competition - where a large number of producers (farmers) sell to a small number of buyers. In South Asia, the number of farmers is the result of a cascading pattern: farmers can only sell to markets in their own country and within each country they may only sell to a few markets. The model can be formulated as follows:

Assume three separate markets X, Y, Z that can buy product from various producers that are evenly distributed between them. Assume supply at each market is of the widely used form for spatial markets:

$$P = a - \frac{b}{v} \cdot q^v$$

where P is the delivered price offered (i.e. DAP price), *a* and *b* are constants and *v* is a constant parameter >-1.

The FOB price can be assumed to be made up of price *p* offered by the firm and *u* being the costs of transporting the product from farm to market. Assuming transport costs are 1 per unit of distance e.g. \$1 per tonne per km then:

$$P = p + u$$

Combining the two equations we obtain:

$$q = \left[\frac{v}{b} (a - p - u) \right]^{\frac{1}{v}}$$

The above result is intuitive, that in integrated spatial markets the catchment area is in part influenced by distance around the market. However, in South Asia the lack of cross-border trade in tea, except for Nepal, reflects the impact of several barriers. The survey data show that no Bangladesh and Indian farmers and traders sell produce across the border while up to a third of Nepalese do so. There are several reasons that are cited for not being able to trade across the border (Table 17). In Bangladesh it is high transaction costs, in India it is largely related to poor market intelligence while in Nepal the main reason is the difficulty in making cross-border transactions.

Table 17: Barriers to sourcing produce across the border

Reason	Country (%)		
	Bangladesh	India	Nepal
High transaction costs	44		3
Poor market intelligence	9	43	3
Lack of business contacts	9	44	10
Border crossing problems	9	12	42
Other	29	1	42

Source: Field Survey

In markets such as northeast South Asia, the equation above can be extended to include the costs of crossing borders, thus:

$$q = \left[\frac{v}{b}(a - p - u)\right]^{\frac{1}{v}} + t$$

where t is the cost of crossing borders.

Border crossing costs are a function of several factors including:

- Trade policies: for instance, in India government sets out where the product may be sold.
- Non-tariff measures including the requirement, for instance, of Nepali products being sent to Indian laboratories for tests before being allowed into the Indian market.
- Lack of transport and logistics services for cross-border movement of products. The transport and logistics systems in each country are oriented away from the border, and influence the flow of produce to markets at points inland in each country.
- Agricultural marketing policies.

Based on the latest Indo-Nepal trade treaty (2009) Nepal tea is not officially allowed to be exported to Siliguri for domestic consumption. Technically, this is because only sellers registered with the Tea Board may sell. One reason registration is not possible is because of the GI system, which regulates the quality and volume of production and manufacturing of tea to the region, although this is not relevant for the Assam variety. However, the broader issue is the fact that Nepalese tea is perceived to be of inferior quality and, as a result, it is kept out of Indian auctions. Tea imports are allowed officially only for re-exports and not for consumption or blending in India.

India-Nepal trade dynamics changed after 2000 because of the enforcement of the Indian law on GIs. Previously, it was common to blend Darjeeling tea with other varieties, including from Nepal. But from 2000 onwards, there was a clamp-down on producers who blended Nepali tea with Darjeeling tea. Anyone found blending and selling on the domestic market was deregistered by the Tea Board. Strict monitoring of daily production is carried out and reported to the Tea Board to ensure that sales figures tally – if not, no certificate of origin (to give proof of GI) is provided.

These tight measures followed a concerted legal effort by India to protect its GIs after some of its well-known products were patented overseas. India's GI Act of 1999 was also necessary because of India's international obligations under the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), which mandates the need for demonstration of home country protection of GI before contesting disputes overseas (see Box 1). In the context of a competitive international market, with relatively difficult conditions (previously, Russia imported 60% of all Darjeeling tea, but this market has declined significantly), and high costs of exporting (e.g. lab testing costs are very expensive), GI is seen as critical to supporting competitiveness of the Darjeeling tea industry through higher prices. But the Nepalese tea sector lags behind in attaining quality standards that would also let it reap the premium associated with intellectual property protection through GI.

In the case of Basmati rice, the GI is recognized on both the Indian and Pakistani sides of the border. In other words, the "reputational" premium from a GI is potentially sharable across borders. In the case of tea, however, it is unlikely that Nepal can share or ride on the reputation of the better-known "Darjeeling" in the medium-term. Unlike Basmati, Darjeeling happens to be a geographical term (and therefore an Appellation of Origin as well). Nepal could develop its own GI of "Nepal" or "Ilam" tea by first protecting it at home. Bangladeshi tea is marketed separately, through national organized channels.

Nepalese tea must pay an excise duty of 70% on entering the Indian market. As discussed previously, it is also restricted in its markets within India – hill tea from Ilam cannot be sold in Darjeeling. According to the officials of business associations interviewed, Nepal tea is now going into Siliguri, but outside of the GI system – they are sold to non-plantation ‘bought leaf’ factories, where they are blended with Indian tea and sold abroad. Even here, the process can be difficult (see Box 2).

Box 2: Exporting tea from Nepal to India

For CTC tea from Nepal, brokers in Siliguri get samples from Nepal, and then pass on the offering prices to the auctioneer. There are no costs of middlemen in Nepal. There will be personal visits for samples. Samples sent by the buyer (through the broker) are sent via Indian trucks and then forwarded. The samples must then go to customs, and are then sent to Kolkata for lab testing. This process, which results in receiving the CFL (license) takes 6 months. Costs for customs regulations and clearance are said to be high, and the license provided is valid only for 6 months. With regular shipments established, Indian trucks are also used. Indian trucks generally come through the Kakarbhitta border crossing – for loading and unloading they are permitted to stay in Nepal only for 24 hours. Payment from the buyer must be deposited at Siliguri. There was an auxiliary duty of 4 percent on tea, which has been removed, but remains in place for green tea imports from Nepal. Despite lobbying by the Nepali tea planters, the Tea Board in India has not removed this duty. For orthodox tea produced in Ilam, Indian trucks come through Kakarbhitta and then take the leaves directly on to Kolkata as they are not permitted to be sold in Darjeeling.

Despite the restrictions, India remains by far the most important export market for Nepal’s tea, accounting for around 90% of exports. Data suggests that exports to India have declined over the past decade. Interestingly, Nepal’s export statistics suggests substantially higher volumes of tea going to India than is reported in Indian import statistics. This may reflect ‘unofficial’ trade, whereby Indian importers are not recording Nepal as the country of origin for tea imports to avoid the new restrictions imposed on Nepalese tea. Or it may reflect genuine re-export trade.

6. Constraints to trade, value chain integration, and competitiveness

Constraints specific to cross-border trade

One major transport constraint affecting cross-border trade in Darjeeling is the possibility of mismatch between the SUVIDHA number and the Central Sales Tax (CST) form.¹⁴ In Delhi, the Central Sales Tax registration number and the Tax Identification Number (TIN) are the same, but they are different in other states. This difference creates inconvenience according to the transport officials.

Check posts, which had been removed in West Bengal for some time, have recently been reintroduced. There is competition among the transporters, and prices are set freely, but unions determine industry-wide margins. Transport handling is seen as a constraint by the industry (It is noted that in Kenya there are special rules for handpicked tea, although this is not the case in India). While transport from Siliguri to Delhi is said to be efficient, **from Kolkata to Siliguri, it takes on average 14 hours to travel only 650 kilometers.** For transport between Siliguri and Nepal, customs formalities are said to cause delays in both directions, with separate forms (ARE) are required.

In addition, there is **no proper storage system near the border**, which Nepalese respondents see as a major constraint. To improve the infrastructure in Siliguri for the tea industry, the West Bengal government has decided to build a container port. Through the arrival of inland waterways, exports of tea are expected to be promoted. Through the establishment of the dry port, it is supposed to

¹⁴ SUVIDHA is a 17 digit unique identification number, for which the seller’s invoice is needed. In West Bengal, Form 58 is needed.

facilitate the consolidation of exportable goods in intermodal short and long distance transport flows and in the collection and distribution of local, regional and intermodal transportation (Siliguri Jalpaiguri Development Authority, 2012).

Box 3: Views on the value of opening up cross-border tea trade

The majority of people interviewed in Darjeeling had the opinion that Nepal tea is of very low quality compared to the tea in Siliguri and Darjeeling, and were generally opposed to allowing free trade with Nepal. There was also concern that the quality of tea in India would be reduced by allowing cross-border trade due to the time lag between the raw material manufacturing and processing. Moreover, based on their opinion, small growers in India would be affected through trade with Nepal. These concerns, along with the fact that domestic production is sufficient to meet consumer demand, means that few see the benefit for India of opening up cross-border trade in tea. At the moment, Nepal tea does not pose any competition unless passed off as Indian tea; although there are some concerns about the possibility of dumping. The bigger concern for India is competition from Vietnam and Kenya, who can produce cheaper tea at the same level of quality as in Darjeeling.

Nepalese officials meanwhile see benefits of tea trade with India mainly through the potential to increase connectivity to markets (Indian and international), although they express some concerns about duplication in production across the border.

According to interviews with officials and industry participants in Nepal, a number of significant constraints impact the possibilities of cross-border trade. These include:

- **Non-acceptance of Nepal lab testing:** One of the biggest constraints is the fact that India does not accept lab testing done in Nepal. Therefore, all shipments from Nepal must be tested in labs in Kolkata, which takes 4-5 days on average. Hence, there is a need for an internationally-accredited lab (or an India lab) at the border, according to the Nepalese officials.
- **Restriction on cross-border trucking:** Indian trucks can come to Nepal (with time restrictions) but Nepalese trucks can go only up to Naxalbari— a few kilometers across the border in India – without duty; beyond Naxalbari, they are required need to pay duty – this process typically takes one week for clearance.
- **Currency restrictions:** Until the ban was lifted in December 2013, no denomination larger than 100 Indian Rupees (USD 1.6) was accepted as legal tender in Nepal for over a decade. This caused problems for trade in commodities like tea, which tends to involve cash, as well as for related services like transport.
- **Poor transport infrastructure:** Roads near the border are said to be in poor condition and no dry port facilities exist at the Kakarbhitta border.
- **Export clearance available only in Siliguri:** this location is 32 kilometers from the border point of Naxalbari.
- **Poor customs facilities:** There are often significant traffic jams at the customs post, no parking facilities exist, and no banks are available on the customs site.

Table 18 gives evidence on the somewhat asymmetric situation across the border, which penalizes Nepalese producers. Participants on the Indian side see the lack of information about markets and lack of relationships as the main constraints to cross-border trade, but report relatively little concern with the actual mechanics of it (perhaps because they have little experience or need to engage in it). On the Nepal side, concerns are much more about the mechanics and much more widespread, including border delays and costs, transport, and ‘other’ factors, which include several of the factors reported above – customs clearance, customs policy and the lab testing problems.

Table 18: Survey results - Restrictions in cross-border trade in Darjeeling and Nepal

Restrictions	Frequency		Percentage of respondents indicating constraint	
	Darjeeling	Nepal	Darjeeling	Nepal
High Cost	0	0	0	0
Lack of information	24	2	92	4
Lack of relationship with sellers	25	6	96	11
Transport Costs	0	6	0	11
Border Crossing Costs	4	14	15	26
Delays due to border crossing	4	11	15	20
Payment Difficulties	0	4	0	7
Other reasons	0	11	0	20

Source: Field Survey

Other constraints that impact trade and competitiveness

Various other general constraints are faced by farmers in the three countries. The most severe constraints are summarized below (Table 19).

Table 19: Major Obstacles Faced in Tea Chains

	Bangladesh	India	Nepal
Electricity	20	73	75
Obtaining licenses		24	27
Labor regulations			97
Transport	3		75
Skills	3	42	92
Corruption			97

Source: Field survey

Among other constraints noted are:

- **Packaging:** This is seen to be extremely poor in the region – it often done in plastic materials and cement bags, leading to poor quality control in the transport process. This is apparently more of a problem on the Indian side of the border, where packaging is determined by the requirements of the auction (set by the Tea Board); in Nepal most packaging requirements are stipulated by the ultimate buyers.
- **Warehousing:** In Darjeeling, there is substantial warehousing space available at a low cost due to government provision, while in Nepal farmers often are forced to have their own facilities (and this is under-provisioned). In Darjeeling, however, warehouse quality is often poor (no temperature control) and theft is a problem.
- **Infrastructure:** At Siliguri, most people commented that roads are good except those in the interior. In Darjeeling there are road connectivity problems and water scarcity problems, with no ground water. Electricity is available 24 hours in Siliguri and Darjeeling. In Nepal, on the other hand, there is shortage of power, with “load shedding” power cuts of about 12 hours per day common in the winter months – this is seen as a significant constraint in the sector, both for irrigation and the prospects of processing. In addition, roads are generally in a poor state.
- **Labor:** Both the Indian and the Nepali sectors report problems with labor shortage. In addition, huge wage differences between Indian, Bangladeshi, and Nepalese workers can

create distortions in the regional market. For example, it is reported that permanent Bangladesh workers receives Rs. 22 -23 per day compared to Rs. 57 for Indian workers.

- **Auctions:** One of the biggest problems noted in the tea sector in Nepal concerns lack of marketing – specifically the lack of a more structured form of access to markets, like the auctions in India. Without access to the auctions, and with serious restrictions on selling outside the auctions, Nepal’s tea farmers are forced to sell through a more narrow set of processors (both in Nepal and India), with output sold as low value-added green leaf tea to ‘bought leaf’ factories. Moreover, it results in a much larger share of output sold in the domestic market than might otherwise be efficient. Our analysis suggests that the auction provides a predictable and relatively efficient marketing outlet for producers (in India). For processors it may also reduce the challenges of organizing supply in a fragmented network, provides predictability, and overcomes the challenges of scale. By playing a central node position in the supply chain, the auction may also serve to facilitate more effective connectivity, again by concentrating supply, warehousing, and transport networks. This could come at some cost to producers, as it creates a structure where middlemen (traders, brokers) play an important role, extract margins and rents, and may limit upgrading potential – but for most farmers the efficiency and predictability the system brings is a trade-off worth taking.
- **Other constraints:** Other constraints for doing business in Siliguri were reported as inadequate marketing, need for broader economic development, labor shortage and climate change. Shortage in rainfall is reported at Siliguri and Darjeeling (around 24 percent). Lack of government support for small farmers (after a decade of encouraging them) has led to declining productivity. In Jhapa and Ilam, too, there have been changes in rain patterns. This, along with labor shortages, political uncertainty and corruption were the main problems identified in Jhapa and Ilam. In Jhapa or Ilam, there are no universities and research institutes, only low quality colleges. There are also no professional tasters and production managers in Nepal. New courses in tea have started, however.¹⁵ Government support is limited – a committee was formed for helping small farmers export to India but was dissolved due to financial problems. Compared to India, the incentives from the Government of Nepal to promote the tea industry are inadequate.

7. Conclusions

International experience shows that border regions often flourish as gateways for cross-border commerce. But in South Asia, a combination of political, economic and geographic factors have curtailed a crucial source of local economic growth. We study a sub-region in the northeast of the Indian Subcontinent by using a combination of secondary data for desk-based quantitative analysis and field research on a case study involving an important traded commodity (tea). Together, we shed light on a range of existing constraints to greater regional integration, whose potentials we find to be vastly under-exploited.

We first assess the potential for greater economic activity among bordering districts by quantifying a measure of trade complementarity by using employment data that proxy for production patterns. We find that the Indian districts (Darjeeling and Uttar Dinajpur) demonstrate greatest potential for new trade opportunities with the Bangladeshi district Panchagarh. That is partly due to the importance of rice production in Panchagarh and in consumption in Indian districts. Complementarity between the Nepalese (Ilam and Jhapa) and the Indian districts is lower, partly because of the greater importance of tea production in Nepalese districts than in Indian households’

¹⁵ For example, an undergraduate program (BSc) in Tea Technology and Management has begun in the multiple campus of Mechi under Tribhuvan University.

consumption. However for a number of products Nepalese districts' production and Indian districts' consumption are well above the average, such as milk, meat, potato.

A related examination of price differentials in an array of consumer items across borders also shows significant wedges, of up to 50% between Nepalese and Indian districts and up to 90% between Indian and Bangladeshi districts. These wedges can be expected to be reduced if border-related costs of policy barriers and delays can be "thinned" between India and both Bangladesh and Nepal.

Border burdens are, however, only part of the larger challenge of competitiveness and below potential development achievements. Deeper trade integration by itself is not sufficient to address the challenges of border regions which are compounded by the interplay of within-country inadequacies in infrastructure, firms' productive capacity, institutions, and investment climate. Markets may open up, but if supply-side hurdles are not redressed, new trade gains are less likely to materialize. The case study of tea illustrates concretely what some of such challenges are likely to be.

For the most part, tea growers (and other producers) in the region are small firms or farmers, who face problems typically faced by production units of their size in other regions as well, namely scale and marketing. This is exacerbated in peripheral regions by two additional factors: connectivity and access to quality (mainly services) inputs. To a certain degree, industry on the Indian side of the border manages to overcome some of these constraints – especially to scale and marketing, and partly connectivity – by the presence of dense economic agglomerations (which are able to provide the services inputs relatively efficiently). Further, with the auction system structuring the market in India, the greater role of value chain intermediaries improves information exchange and helps build networks – although this may come at the cost of margin.

Unlike trade where voluntary exchange of goods and services is often win-win, certain national regulations can be discriminatory by design. The right to excludability enshrined in the GI system, for example, disadvantages an important export from Nepali districts neighboring Darjeeling. As it is, official cross-border trade between Nepal and India faces several barriers, including limitations on cross-border trucking and the lack of mutual recognition of quality standards and testing. The cumulative impact is to weaken the potential for sustainable processing facilities emerging on the Nepal side of the border. These restrictions contribute to the Nepal tea sector being highly fragmented, resulting in low levels of coordination among supply chain participants and limited access to market information, perpetuating the perception of lower quality.

Even under a scenario where such cross-border restrictions were substantially reduced or removed, competitiveness of firms in the region would remain a concern, and cross-border integration may remain limited unless additional constraints are addressed. Chief among these is the productivity of firms that affect the quality of exports and the broader enabling environment afforded by quality transport and logistics infrastructure and services.

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Appendix

Table A1: Value of consumption in Uttar Dinajpur (INR million) vs. sales in Ilam (NPR million)

	Uttar	Ilam		Uttar	Ilam
Rice/Main Paddy	4,800	9.918	Honey	5	0.000
Milk	911	1,150	Groundnut oil	1	0.000
Ghee	31	11.300	Edible oil: others	11	0.000
Eggs	192	7.796	Radish	14	0.000
Meat	1,321	116	Carrot	4	0.000
Wheat	567	4.708	Beet	0	0.000
Ginger	97	1,080	Arum	19	0.000
Tumeric	133	0.392	Pumpkin	37	0.000
Other spices	113	0	Cucumber	35	0.000
lemons	32	0	Parwal, patal	100	0.000
Mango	45	7.966	Cauliflower	85	0.000
Banana	68	23.200	Cabbage	63	0.000
Papaya	38	0	Brinjal	177	0.000
Maize	7	39.863	Lady's finger	72	0.000
Potato	548	160.314	Palak/other leafy vegetables	121	0.000
Sweet potato	0	0	French beans, barbati	14	0.000
Garlic	93	0.314	Tomato	53	0.000
Vegetables	151	112.1	Capsicum	3	0.000
Oranges	26	77.3	Jackfruit	10	0.000
Guava	24	20.5	Other vegetables	30	0.000
Tea	492	203	Watermelon	19	0.000
Pear	2	0.683	Maida	19	0.000
Onions	259	0.588	Coconut (no.)	14	0.000
Chilies	65	26.6	Coconut green (no.)	2	0.000
Pineapple	9	0.373	Apple	45	0.000
Gram	26	61.7	Grapes	15	0.000
Oil seeds/Mustard	1,010	0	Suji, rawa	8	0.000
Leechi	7	0	Other fresh fruits	11	0.000
Black pepper	1	0	Groundnut	5	0.000
Tamarind	4	0	Dates	2	0.000
Curry powder	13	0	Cashewnut	3	0.000
Arhar, tur	26	0	Raisin, kishmish, monacca, etc	16	0.000
Pickles (gm)	6	0	Other cash crops	0	514.000
Pan: leaf (no.)	44	0	Millet	0	36.300
Leaf tobacco (gm)	4	0	Cow Pea	0	0.497
Moong	138	0	Other legumes	0	1.689
Masur	570	0	Cardamon	0	211.000
Peas	64	0	Pomegranate	0	0.736
Other pulses	3	0	Curd	0	0.305
Besan	61	0	Mean	163	50.378
Butter	1	0			

Source: India NSS and Bangladesh HIES

Table A2: Value of consumption in Uttar Dinajpur (INR million) vs. sales in Jhapa (NPR million)

	Uttar	Jhapa		Uttar	Jhapa
Rice/Main Paddy	4800	213.000	Groundnut oil	1	0.000
Milk	911	235.000	Edible oil: others	11	0.000
Ghee	31	17.700	Radish	14	0.000
Eggs	192	12.900	Carrot	4	0.000
Meat	1321	52.500	Beet	0	0.000
Wheat	567	112.000	Arum	19	0.000
Ginger	97	2.225	Pumpkin	37	0.000
Tumeric	133	1.076	Cucumber	35	0.000
Other spices	113	0.426	Parwal, patal	100	0.000
lemons	32	8.477	Cauliflower	85	0.000
Mango	45	0.488	Cabbage	63	0.000
Banana	68	22.000	Brinjal	177	0.000
Papaya	38	0.673	Lady's finger	72	0.000
Maize	7	283.900	Palak/other leafy vegetables	121	0.000
Potato	548	11.700	French beans, barbati	14	0.000
Sweet potato	0	1.884	Tomato	53	0.000
Garlic	93	0.000	Capsicum	3	0.000
Vegetables	151	58.500	Jackfruit	10	0.000
Oranges	26	0.000	Other vegetables	30	0.000
Guava	24	0.000	Watermelon	19	0.000
Tea	492	1200.000	Maida	19	0.000
Pear	2	0.000	Coconut (no.)	14	0.000
Onions	259	0.000	Coconut green (no.)	2	0.000
Chilies	65	3.612	Apple	45	0.000
Pineapple	9	0.000	Grapes	15	0.000
Gram	26	6.551	Suji, rawa	8	0.000
Oil seeds/must.	1010	2.018	Other fresh fruits	11	0.000
Leechi	7	1.184	Groundnut	5	0.000
Black pepper	1	0.000	Dates	2	0.000
Tamarind	4	0.000	Cashewnut	3	0.000
Curry powder	13	0.000	Raisin, kishmish, monacca	16	0.000
Arhar, tur	26	0.000	Soybeans	0	0.646
Pickles (gm)	6	0.000	Cow Pea	0	1.155
Pan: leaf (no.)	44	0.000	Colocasia	0	10.800
Leaf tobacco	4	0.000	Other cash crops	0	26.300
Moong	138	0.000	Coriander seeds	0	26.800
Masur	570	0.000	Lime	0	0.269
Peas	64	0.000	Other Citrus	0	1.615
Other pulses	3	0.000	Other fruit	0	23.900
Besan	61	0.000	Curd	0	52.500
Butter	1	0.000	Mean	286	53.519
Honey	5	0.000			

Source: India NSS and Nepal LSS

Table A3: Value of consumption in Uttar Dinajpur (INR million) vs sales in Panchagarh (BDT million)

	Uttar D.	Panchagarh		Uttar D.	Panchagarh
Rice/Main Paddy	4,800	4.469	Honey	5	0.000
Milk	911	0.240	Groundnut oil	1	0.000
Ghee	31	0.000	Edible oil: others	11	0.000
Eggs	192	0.253	Radish	14	0.017
Meat	1,321	0.035	Carrot	4	0.000
Wheat	567	0.071	Beet	0	0.000
Ginger	97	0.006	Arum	19	0.000
Tumeric	133	0.023	Pumpkin	37	0.038
Other spices	113	0.000	Cucumber	35	0.000
lemons	32	0.000	Parwal, patal	100	0.000
Mango	45	0.102	Cauliflower	85	0.000
Banana	68	0.073	Cabbage	63	0.036
Papaya	38	0.053	Brinjal	177	0.068
Maize	7	0.061	Lady's finger	72	0.008
Potato	548	0.257	Palak/other vegetables	121	0.000
Sweet potato	0	0.000	French beans, barbati	14	0.029
Garlic	93	0.010	Tomato	53	0.047
Vegetables	151	0.000	Capsicum	3	0.000
Oranges	26	0.000	Jackfruit	10	0.121
Guava	24	0.013	Other vegetables	30	0.092
Tea	492	0.000	Watermelon	19	0.020
Pear	2	0.000	Maida	19	0.000
Onions	259	0.107	Coconut (no.)	14	0.000
Chilies	65	0.063	Coconut green (no.)	2	0.000
Pineapple	9	0.005	Apple	45	0.000
Gram	26	0.000	Grapes	15	0.000
Oil seeds/Mustard	1,010	0.047	Suji, rawa	8	0.000
Leechi	7	0.004	Other fresh fruits	11	0.056
Black pepper	1	0.000	Groundnut	5	0.000
Tamarind	4	0.000	Dates	2	0.000
Curry powder	13	0.000	Cashewnut	3	0.000
Arhar, tur	26	0.000	Raisin, kishmish, monacca	16	0.000
Pickles (gm)	6	0.000	Sugarcane	0	0.465
Pan: leaf (no.)	44	0.000	By Product of Paddy	0	2.873
Leaf tobacco (gm)	4	0.000	By Product of Wheat	0	0.082
Moong	138	0.000	Patal	0	0.022
Masur	570	0.000	Puisak	0	0.017
Peas	64	0.000	Animal Skins	0	0.007
Other pulses	3	0.045	Cowdung	108	2.481
Besan	61	0.000	Average	164	0.155
Butter	1	0.000			

Source: India NSS and Nepal LSS

Table A4: Value of consumption in Darjeeling (INR million) vs. sales in Ilam (NPR million)

	Dar	Ilam		Dar	Ilam
Rice/Main Paddy	2835	9.918	Edible oil: others	7	0.000
Milk	719	1150.000	Radish	54	0.000
Ghee	20	11.300	Carrot	17	0.000
Eggs	261	7.796	Turnip	1	0.000
Meat	582	116.000	Beet	1	0.000
Wheat	374	4.708	Arum	40	0.000
Ginger	67	1080.000	Pumpkin	28	0.000
Tumeric	79	0.392	Cucumber	12	0.000
Other spices	79	0.000	Parwal, patal	55	0.000
lemons	6	0.000	Cauliflower	48	0.000
Mango	0	7.966	Cabbage	70	0.000
Banana	36	23.200	Brinjal	131	0.000
Papaya	56	0.000	Lady's finger	23	0.000
Maize	0	39.863	Palak/other leafy vegetables	91	0.000
Potato	299	160.314	French beans, barbati	7	0.000
Sweet Potato	2	0.000	Tomato	36	0.000
Garlic	57	0.314	Capsicum	2	0.000
Vegetables	189	112.100	Plantain: green	5	0.000
Oranges	24	77.300	Jackfruit	6	0.000
Guava	20	20.500	Other vegetables	98	0.000
Tea	115	203.000	Banana (no.)	36	0.000
Pear	0	0.683	Watermelon	0	0.000
Onions	0	0.588	Maida	5	0.000
Chilies	31	26.600	Coconut (no.)	15	0.000
Pineapple	5	0.373	Coconut green (no.)	0	0.000
Gram	52	61.700	Berries	1	0.000
Oil seeds/Must.	843	0.000	Apple	58	0.000
Leechi	16	0.000	Grapes	4	0.000
Black pepper	12	0.000	Suji, rawa	6	0.000
Tamarind	1	0.000	Other fresh fruits	5	0.000
Curry powder	1	0.000	Groundnut	8	0.000
Arhar, tur	39	0.000	Dates	1	0.000
Pickles (gm)	14	0.000	Cashewnut	2	0.000
Pan: leaf (no.)	51	0.000	Walnut	0	0.000
Leaf tobacco	26	0.000	Raisin, kishmish, monacca	4	0.000
Toddy (litre)	5	0.000	Other dry fruits	8	0.000
Moong	125	0.000	Other cash crops	0	514.000
Masur	346	0.000	Millet	0	36.300
Peas	3	0.000	Cow Pea	0	0.497
Other pulses	0	0.000	Other legumes	0	1.689
Besan	1	0.000	Cardamon	0	211.000
Butter	15	0.000	Pomegranate	0	0.736
Honey	2	0.000	Curd	0	0.305
Groundnut oil	1	0.000	Mean	95	44.588

Source: India NSS and Nepal LSS

Table A5: Value of consumption in Darjeeling (INR million) vs. sales in Jhapa (NPR million)

	Dar	Jhapa		Dar	Jhapa
Rice/Main Paddy	2835	213.000	Radish	54	0.000
Milk	719	235.000	Carrot	17	0.000
Ghee	20	17.700	Turnip	1	0.000
Eggs	261	12.900	Beet	1	0.000
Meat	582	52.500	Arum	40	0.000
Wheat	374	112.000	Pumpkin	28	0.000
Ginger	67	2.225	Cucumber	12	0.000
Tumeric	79	1.076	Parwal, patal	55	0.000
Other spices	79	0.426	Cauliflower	48	0.000
lemons	6	8.477	Cabbage	70	0.000
Mango	0	0.488	Brinjal	131	0.000
Banana	36	22.000	Lady's finger	23	0.000
Papaya	56	0.673	Palak/other leafy vegetables	91	0.000
Maize	0	283.900	French beans, barbati	7	0.000
Potato	299	11.700	Tomato	36	0.000
Sweet Potato	2	1.884	Capsicum	2	0.000
Garlic	57	0.000	Plantain: green	5	0.000
Vegetables	189	58.500	Jackfruit	6	0.000
Oranges	24	0.000	Other vegetables	98	0.000
Guava	20	0.000	Banana (no.)	36	0.000
Tea	115	1200.000	Watermelon	0	0.000
Pear	0	0.000	Maida	5	0.000
Onions	152	0.000	Coconut (no.)	15	0.000
Chilies	31	3.612	Coconut green (no.)	0	0.000
Pineapple	5	0.000	Berries	1	0.000
Gram	52	6.551	Apple	58	0.000
Oil seeds/Mustard	843	2.018	Grapes	4	0.000
Leechi	16	1.184	Suji, rawa	6	0.000
Black pepper	12	0.000	Other fresh fruits	5	0.000
Tamarind	1	0.000	Groundnut	8	0.000
Curry powder	1	0.000	Dates	1	0.000
Arhar, tur	39	0.000	Cashewnut	2	0.000
Pickles (gm)	14	0.000	Walnut	0	0.000
Pan: leaf (no.)	51	0.000	Raisin, kishmish, monacca	4	0.000
Leaf tobacco (gm)	26	0.000	Other dry fruits	8	0.000
Toddy (litre)	5	0.000	Soybeans	0	0.646
Moong	125	0.000	Cow Pea	0	1.155
Masur	346	0.000	Colocasia	0	10.800
Peas	3	0.000	Other cash crops	0	26.300
Other pulses	0	0.000	Coriander seeds	0	26.800
Besan	1	0.000	Lime	0	0.269
Butter	15	0.000	Other Citrus	0	1.615
Honey	2	0.000	Other fruit	0	23.900
Groundnut oil	1	0.000	Curd	0	52.500
Edible oil: others	7	0.000	Mean	95	26.874

Source: India NSS and Nepal LSS

Table A6: Value of consumption in Darjeeling (INR million) vs sales in Panchagarh (BDT million)

	Darjeeling	Panch.		Darjeeling	Panch.
Rice/Main Paddy	2,835	4.469	Edible oil: others	7	0.000
Milk	719	0.240	Radish	54	0.017
Ghee	20	0.000	Carrot	17	0.000
Eggs	261	0.253	Turnip	1	0.000
Meat	582	0.035	Beet	1	0.000
Wheat	374	0.071	Arum	40	0.000
Ginger	67	0.006	Pumpkin	28	0.038
Tumeric	79	0.023	Cucumber	12	0.000
Other spices	79	0.000	Parwal, patal	55	0.000
lemons	6	0.000	Cauliflower	48	0.000
Mango	0	0.102	Cabbage	70	0.036
Banana	36	0.000	Brinjal	131	0.068
Papaya	56	0.053	Lady's finger	23	0.008
Maize	0	0.061	Palak/other leafy vegetables	91	0.000
Potato	299	0.257	French beans, barbati	7	0.029
Sweet Potato	2	0.000	Tomato	36	0.047
Garlic	57	0.010	Capsicum	2	0.000
Vegetables	189	0.000	Plantain: green	5	0.000
Oranges	24	0.000	Jackfruit	6	0.121
Guava	20	0.013	Other vegetables	98	0.092
Tea	115	0.000	Banana (no.)	36	0.073
Pear	0	0.000	Watermelon	0	0.020
Onions	152	0.107	Maida	5	0.000
Chilies	31	0.063	Coconut (no.)	15	0.000
Pineapple	5	0.005	Coconut green (no.)	0	0.000
Gram	52	0.000	Berries	1	0.000
Oil seeds/Mustard	843	0.047	Apple	58	0.000
Leechi	16	0.004	Grapes	4	0.000
Black pepper	12	0.000	Suji, rawa	6	0.000
Tamarind	1	0.000	Other fresh fruits	5	0.056
Curry powder	1	0.000	Groundnut	8	0.000
Arhar, tur	39	0.000	Dates	1	0.000
Pickles (gm)	14	0.000	Cashewnut	2	0.000
Pan: leaf (no.)	51	0.000	Walnut	0	0.000
Leaf tobacco (gm)	26	0.000	Raisin, kishmish, monacca	4	0.000
Toddy (litre)	5	0.000	Other dry fruits	8	0.000
Moong	125	0.000	Sugarcane	0	0.465
Masur	346	0.000	By Product of Paddy	0	2.873
Peas	3	0.000	By Product of Wheat	0	0.082
Other pulses	0	0.045	Patal	0	0.022
Besan	1	0.000	Puisak	0	0.017
Butter	15	0.000	Animal Skins	0	0.007
Honey	2	0.000	Cowdung	0	2.481
Groundnut oil	1	0.000	Average	97	0.143

Source: India NSS and Bangladesh HIES