Potential for Creating Cross-Border Value Chain in Select Horticulture Products and Spices between North East India and Bangladesh using Inland Water Transport

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Potential for Creating Cross-Border Value Chain in Select Horticulture Products and Spices between North East India and Bangladesh using Inland Water Transport

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Abstract

South Asia is often considered to be one of the least integrated regions in the world. The intraregional trade in South Asia stands at merely five per cent whereas its extent is more than 25 per cent for countries in the ASEAN region. The low degree of intraregional trade in South Asia could be attributed to factors, such as lack of policy measures to facilitate seamless movement of cargo across borders leading high time and cost of cargo movement, lack of regulatory harmonisation leading to various non-tariff barriers (NTBs), and above all lack of trust.

The issue of trust deficit could be addressed once countries in the sub-region succeed in identifying and effectively utilising their mutual dependencies in production and/or consumption processes. Such dependencies would create regional value chains (RVCs) where processes across borders are synchronised from production to consumption.

In such a scenario, countries would cooperate, instead of competing, with each other in the international markets for a single product. To effectively use the benefits of RVCs, seamless connectivity is imperative. In recent years, various infrastructural projects are being implemented in the region to better connect countries in the sub-region by road, rail, water and air (namely, construction of Asian Highway, Trans Himalayan Railways, Infrastructure development on national waterways, construction and upgradation of new and existing airports etc.).

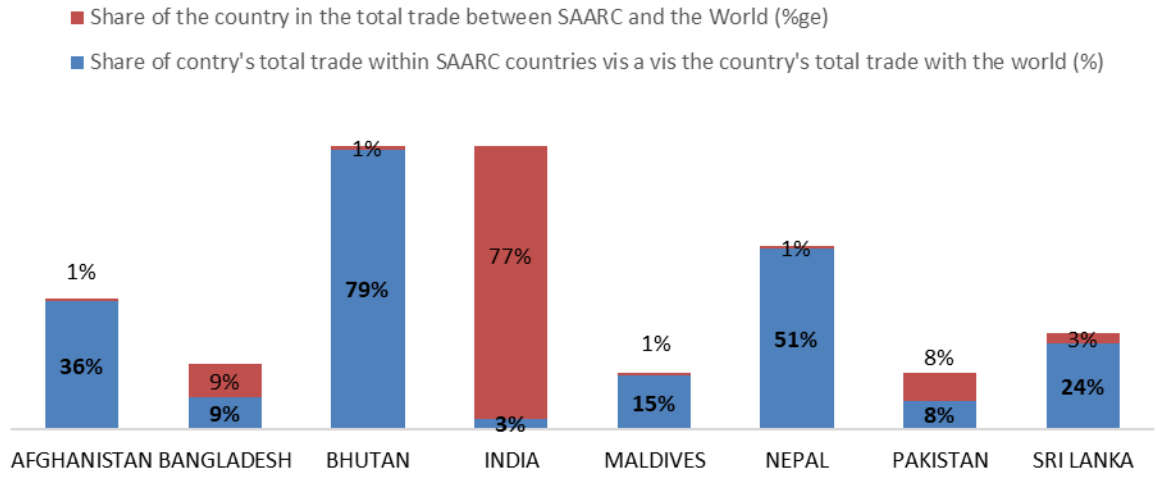
In this context, this Discussion Paper aims at identifying horticulture crops which has the potential for creating value chains between the North Eastern region of India and Bangladesh. It also underlines how Inland Water Transport (IWT) can help boost the value chain and hence interdependency between the two.

Introduction

South Asia is often considered as one of the least economically integrated regions in the world. The intra-regional trade in South Asia is a little over five per cent of the region's total trade (World Bank, 2018). The total trade in goods among countries within South Asia stands at merely US$23bn in 2015 whereas the estimated potential is US$67bn (World Bank, 2018). The big gap between estimated and actual trade could be because of the large trade deficit between India and Bangladesh (estimated at US$9,919mn); and between India and Pakistan (estimated at US$34,799mn) (World Bank, 2018).

As shown in Figure 1, India is the largest player among the countries of South Asian

Figure 1. Share of SAARC countries in trade within SAARC and between SAARC and the World in 2015

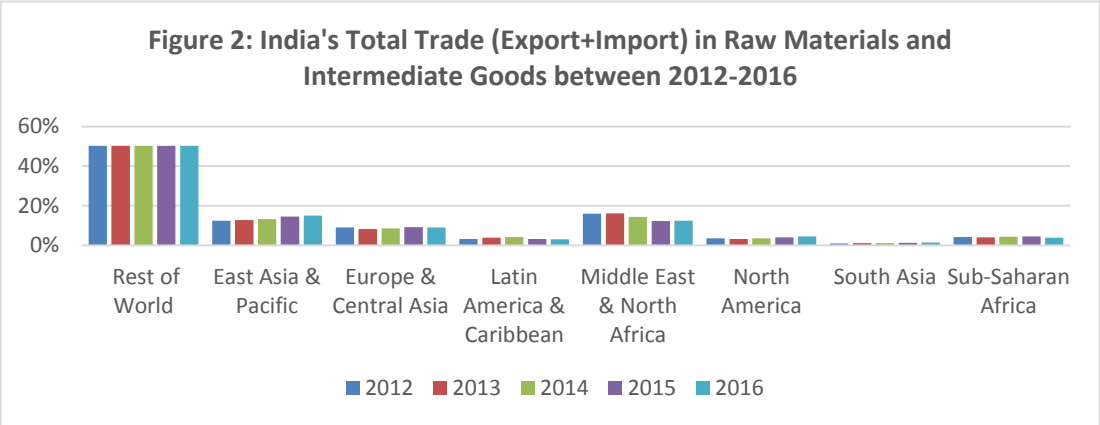


Source: ITC Trade Map

Association for Regional Cooperation (SAARC) and constitutes 77 per cent of total trade between SAARC and other regions in the world. However, only three per cent of India's total trade takes place within the South Asian region. Figure 1 further emphasises that smaller and/or landlocked economies, such as Bhutan, Nepal, Afghanistan and Maldives, tend to trade more within the region compared to the larger economies.

The low degree of intra-regional trade in South Asia is also observed in the trade of intermediate products. For example, in case of the countries of the Association of Southeast Asian Nations (ASEAN), 30 per cent of the intermediate products are sourced from within the region. In South Asia, such linkages are very insignificant. As shown in Figures 2, 3 and 4, India, Bangladesh and Pakistan hardly trade (export-plus-import) 10

per cent of their raw materials and intermediate goods taken together within the region. In fact, trade with East Asia and Middle East and North Africa (MENA) region are significantly higher compared to intra-regional trade in raw materials and intermediate goods within South Asia.



Source: WITS, 2018

Source: WITS, 2018

Source: WITS, 2018

The degree of trade within countries in raw materials and intermediate goods are often considered as fair proxy for a country's participation in value chains (UNESCAP, 2015; UNIDO, 2011). Given the low degree of trade within the countries of South Asia, both terms of total merchandise trade and in terms of trade in goods and intermediate commodities, one can understand that existence of RVC within the South Asia region is limited.

Several factors contribute towards the development of and effective and economically beneficial cross-border value chains. One of the major pillars of any functional cross-border value chain is transport and logistics. This needs to complemented with efficient customs procedures, efficient border management, harmonised regulatory standards and a facilitating trade regime without any tariff or non-tariff barrier (World Bank, 2018; Grobbelaar & Meyers, 2017; OECD, 2015). While the South Asian Free Trade Agreement (SAFTA) has led to reduction in tariffs but the countries in the region still suffer from lack of efficient logistics, poor road and border infrastructure and practices a number of NTBs in the form of Sanitary and Phyto-sanitary (SPS) measures and Technical Barriers to Trade (TBT) (World Bank, 2018; CUTS, 2016, 2018).

When negotiations at SAARC failed to put in place a Motor Vehicles Agreement (MVA) that aimed at promoting intra-regional trade by facilitating seamless movement of cargo and passengers across South Asia, four of the member countries namely, Bangladesh, Bhutan, India and Nepal (BBIN) came together and inked the historical BBIN MVA in 2015. Though the Upper House of Bhutan's Parliament did not ratify the agreement, but other member countries of the BBIN sub-region (i.e. Bangladesh, Nepal and India) decided to go ahead and implement the agreement. Presently, governments in these three countries are working on standard operational procedures to implement the MVA. Successful implementation of the BBIN MVA is very important since it would encourage greater trade and connectivity among BBIN by reducing delays at border crossings.

In the long run, the BBIN MVA is also expected to promote deeper economic integration among BBIN, by transforming transport corridors into economic and connecting the production with the demand centres across the border, thereby creating value chains. However, it also need to be aided by other initiatives aimed at streamlining and harmonising customs and regulatory procedures, and reducing paperwork.

While the countries in the BBIN sub-region are still working on the standard operational procedures for BBIN MVA, some remarkable developments are also taking place towards strengthening regional connectivity via inland waterways especially between India and Bangladesh. Since IWT is considered to be the cheapest and cleanest mode of transporting cargo, a number of initiatives are being undertaken to realise its potential benefits. Some of them include declaration of 111 inland river systems as

national waterways, undertaking dredging activities at various stretches to maintain Least Available Depth (LAD) of two-three 3 metres and 45m wide channels, promote manufacturing of especially low draft vessels, creation of infrastructure to support multimodal connectivity with select inland ports, setting up freight villages, starting roll-on roll-out (RO-RO) services etc. One of the objectives of all these initiatives is to integrate National Waterway 1 (NW1) with National Waterway 2 (NW2) and National Waterway 6 (NW6) through the Indo-Bangla Protocol Route for Trade & Transit (PIWTT).[1]

Once effectively implemented, the North Eastern Region (NER) of India stands to hugely gain from these connectivity initiatives. While the BBIN MVA is likely to reduce the distance between Kolkata and NER states via Bangladesh, strengthening IWT along Brahmaputra and Barak rivers could further boost connectivity between NER, Bangladesh and rest of India.

Increased connectivity through waterways could go a long way in creating commodity specific cross-border value chains between the NER and Bangladesh. For example, fresh fruits, vegetables and spices (viz. Apple, Kiwi, Orange, Lemon, Pineapple, Onion, Lemon Tomato, Turmeric, Ginger, Large Cardamom etc.) grown in NER would find markets and/or gets processed in Bangladesh. Similarly, movement of minerals, oil, other natural resources and industrial products would also find their way into Bangladesh in a more time and cost-efficient manner.

NER is endowed with diverse agro-climatic conditions and potential of growing various types of agri-horticulture crops. Some of the crops grown in this region are unique to NER while some are also grown in rest of India in different seasons. However, NER has remained one of India's economically isolated and backward regions and this has been one of the reasons why its potential in horticulture products has remained untapped. Other reasons are geographical remoteness, lack of transport connectivity and food processing units. Owing to poor connectivity, produce fails to find timely markets leading to distressed selling and/or wastage in NER.

The agro-processing sector in Bangladesh, on the other hand, currently stands at US$2.2bn and grew on an average of 7.7 per cent per annum between fiscal years 2004-05 and 2010-11. The beverage industry more than doubled during the same period to

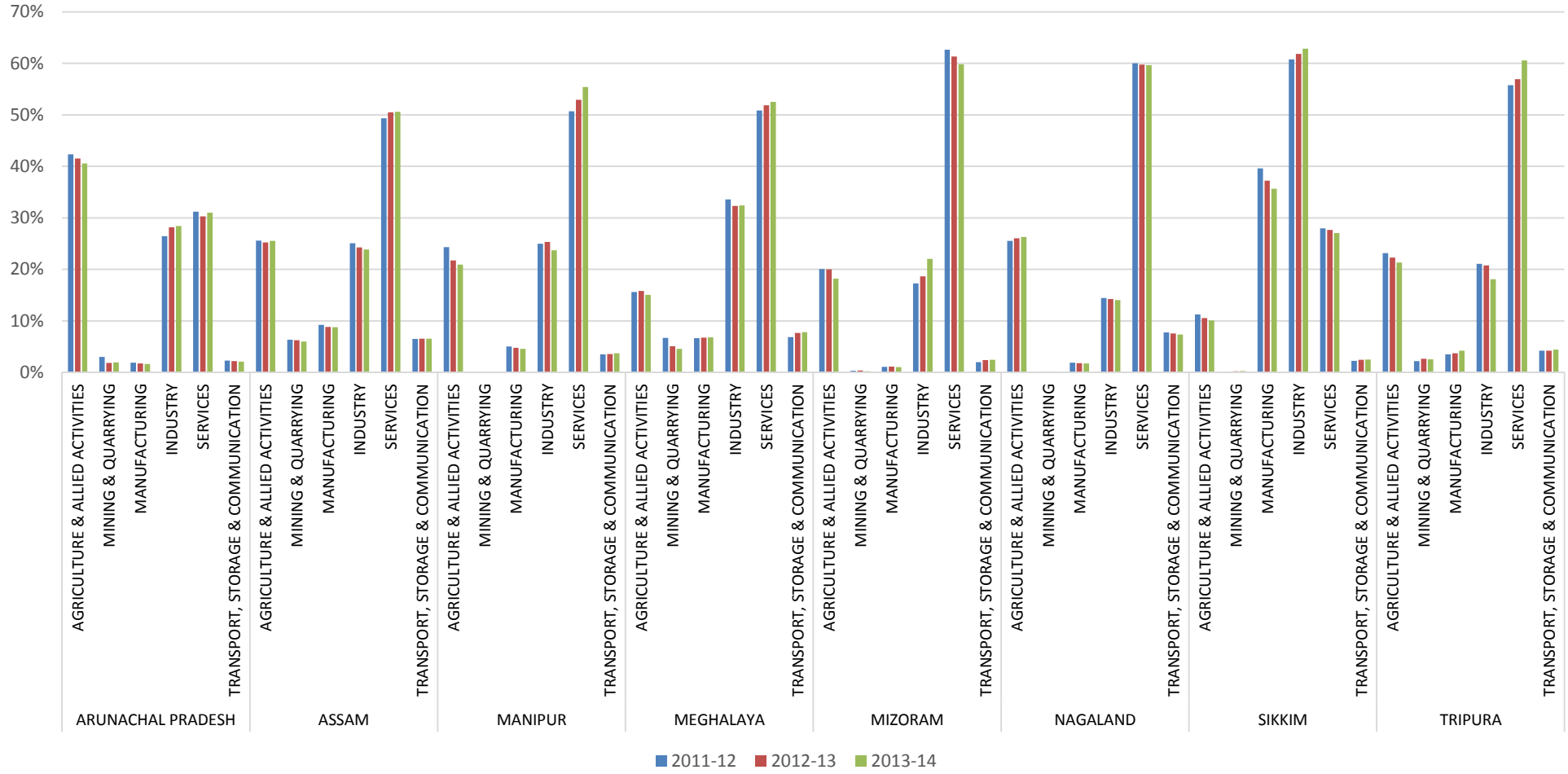
[1]NW1 covers a total of 1,620 km on the river Ganges from Allahabad to Haldia; NW2 covers a total of 891 Km on the river Brahmaputra from Dhubri to Sadiya; and NW6 covers a total of 121 Km on the Barak river from Bhanga to Lakhipur. The stretch between Kolkata to Shilghat via Mongla; Kolkata to Karimganj via Ashugnj; and Karimganj to Shilghat via Ashuganj and Aricha falls under the Protocol on Inland Water Transit and Trade (PIWTT). Thus, any effort to connect NW1 with NW2 and NW16 would not only facilitate greater connectivity and greater cargo movement between NER and rest of India but also promote greater trade and integration between India and Bangladesh.

US$29mn, showing an average growth rate exceeding eight per cent per annum (Katalyst, 2016). Further, Bangladesh export processed fruit items to NER, Rest of India as well as to various South East Asian countries especially, Malaysia and Myanmar.

In this regard, the paper aims to identify agri-horticulture commodities in which cross-border values chains could be established between NER and Bangladesh. Further, the study also attempts to point out how IWT can help promoting better connectivity between NER and Bangladesh thereby helping in creation of time and cost-efficient value chains in select products.

The paper has been divided into nine sections. The first section set the theme of the paper. The second and third section provides an overview of NER's economy, agri-horticulture products grown in the region and existing trade patterns with Bangladesh. The fourth section points out commodities in which potential for creation of value chain exist. The fifth section highlights how NER and Bangladesh could participate in different stages of the value chain. The sixth section underlines the rationale for considering waterways for creating cross-border value chains. The seventh section points out how IWT could ease pressure of cargo traffic from the roadways. The last two sections provide recommendations on how to strengthen cross-border value chains followed by concluding remarks.

Figure 5: Percentage of Different Sectors in the GSDP at Factor Cost by Industry of Origin for the Year for 2011-12, 2012-13 and 2013-14, (at current prices) as on August 01, 2014

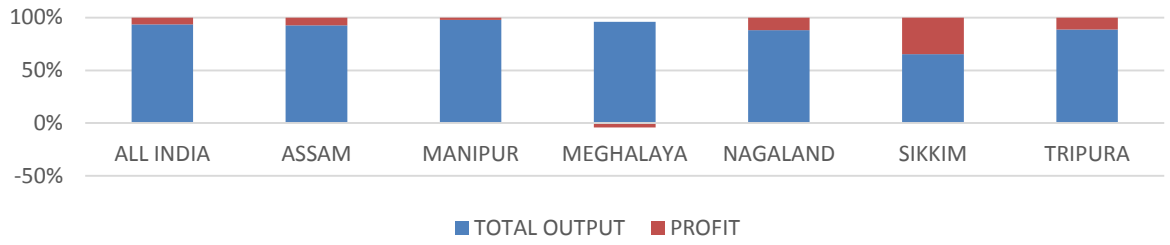


Source: *Basic Statistics of North East Region, NEC, 2015*

An Overview of States in NER

The NER has remained one of the most economically backward regions in India. Geographical challenges posing difficulties in physical connectivity has been one of the reasons for this backwardness. This is rather unfortunate since in the pre-partition India, this has been one of the most prosperous regions in the world and during the British rule, the roadways (through present Bangladesh) and waterways were extensively used for the purpose of trade and commerce.

Figure 6: Estimate of Output per Factory and Profit per Factory for NER *vis-a-vis* all-India Level for 2013-14



Source: *Annual Survey of Industries, Central Statistical Organisation, 2013-14*

Figure 5 shows that the NER has been mostly an agrarian- and services-driven economy, with their relative share in their respective Gross State Domestic Product (GSDP) in the range of 30-40 per cent and more than 50 per cent respectively. However, the share of agriculture and allied activities were found to be less than 10 per cent for Sikkim and Meghalaya. The share of manufacturing is however less than 10 per cent across all the state in the NER. Share of industry in the each of the state's GSDP was found to be in the range of 10 per cent, except for Assam, Arunachal Pradesh and Meghalaya since the relative share of industry in their GSDP was found to be more than 20 per cent. However, NER itself houses only 2.29 per cent of the total factories in operation throughout India (Annual Survey of Industries, 2013-14).

Figure 6 is important to understand the profitability of the operational factories in NER *vis-a-vis* India as a whole. It shows that while profit per factory is highest in Sikkim, it is negative in the case of Meghalaya. Further, the profit per operational factory in Nagaland, Sikkim and Tripura is greater than all India numbers. While the overall performance of industries in the NER, considered in terms of the output and profit

earned per operational factory, is better compared to All India average performance, but the absolute number of units in NER is limited as shown in Table 1.

Table 1: State wise Number of Operational Factories in India and NER

Indicators	All India	Assam	Manipur	Meghalaya	Nagaland	Sikkim	Tripura
Number of Factories in Operation	185690	3283 (2%)	140 (0.08%)	105 (0.06%)	115 (0.06%)	66 (0.04%)	538 (0.29%)

Source: *Annual Survey of Industries, 2013-14*

Note: Figures in Bracket represent the percentage of operational factories of the total number of operational factories in India.

Area, Production and Productivity of Horticulture Products in NER

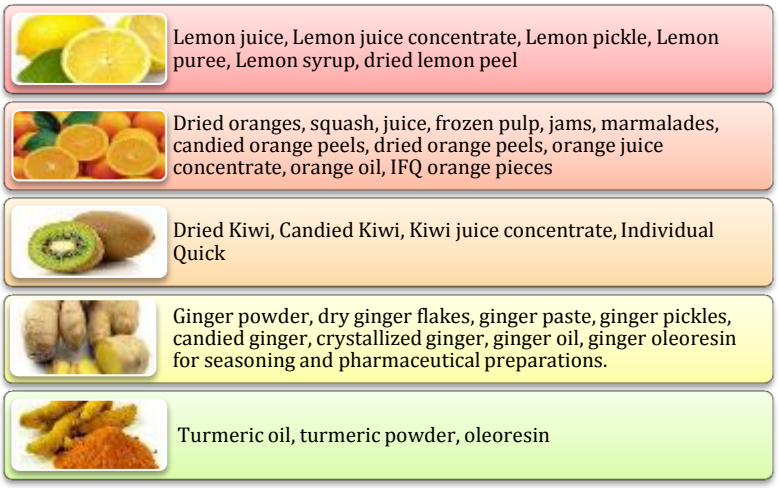
The NER, having suitable agro-climatic conditions, has huge potential for development of export-oriented and high value horticulture products (APEDA, 2017; Rais, Acharya and Vanloon, 2014). As shown in Table 2, compared to the all India figures NER shares only a miniscule amount of the total production of fruits, vegetables and spices. Except for vegetables, in some states, and spices the productivity is significantly lower than the national average.

Table 2: State Wise Area, Production and Productivity of Fruits, Vegetables and Spices in NER during 2013-14

STATE	FRUITS			VEGETABLES			SPICE		
	AREA	PRODUCTION	PRODUCTIVITY	AREA	PRODUCTION	PRODUCTIVITY	AREA	PRODUCTION	PRODUCTIVITY
Arunachal Pradesh	89.10	321.30	3.60	1.40	35.00	25.00	10.20	64.30	6.30
Assam	144.70	2,007.80	13.90	281.40	3,031.90	10.80	93.10	279.10	3.00
Manipur	54.10	515.70	9.50	25.20	271.00	10.80	10.50	24.10	2.30
Meghalaya	35.30	348.00	9.90	43.60	515.30	11.80	17.50	83.90	4.80
Mizoram	57.60	343.90	6.00	41.10	254.10	6.20	22.50	59.60	2.70
Nagaland	40.60	411.00	10.10	38.60	492.40	12.80	9.80	39.20	4.00
Sikkim	16.00	24.10	1.50	26.10	134.50	5.20	32.10	55.80	1.70
Tripura	68.40	786.40	11.50	46.70	780.50	16.70	5.70	18.00	3.20
Total NER	**505.80**	**4,758.20**	NA	504.10	5,514.70	NA	201.40	624.00	NA
All India	**9,396**	**1,62,896**	**17.30**	**9,396**	**1,62,896**	**17.30**	**3,163**	**5,908**	**1.90**

Source: *Indian Horticulture Database, National Horticulture Board, 2014*
Note: *Area measured in '000 HA, Production measured in '000 MT, Productivity measured in MT/HA*

Two major reasons for the low productivity could be attributed to the climatic fluctuations and lack of connectivity with markets. Often the cultivators are apprehensive of producing larger quantities of produce in fear of wastage. Lack of availability of processing unit is another issue that accentuates the problem. However, in spite of these challenges, trade between NER and the neighbouring countries, especially Bangladesh and Myanmar is happening, majorly through the land routes (APEDA, 2017).



Based on a number of factors, APEDA has identified a list of 29 horticulture products that could be potential exports from the NER to the neighbouring countries in the BBIN and ASEAN regions. Out of these 29 horticulture items, this paper considered four commodities – namely, Lemons/Lime; Oranges (Mosambi/Malta variety); Kiwi; and Ginger. In addition, based on CUTS' interaction with some of the leading food processing units in Bangladesh, Turmeric has also been considered.

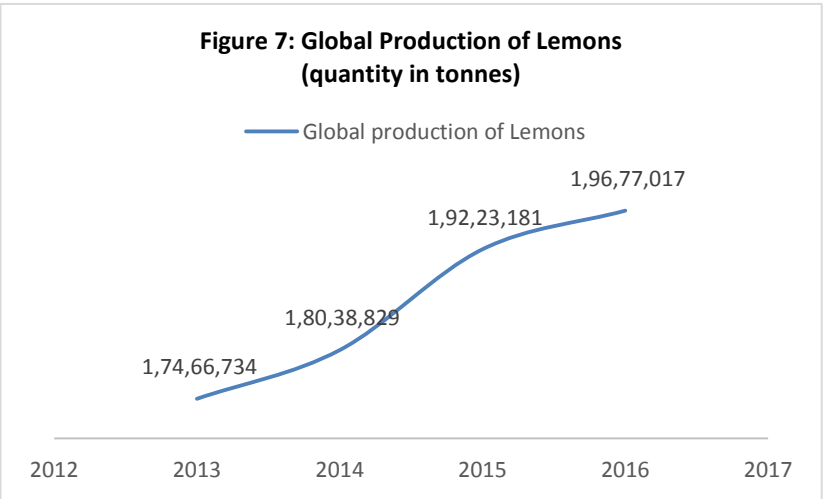
Scope for North East India to Participate in Cross-border Bilateral Value Chain for Select Products[2]

Lemon (HS CODE 080550)

Production Status of the Product in NER

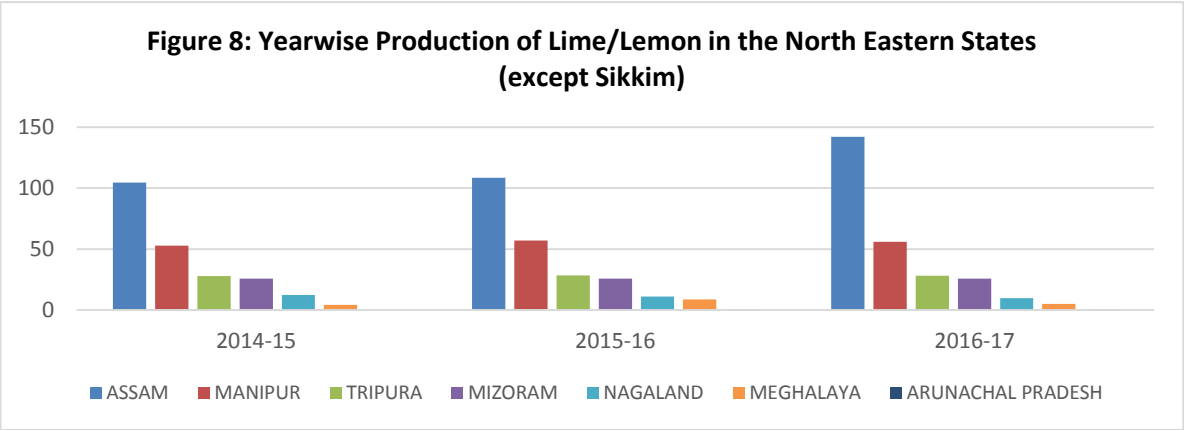
The total world output of lemons increased by 13 per cent between 2013 and 2016. India is the largest producer of lemons and limes in the world accounting for more than 15 per cent of global lemon production in 2016 (FAO Statistics). Mexico, China, Brazil and Argentina are the next biggest producers of lemon. However, despite India being the largest producer of lemons, the yield per hectare for India was well below the international average of 1,15,985 hg/ha (hectogramme per hectare) in 2016 (FAO Statistics, 2016). In India, Assam is the eighth largest producer of Lemon. The NER produced nearly 239.88 thousand metric tonnes in 2016 which is around 10 per cent of India's lemon production. Assam lead (among NER states) in production of lemons followed by Manipur, Mizoram and Tripura (NHB 2017).

Figure 7: Global Production of Lemons (quantity in tonnes)



Source: *FAO Stat, 2013-2016*

[2]Commodities for this paper were selected based on the potential value chains they can create between NER and Bangladesh. For example, PRAN food products export a number of fruit juices to India. The products were selected such that companies like PRAN can procure the raw materials from NER, produce the final products and export to India or to other countries.



Source: *NHB, 2014-2017*

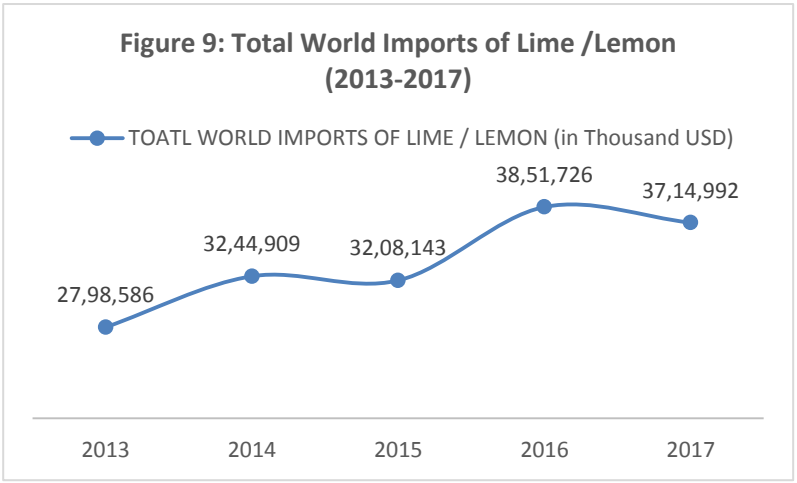
International Market Size for Lemons: Current Trends

There has been a 33 per cent increase in the import of lime/lemon between 2013 and 2017. As shown in Figure 9, the total world import of lemons increased from US$2,800mn in 2013 to US$3,710mn in 2017. US, Germany, Russia, Netherlands and France are the top five importing countries of the product (ITC Trade Map, 2017).

The largest exporters of lemon in 2017 (by value) were Spain, Mexico, Turkey, South Africa and Netherlands (ITC Trade Map, 2017).

Opportunities for Indo-Bangla Trade in Lemons

India holds 24th position in the list of exporters and ranks 142 among the lemon importing countries. Bangladesh, on the other hand, ranks 81 among the list of exporting countries and ranks 125 among the lemon importing countries (ITC Trade Map, 2017).



Source: *ITC Trade Map, 2013-2017*

Table 3, shows the average unit value of exports and imports for India and Bangladesh *vis-à-vis* the world market.

Table 3: A Comparative Analysis of Value of Exports and Imports (per unit) of Lemon between India, Bangladesh *vis-à-vis* the World

Region	Average Per Unit Value of Exports (in US$/Tonne)	Average Per Unit Value of Imports (in US$/Tonne)
World	1007	1083
India	535	1075
Bangladesh	2072	709
Source: *ITC Trade Map, 2017*		

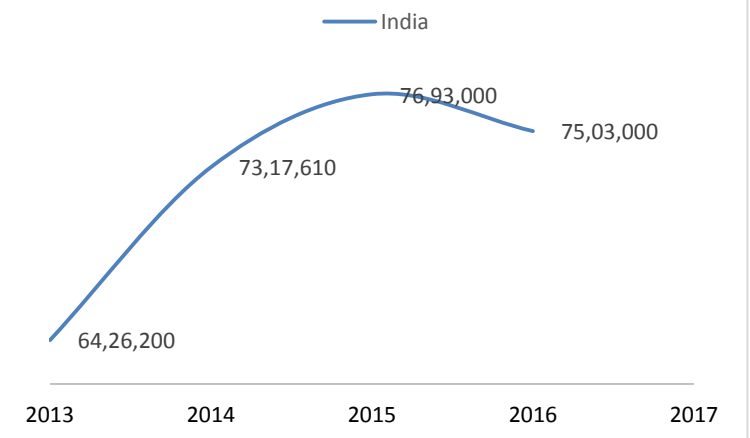
As shown in Table 3, both India and Bangladesh stand to gain from mutual trade in lemons. Bangladesh can benefit by importing lemons from India which offers an average per unit price of US$535 compared to US$709 at which Bangladesh is presently importing. During 2017, Bangladesh imported 134 tonnes of lemon from South Africa. Interestingly, the NER produced 267 tonnes of lemon during the same year and it could have satisfied Bangladesh's import requirement for lemon in a cheaper and time efficient manner.

Orange: Mosambi/Malta (HS CODE 080510)

Overview of the Product

India is the fourth largest producer of orange after Brazil, US and China. Mosambi, Malta, Khasi Mandarin are among the most popular variety of oranges that have significant market demand both in the domestic as well as in the international market. The overall production of oranges in India has grown at the rate of 17 per cent between 2013 and 2016. It is interesting to note that during the same time period the world production of oranges have also increased by only one per cent. Assam, Mizoram and Nagaland are the producers of mosambi/malta in the NER (NHB, 2017).

Figure 10: Production of Oranges in India between 2013 and 2016 (quantity in tonnes)



Source: *FAO Stat (2013-2016)*

International Market Size for Mosambi/Malta: Current Trends

The mosambi/malta varieties have significant demand in international markets, and as per trade data, in 2017, the world witnessed imports of mosambi/malta worth US$5,645mn. India's export of mosambi and malta is higher compared to those of Khasi mandarin (HS Code 080520). France, Netherlands, Germany, China and Russia are the top five importers of mosambi. Spain, South Africa, USA, Egypt and Netherlands are the largest exporters in the world. India ranks 28th among the list of countries exporting mosambi/malta. In 2017, India exported 22,776 tonnes of mosambi/malta and Bangladesh was the largest importer of mosambi/malta followed by Nepal and UAE (ITC Trade Map 2017).

Opportunities for Indo-Bangla Trade in Mosambi/Malta

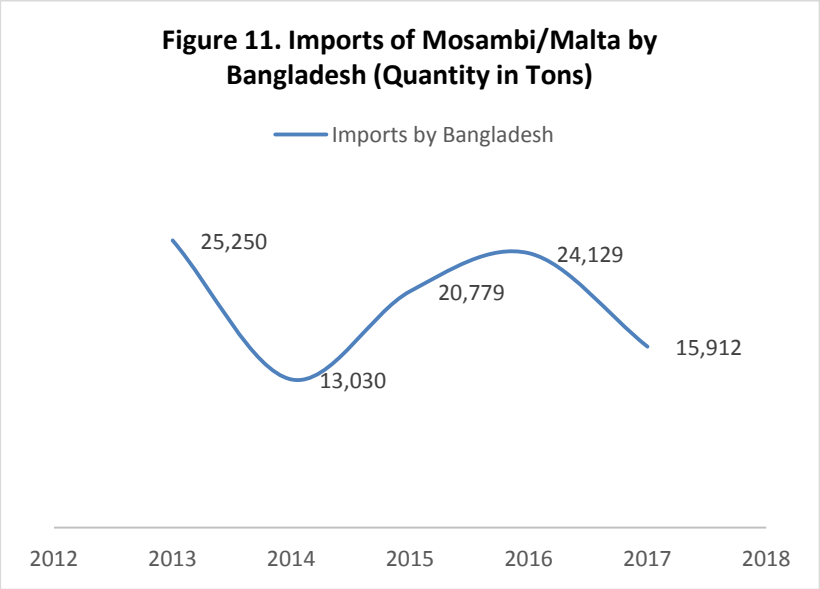


Figure 11. Imports of Mosambi/Malta by Bangladesh (Quantity in Tons)

Source: ITC Trade Map

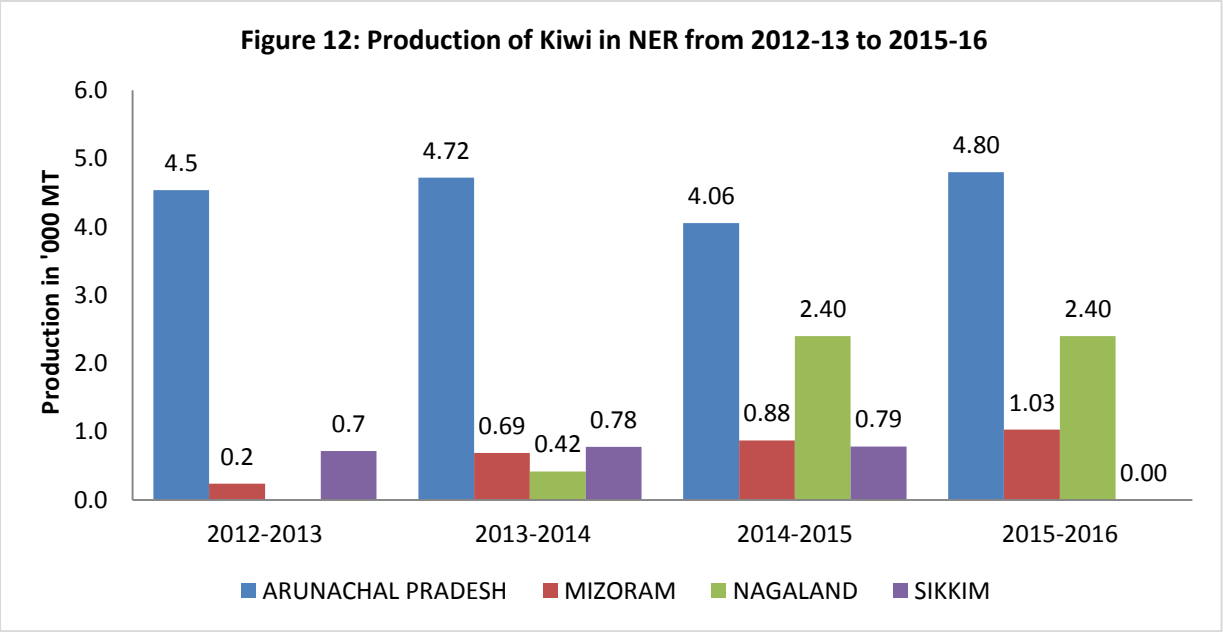
Trade between India and Bangladesh in mosambi/malta is already happening. However, there has been a decline in the export volume for mosambi/malta in 2017 compared to the previous year. One of the reasons for decline has been increase in the import tariff for fresh fruits by Bangladesh (Shrivastav, S, 2017)

Kiwi (HS CODE 080510)

Overview of the Product

Arunachal Pradesh is the highest producer of kiwi in India followed by Nagaland and Mizoram producing 57, 23 and 10 per cent respectively. NER produces around 96 per cent of the total produce in India (NHB, 2017).

International Market Size for Kiwi: Current Trends



Source: *NHB, 2017*

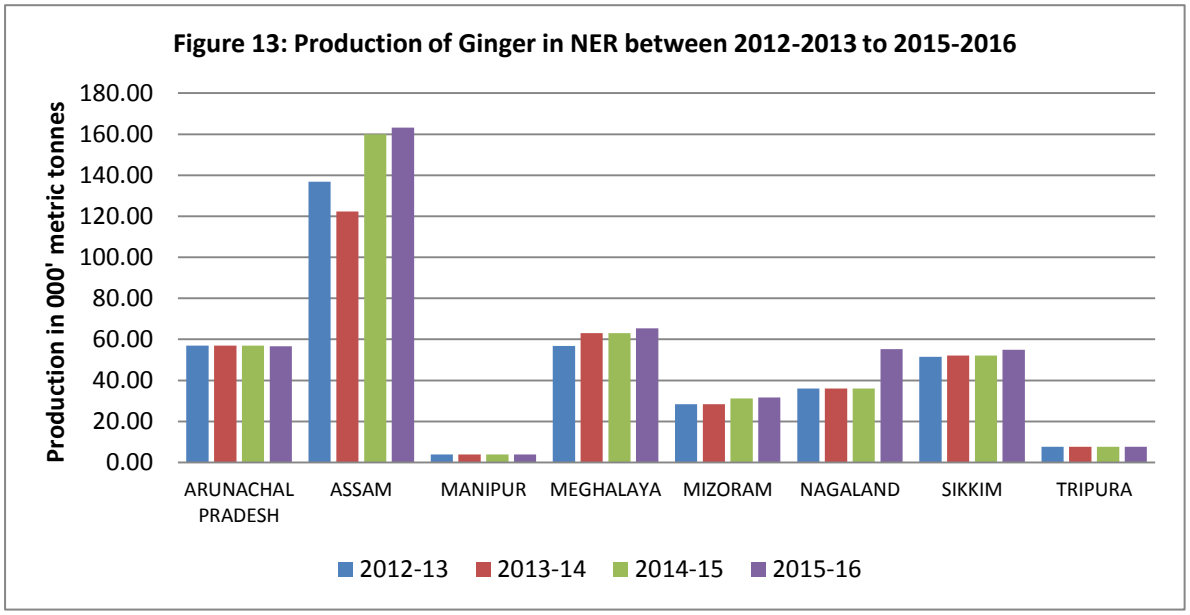
India export kiwi to Maldives, United Arab Emirates and Nepal even though the total volume is negligible. In 2017, the only importer of Indian kiwi was Maldives. India's import represents 1.2 per cent of world imports for kiwi; its ranking in world imports is 19. India imported 2,3310 tonnes in 2017 from Iran, New Zealand, Chile, Italy, Greece, and United Arab Emirates. India ranks 84 in world export of kiwi (ITC Trade Map).

Opportunities for Indo-Bangla Trade in Kiwi

India currently produces about 9,000 metric tonnes and nearly 7,000 metric tonnes of India's production comes from NER (Haider, F, 2017). Nearly 70 per cent of the kiwi produced in NER are wasted annually due to lack of storage and packaging facilities (APEDA, 2017). On the other hand, Bangladesh imported three tonnes from Thailand and United Arab Emirates at the rate of US$2,000 and US$500 per tonne respectively. The average distance of supplying countries is 2,199km for Bangladesh (ITC Trade Map, 2017), whereas, the distance between NER and Bangladesh is 1,129km (Arunachal Pradesh to Dhaka via Sylhet). Bangladesh could have easily imported kiwi from NER for catering to their domestic demand.

Ginger (HS CODE 091011)

Overview of the Product



Source: NHB, 2017

In India, NER leads in production of ginger and it is one of the key agricultural crops those are grown in almost all the states of the NER. This region is one of the area with highest productivity in the world (5.8 tonnes/hectare) as against the national average of 3.7 tonnes/hectare. Moreover, this region is also emerging as India's hub for organic ginger (Rahman, H, R Karuppaiyan, K Kishore and R Denzongpa, 2009). Production of ginger is highest in Assam followed by Meghalaya Arunachal Pradesh, Nagaland, Sikkim, Mizoram (NHB, 2016). The post-harvest loss is estimated to be about 10.5 per cent during handling and transportation (Jha, A K and B C Deka). Among all spices, ginger is the main cash crop supporting the livelihood and improving the economic level of many ginger growers of north eastern region.

International Market Size for Ginger: Current Trends

China, Thailand, and Netherlands are leading exporters of ginger and India is the fifth largest exporter. India's share in world export is only 3.2 per cent for this product. The importers are US, Japan and Netherlands. India's import represents 1.4 per cent of world's import for this product, and its ranking in world imports is 16. Between 2013 and 2017 there has been six and 13 per cent increase in the import of ginger in terms of quantity and value respectively (ITC Trade Map, 2017).

Opportunities for Indo-Bangla Trade in Ginger

Bangladesh is the sixth largest importer of ginger and its imports represent 5.1 per cent of world imports for this product. Bangladesh's major supplying markets are China and

India. However, China's share in Bangladesh's import is 60.78 per cent, whereas India's share is only 9.6 per cent. Interestingly, export price of India is half of China's offer price for Bangladesh (Table 4). In 2017, major importers (by value) of Indian ginger are Morocco and Bangladesh. Between 2013-2017, there was no change in traded volume but the value of ginger traded between India and Bangladesh have increased by 55 per cent.

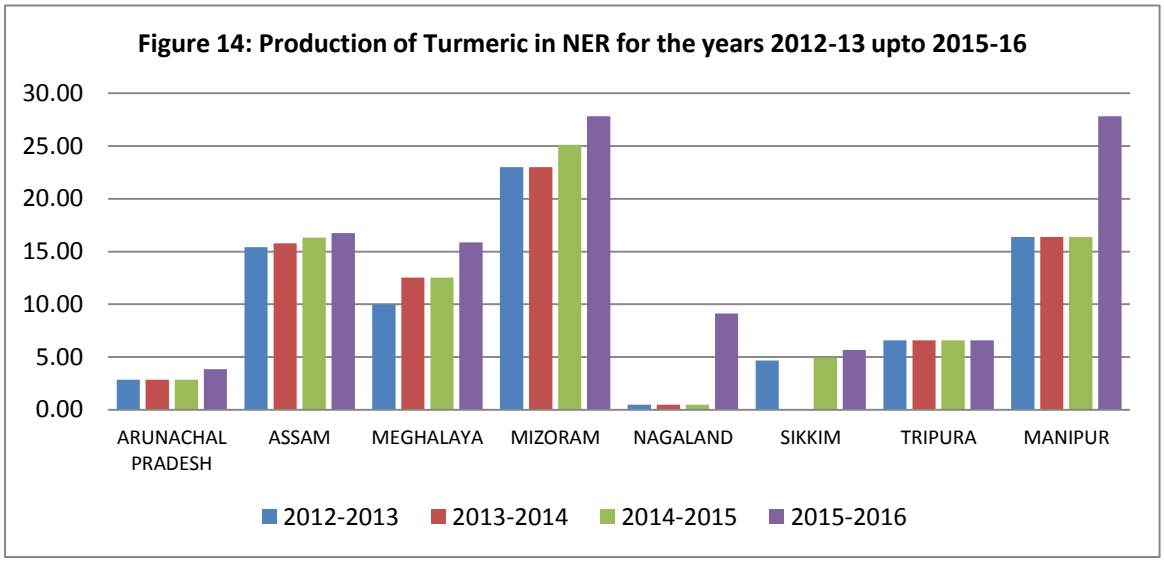
Table 4: Bangladesh's Import Price and Import Quantity of Ginger from its Top Three Supplying Countries (for 2017)

Exporting Country	Import value per tonne in US$	Quantity imported by Bangladesh from partner countries (in tonnes)
China	649	35234
Indonesia	881	8817
India	359	10086
Source: *ITC Trade Map, 2017*		

Turmeric (HS CODE 091030)

Overview of the Product

Similar to ginger, turmeric is also grown in all the states of NER. Production of turmeric is highest in Mizoram followed by Assam, Meghalaya (NHB, 2017). It is the third largest grown crop in this region. Lackadong and Megha are the two highest producing areas yielding superior variety of turmeric, and trials in select states of North East have proved that average yield is around 20-30 tonnes per hectare. They contain high oleoresin and not less than 6.5 per cent curcumin content. (The Hindu, 2011). The local demand being very limited, roughly 70-80 per cent of the total production is reportedly available as marketable surplus from the region (Jha, A K and B C Deka).



Source: *NHB, 2017*

International Market Size for Turmeric: Current Trends

India is both a significant exporter and importer for this product in the international market. India's share in world export and import is 66.6 and 10.4 per cent respectively. India have experienced 15 per cent growth in export value (between the period 2013-2017) and India tops in export of ginger followed by Myanmar and Indonesia. In the year 2017, 159193 tonnes of turmeric was traded internationally. Major importers of ginger are US, India, Iran, UK etc. Major importers of turmeric are US, Saudi Arabia, Germany and Netherlands.

Opportunities for Indo-Bangla Trade in Turmeric

Bangladesh's imports represent 2.3 per cent of world imports for this product; its ranking in world imports is 15. Bangladesh sources its entire turmeric from India and Myanmar. India's share in Bangladesh's import is 73.6 per cent and Myanmar's' share in Bangladesh import is 26.4 per cent. The export value of India (1150 US$/Tonne) is much higher than export value of Myanmar (702 US$/Tonne) (ITC Trade Map, 2017) but Bangladesh imports mostly from India. This could be because of the quality of the Indian turmeric over those from Myanmar.

Table 5 shows states and districts where the maximum production of the select commodities take place.

Table 5: Major Producing Areas for Select Products in NER

Products	States in North East India where these products are majorly cultivated	District where they are cultivated
Lemon	Assam	Dibrugarh, Golaghat, Cachar, Chirang, Nalbari, Dima Hasao, Barpeta, Nalbari
Orange	Assam	N.C. Hills, Kamrup (Rural), Tinsukia, Kamrup (Metro), Karbi Anglong
Kiwi	Arunachal Pradesh	West Kameng, Lower Subansiri
Ginger	Assam	Tinsukia, Golghat, Karbi Anglong, Udalguri, Sonitpur
Turmeric	Mizoram	Saiha, Champhai, Mamit, Kolasib, Serchhip
Source: *Adapted from APEDA (2017)*		

Creating an Integrated Value Chain for Countries to Participate

Value chain comprises of various activities, such as harvesting/production, processing, design, marketing, distribution and support to the final consumers. When these series of activities are executed in different countries based on their specialisation it is called cross-border value chain. Further, in case of value chain the activities may be performed by the same firm in two different countries or shared among several firms. Figure 15 suggests one of the probable value chain links between NER and Bangladesh in the select products.

Activities under Value Chain

Inputs: Cultivation of fruits need various inputs, such as fertilisers, pesticides etc.

Harvesting: Cultivating fruits is labour-intensive compared to cereals so it will give employment opportunity a significant population of NER and offer great opportunities to add value.

Post-Harvest: All fruits exported undergo primary processing. After collecting fruits from cultivators they are sorted, graded and cleaned. Its required products are also either given hot water treatment or frozen. This is done either by the aratdars[3] or exporters. The processors performing primary processing do not have heavy investment in machinery; rather they have basic facility for cleaning and freezing. After that they are packed as per standard, branded and bar codes are applied to distribute the same in local as well as foreign markets. Packaging in this post-harvest stage is very crucial as inappropriate packing and storage may result in high post-harvest loses.

Logistics and transportation: It is one of the key elements in this value chain. It holds special importance for horticulture industry as timely delivery need to be ensured owing to its perishable nature.

[3] A person who owns a warehouse, more specifically, a commission agent for stocking and selling different kinds of agricultural goods.

Major/Secondary Processing Services/ Secondary processing services: In secondary process, fruits are transformed into value added products such as juice, jam, pickles, squashes, concentrates etc. This step involves methods such as cooking, baking, frying, cutting etc; hence establishment of proper processing is required for these activities. The finished products are then containerised for distribution in markets.

Marketing: Maintaining open lines of communication regarding demand preferences in products, quality, packing—and fostering buyer involvement.

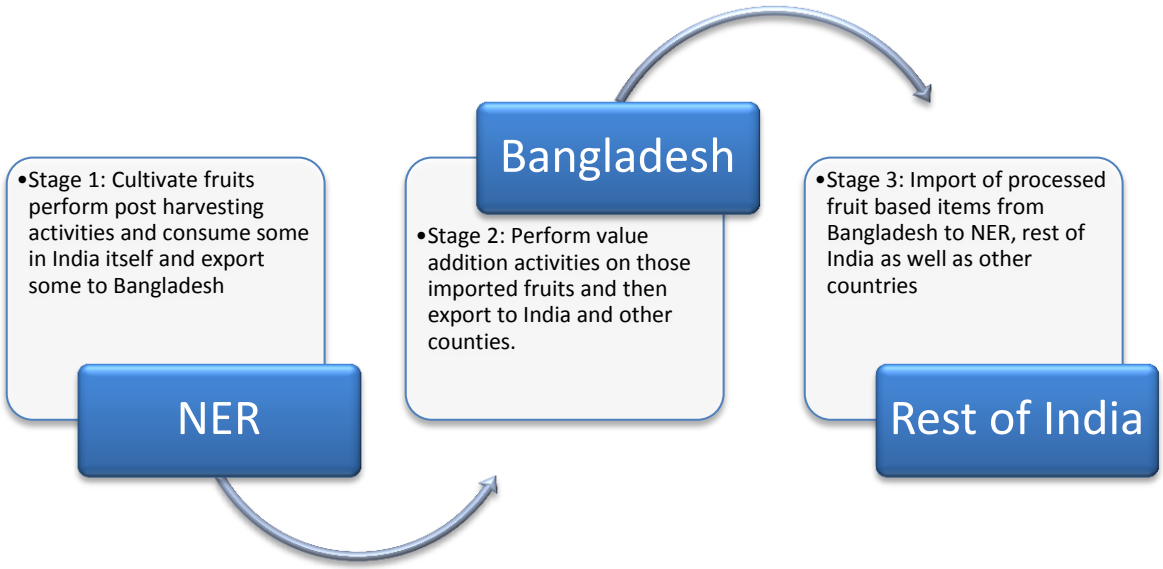


Figure 15: One Probable Value Chain Network between NER and Bangladesh

Such cross border value chain has the scope of generating employment in both NER and Bangladesh at various levels as indicated below. A study conducted by Mohammad, R, S Acharya, G W Vanloonin 2014 estimated that if a product undergoes even primary processing farmer's income will increase by 42.8 per cent per kg. The stages of value addition have been explained below:

Under Stage 1 (Employment opportunities that could be generated in NER)

- Farming activities (cultivation, plucking)
- Primary processing/post-harvest activities (washing, grading, sorting, drying)
- Aggregators: They will collect fruits from farmers and supply them to exporters.
- Logistics (local transport, transport for export, cold storage)
- Retailers
- Exporters

Under Stage 2: (Employment opportunities generated in Bangladesh)

- Logistics (local transport, transport for export, cold storage)
- Secondary processing unit (labourers, technician, scientist)
- Marketing

Under Stage 3 (Employment opportunities generated in both NER, Rest of India and Bangladesh)

- Importers
- Logistics (local transport, transport for export, cold storage)
- Marketing
- Retailers

Rationale for Connecting NER with Bangladesh through IWT

India and Bangladesh share around 4,096.70km long international border, out of which 1,880km is with north-eastern states, namely Assam, Meghalaya, Tripura, and Mizoram. These states in NER, except Meghalaya, share both land and riverine border with Bangladesh, among which Tripura and Mizoram have the longest land and riverine border with Bangladesh respectively (SHEFEXIL, 2011). Out of the total length of the border which NER share with Bangladesh, 35 per cent is by land and around 10 per cent is through riverine tract.

NER is connected to rest of India through a narrow stretch of 22km (called chicken's neck) which encompasses hilly terrain, steep roads and multiple hairpin bands. The distance between Agartala and Kolkata is 1,605km via Shillong and Guwahati whereas, the distance between important cities of Bangladesh and NER is between 20-200 km (FICCI, 2012). While road networks have an advantage of providing last mile connectivity but unfortunately in case of NER poor road conditions have escalated both transportation cost as well as time (Vidyadharan, Veena and Prithviraj Nath, 2017). So, for NER, transporting commodities through IWT could be one of the good alternatives as well as the cheapest way to connect with Bangladesh. It continues to link NER to Bangladesh as well as rest of the India even during flood season, when other modes of transport are severely hindered or not in operation, enabling transport of goods.

Given the challenges in road connectivity between NER and Bangladesh, and a thriving food processing market in the latter, it makes sense to explore possibilities of establishing cross-border value chain between the two to arrive at a win-win situation.

How IWT can help Reduce distance between Production Centres and Nearest Transport Nodes?

Presently, waterways are used only to transport goods like cement, limestone, coal etc. between NER and Bangladesh and over dimensional cargoes (ODCs) constitute bulk of the cargo transported through NW 2. However, according to a recent study undertaken by CUTS International (2018), cotton waste (has a significant demand in Assam and used for manufacturing mattresses) which is imported to Assam from the textile mills of Dhaka (Bangladesh) through roadways can come to Rowmari by road and then take a riverine route to Dhubri. This will not only reduce the cost of transportation but also help transport the cargo within 24 hours. The study also highlighted significant movement of small mechanised boats of capacity 10-50 tonne in lower Assam on the Brahmaputra river. Additionally, the prospects of cross-border trade in perishable products between NER and Bangladesh along the Dhubri (Assam)-Chilmari (Bangladesh) stretch using such mechanised boats were found to be significant.

Box 1: Benefits of IWT

1. Less Fuel Consumption and hence more environment friendly: One litre of fuel can move 105 tonnes by water compared to 24 tonnes by road and 85 tonnes by rail;

2. Lower Cost of Transportation: The cost of moving one tonne of freight over 1 km is Rs1.19 for waterways compared to Rs2.28 by road and Rs1.41 for railways

Source: *World Bank www.worldbank.org/en/country/india/brief/developing-india-first-modern-inland-waterway*

Table 6 does a comparison of distances between the production centres of the fruits from the Land Customs Station (LCS) *vis-à-vis* the waterway terminals. It is evident from the data that on an average 206kms of road travel will be saved if the select products are sent through waterways instead of roadways. The waterway borne consignments could be shipped at Pandu or Dhubri and these consignments can avail the PIWTT and directly reach Ashuganj, near Dhaka, through NW2. From Ashuganj these consignments could be again loaded in trucks and dispatched to their respective destinations. According to representatives of the food processing industries, since most of the big processing units are located near Dhaka, this would take less time than the usual route through land borders.

In case of turmeric, since most of the production zones are in Mizoram and do not have access to waterway transport like Assam, transportation through roadways would be more economical.

The same has been graphically presented in figures 16, 17, 18, 19 and 20. It is evident from the figures that the production centres are closer to the inland ports rather than LCSs and hence it makes economic sense to avail waterways rather than roads. Further, given that most of the roads in NER are still two-lane and are in dilapidated conditions, taking the water borne routes would avoid traffic congestion and unnecessary delays in transporting cargo.

Table 6: A comparative Analysis of Distance between the Production Centres of Select Fruits from nearest LCSs *vis-à-vis* Waterway Terminals

Product	Production Centre	Name of the nearest LCS	Distance from nearest LCS (in kms. approx.)	Name of the nearest Indian port of call	Distance from nearest Waterway terminal (in kms. approx.)	Distance Differential (in kms)
Lemon, Assam	Barpeta	Mankachar	259	Dhubri	164	95
	Golaghat	Sutarkandi	410	Shilghat	124	286
	Cachar	Sutarkandi	84	Karimganj Steamer ghat	72	12
	Dibrugarh	Sutarkandi	588	Shilghat	281	307
	Chirang	Mankachar	230	Dhubri	140	90
	Nalbari	Mankachar	304	Pandu	62	242
Orange, Assam	N.C. Hills	Sutarkandi	179	Karimganj Steamer ghat	166	13
	Kamrup (Rural)	Mankachar	274	Guwahati Steamer Ghat (Pandu)	28	246
	Tinsukia	Shellabazar	545	Silghat	320	225
	Kamrup (Metro)	Mankachar	250	Guwahati Steamer Ghat (Pandu)	19	231
	Karbi Anglong	Dawki	282	Silghat	177	105
Kiwi, Arunachal Pradesh	West Kameng	Mankachar	554	Guwahati Steamer Ghat (Pandu)	303	251
	Lower Subansiri	Mankachar	707	Silghat	284	423
Ginger, Assam	Tinsukia	Shellabazar	545	Silghat	320	225
	Golghat	Dawki	402	Silghat	121	281
	Karbi-Anglong	Dawki	282	Silghat	177	105
	Udalguri	Shellabazar	240	Pandu	93	147
	Sonitpur	Dawki	286	Silghat	25	261
Turmeric, Mizoram	Saiha	Dimagiri	217	Karimganj	519	(302)
	Champhai	Dimagiri	298	Karimganj	389	(91)
	Mamit	Dimagiri	347	Karimganj	158	189
	Kolasib	Raghna Bazar	150	Karimganj	133	17
	Serchhip	Dimagiri	214	Karimganj	306	(92)

Source: *Estimated by authors*

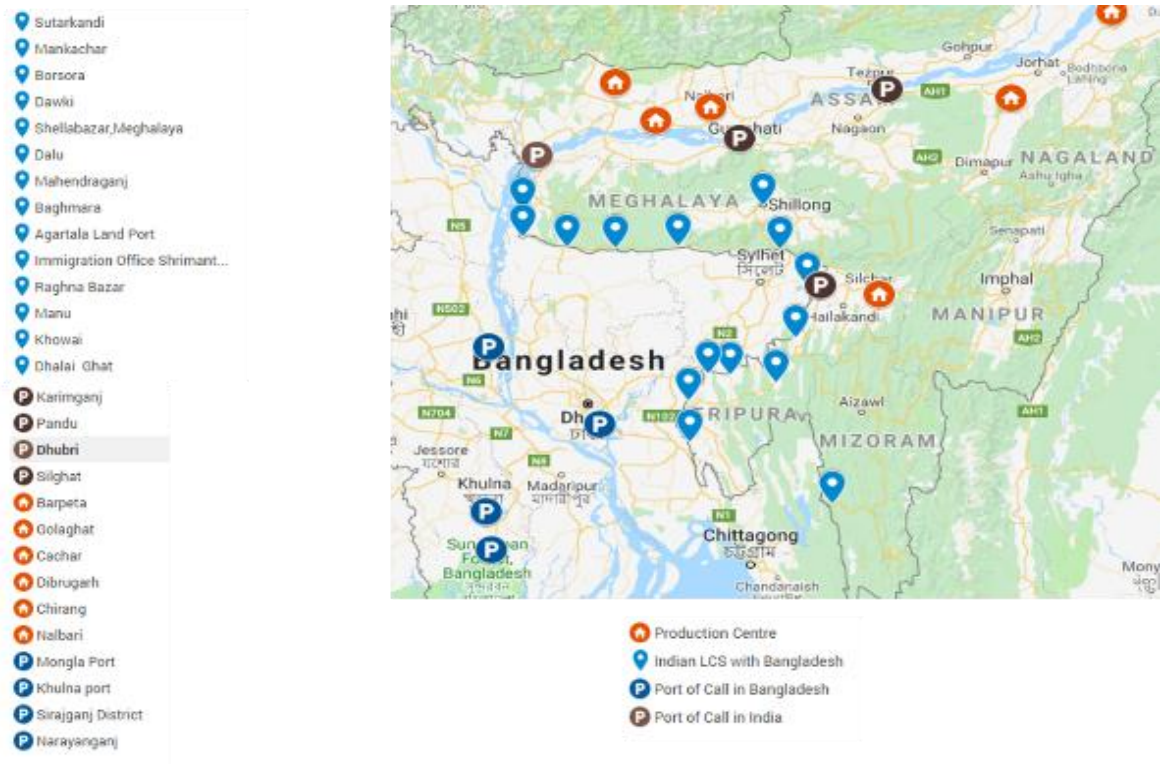


Figure 16: Lemon: Production Centres, Land Customs Stations and Inland Water Ports

Figure 17: Oranges Production Centres, Land Customs Stations and Inland Water Ports

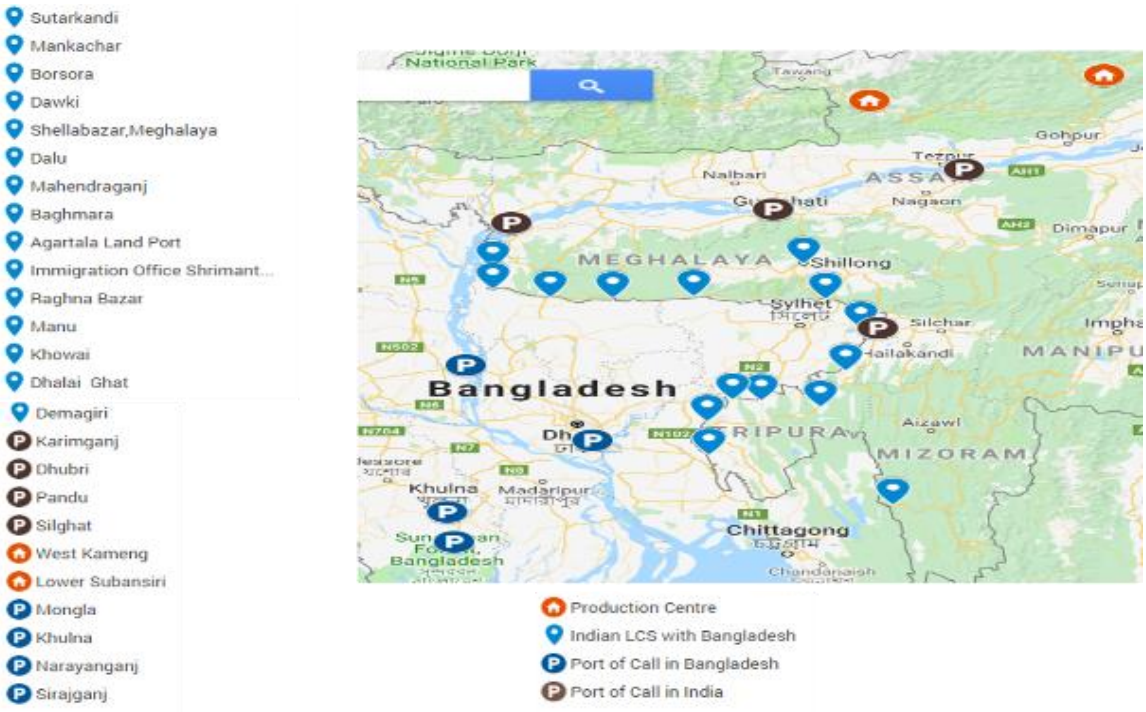


Figure 18: Kiwi Production Centres, Land Customs Stations and Inland Water Ports

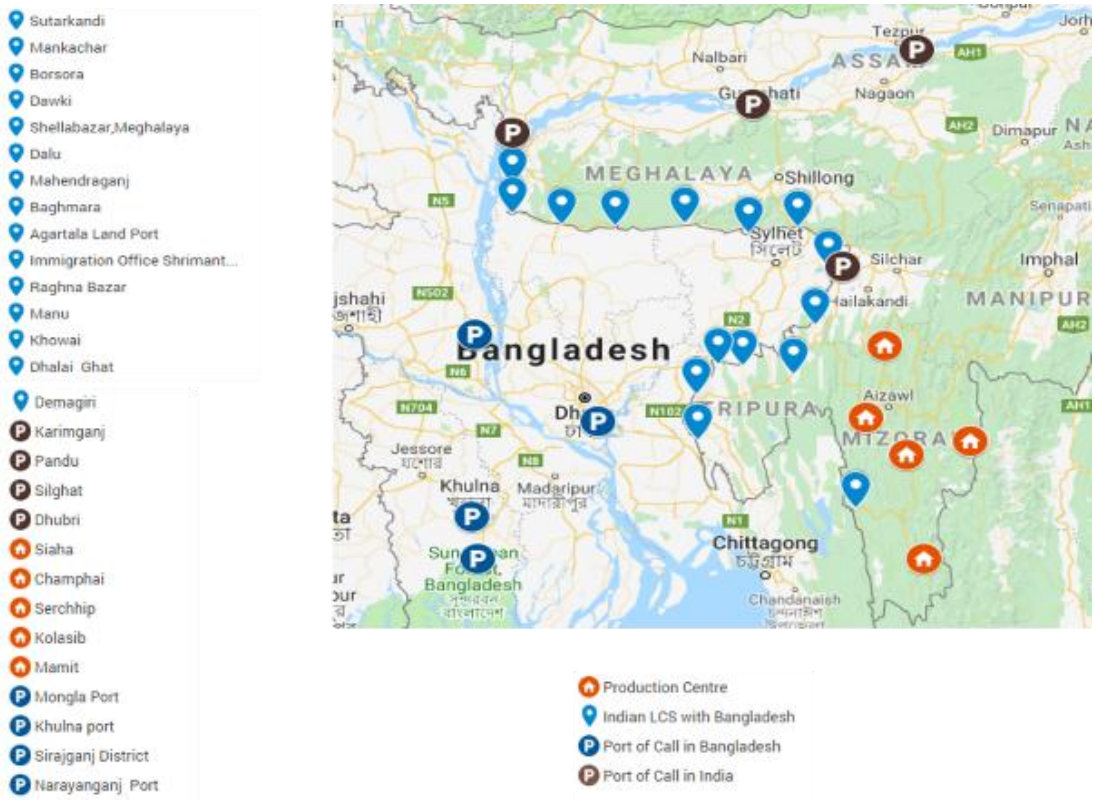


Figure 20: Turmeric: Production Centres, Land Customs Stations and Inland Water Ports

Figure 19: Ginger Production Centres, Land Customs Stations and Inland Water Ports

Note: Figures 16 to 20 has been developed by the authors from Google Maps

Key Challenges and Recommendations to Facilitate Development of Cross-border Value Chain through IWT

- ***Lack of awareness among farmers:*** Farmer's awareness about consumer needs and preferences need to be increased. From the perspective of end-to-end visibility, the processing units in Bangladesh will try to ensure that the standard of raw materials they are going to procure to make processed products are compatible to the standards of the US and European market. In India, farming practices are often not in compliance with international standard. In this respect, farmers' cooperative or self-help group (SHG) play a crucial role by disseminating guideline on standards among farmers. Model such as contract farming or selling to exporters through farmers' cooperative will ensure Good Agriculture Practice (GAP) and other standards.

- ***Poor procurement:*** The sheer numbers of unorganised players are involved in the stages of procurement of fresh fruits and vegetables from farmers and delivery to the processing units. This not only make farming unviable for farmers due to low selling price but also make implementation of quality and safety norms difficult. Direct linkage between processing players and farmers will not only ensure good price for farmers but also ensure enough marketable surplus and delivery of quality product to the processing units.

- ***Poor supply chain infrastructure:*** Limited infrastructure not only increases supply chain wastage but also reduces quality and nutrition levels of foods. A large portion of fruits and vegetables are damaged due to short shelf life. The losses during transportation has been estimated to be nearly three per cent and at wholesaler and retailer level, the loss is about two per cent (APEDA, 2017). Avoiding these would require setting up cold chain facilities right from the farm level till the commodity is either consumed or processed. To this end, availability of warehousing and cold storage facilities at inland waterway ports is imperative.

- ***Coordination among stakeholders:*** Fruits are perishable as well as fragile in nature, thus this industry requires high degree of coordination between different actors along the chain.

- ***Upgradation of processing units:*** Bangladesh need to upgrade processing, packaging as well as processing segment based on market need for being able to export their product to developed countries as this is a buyer-driven value chain. Processing standards need to be aligned per under international standard for being able to participate in the regional value chain.

- ***Lack of Plant Quarantine (PQ) facility in NER delays delivery and increases cost:*** In NER, only few National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited labs are present and nearest FSSAI notified labs are in Kolkata. Thus there is a need for establishing such facilities near the border for to reduce at-the-border clearance time.

Conclusion

The transition from Look East Policy to Act East Policy kick started a number of initiatives to develop the NER, primarily owing to its geo-strategic advantages. The NER is the gateway to ASEAN region and is also close to Bangladesh. Connectivity initiatives are likely to boost India-ASEAN and Indo-Bangla trade and economic integration.

The East West industrial corridor, the India-Myanmar-Thailand Trilateral Highway, The Asian Highways are some of the initiatives to better connect both India and Bangladesh with ASEAN via NER. To boost air connectivity between NER and its neighbouring countries, the Government of India have constructed airports at strategic locations and is planning to start regular flights between Guwahati in Assam to Dhaka and Singapore. The initiative to connect every state capital via railways and reviving the historical cross-border rail routes between India and Bangladesh are expected to further boost trade, connectivity and hence economic integration with the NER. However, while these initiatives are important, but they are extremely capital-intensive and would take significant time to become operational.

Between India and Bangladesh, the PIWTT is already operational and both the countries are committed to develop connectivity via waterways. Both countries have agreed to declare Kolaghat in West Bengal and Chilmari in Bangladesh as new 'Ports of Call'. The new arrangement will facilitate movement of fly ash, cement, construction materials etc. from India to Bangladesh through IWT on Rupnarayan river. Possibilities of starting river cruise services between Kolkata-Dhaka and Guwahati-Jorhat and back was also discussed and the initiative is likely to come through soon.

To bring about significant reduction in logistics cost and faster delivery of Bangladesh export cargo, Indian side raised the point regarding permitting 'Third country' EXIM Trade under Coastal Shipping Agreement and PIWTT by allowing Transhipment through Ports on the East Cost of India. Both sides agreed for development of Jogighopa as a hub/trans-shipment terminal for movement of cargo to Assam, Arunachal Pradesh, Nagaland and Bhutan.

Overall, the initiatives undertaken by governments in both India and Bangladesh are encouraging and testifies for the political willingness to improve connectivity. However, to sustain the present efforts and ensure long-term gains from efforts, it is necessary that countries also take appropriate steps to enhance regulatory, financial and digital connectivity so that businesses can efficiently coordinate and manage all operations involved at various stages in a value chain.

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