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Assessing the Port Cargo: Present and Future Scenarios

Seaports play an important role in the transportation of trade, and cultural exchange. In recent years, regional integration and connectivity initiatives between India's NER and Bangladesh have gained traction. There has been a noticeable spike in strategic and economic interests in Bay of Bengal. Greater engagement in the maritime sector is likely to promote sustained growth, strengthen connectivity and unlock the transportation linkages of India's landlocked NER via Bangladesh. Access to ports in Bangladesh for global trade may end NER's land-lockedness. Therefore, better understanding of the ports of Bangladesh will help the NER in promoting port-centric development.

1. NER and Bangladesh Growth Potential

Over the years, trade, connectivity and infrastructure development have significantly improved between India and Bangladesh. However, large trade gaps still exist between them. To narrow the trade gap, the Comprehensive Economic Partnership Agreement (CEPA) has been suggested as it may create a game-changing shift in the NER-Bangladesh relation in terms of opening up new economic opportunities, including multi-modal connectivity, new markets and deepening cooperation and partnership in the eastern South Asian subregion.

The port capacity in Bangladesh and India will depend on the growth and value of the GDP. Here, we estimate the future GDP of India and Bangladesh in current US\$ till 2050. We first estimate the GDP of India, Bangladesh and NER states till 2050 based on the linear forecast model in business as usual condition and next, we add the GDP of NER states (including West Bengal) with Bangladesh GDP (Figure 1).¹ The forecast indicates India is anticipated to become an US\$ 6 trillion and US\$ 10 trillion economy by 2035 and 2050, respectively, ceteris paribus.² Similarly, Bangladesh is expected to become an US\$ 1 trillion and US\$ 1.5 trillion economy by 2040 and 2050, respectively.³ With enhanced connectivity between NER and Bangladesh, Bangladesh and NER together are anticipated to become an US\$ 2.1 trillion economy by 2050. This anticipated economic rise also has several implications for the NER and Bangladesh, particularly Tripura.⁴

First, with rise in income and enhanced connectivity, trade costs may eventually decline, thereby expediting the movement of goods and services across borders;

Second, trade will grow, leading to greater integration and growth of the region, provided countries show serious interests to the integration and undertake essential reforms;

Third, Bangladesh may become an economic hub in the eastern South Asia with higher profile in regional trade, multi-modal connectivity, transit and logistics networks; and

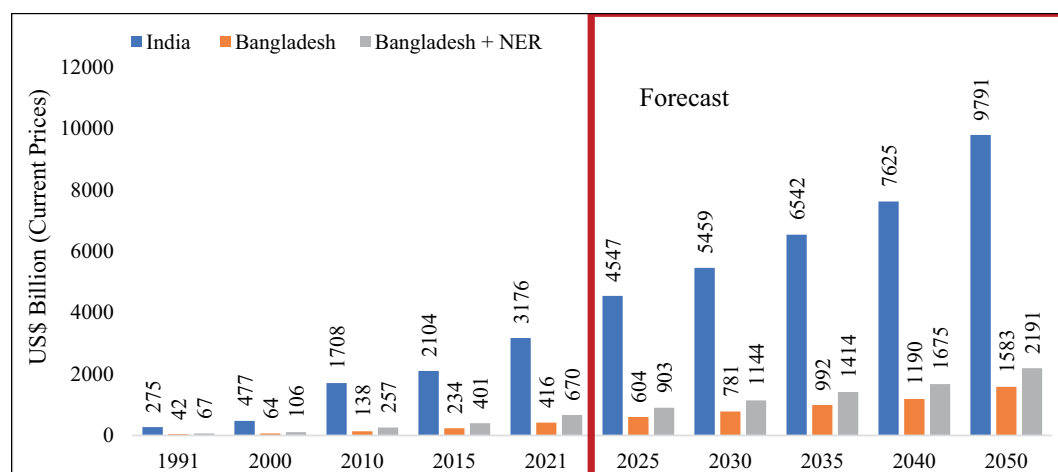
Fourth, maritime access and economic size reinforce each other greatly — better connectivity could lead to higher income in the NER and Bangladesh.

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2. Actual and Potential Cargo and Container Traffic of Ports in India

Indian ports and shipping industry has been playing a pivotal role in sustaining growth. The cargo at 12 Indian major ports has been showing a rising trend.⁵ The total export and import cargo at the ports have increased from 914 million tonnes in 2012 to 1,250 million tonnes in 2021 (Figure 2). To forecast the

Figure 1: GDP Forecast of India, Bangladesh and Bangladesh Plus NER



Source: Calculated Based on World Economic Outlook Database, IMF and RBI

export and import cargo, total cargo and container cargo in ports of India, first, we estimate India’s export, import, total cargo and container cargo against India’s GDP based on a linear regression model (see Appendix 2). Next, we assume India’s GDP to grow at 6.7 per cent till 2025, 6 per cent till 2030, 5 per cent till 2040 and 4 per cent till 2050 and using the multiplier to get forecasted values of port traffic till 2050.

According to the port traffic forecast, export cargo to be handled at Indian ports is anticipated to increase from 408 million tonnes in 2021 to 589 million tonnes in 2030 and 899 million tonnes by 2050, respectively, ceteris paribus (Figure 2). Similarly, import cargo to be handled at Indian ports is anticipated to increase from 842 million tonnes in 2021 to 1,419 million tonnes in 2030 and 2,001 million tonnes by 2050, respectively (Figure 2). The analysis shows that import cargo will increase at a higher rate than export cargo at the Indian ports.

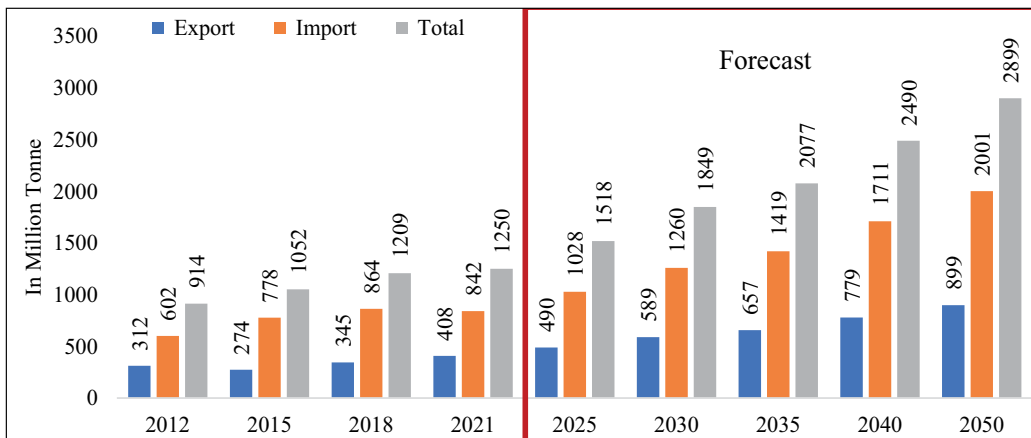
The total cargo to be handled at Indian ports is expected to increase from 1250 million tonnes in 2021 to 1849 million tonnes in 2030 and 2899 million tonnes in 2050, respectively (Figure 2). According

to the forecast, container traffic at Indian ports is expected to increase from 7,983,889 TEUs in 2021 to 10,255,094 TEUs by 2030 and 13,670,118 TEUs by 2050, respectively (Figure 3).

The Indian government has been playing an important role in supporting the maritime sector by providing various fiscal and non-fiscal incentives for improving port capacity and developing and maintaining ports in India. For example, the government has extended a 10-year tax holiday to port operators. The government has also allowed 100 per cent FDI under the automatic route for port and harbour construction and maintenance projects. In addition, India has launched the Maritime India Vision 2030 in 2021, which has identified over 150 initiatives covering all facets of the country’s maritime sector.

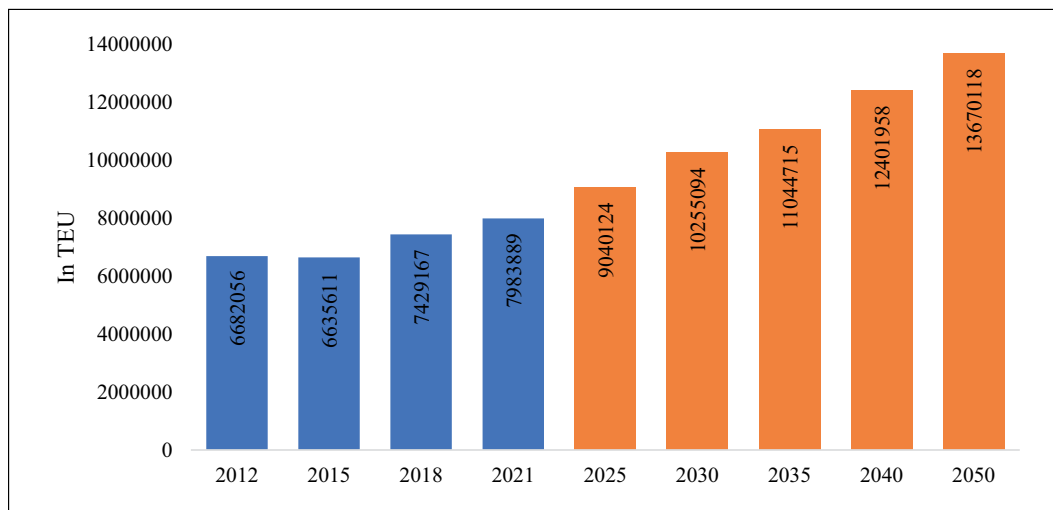
For the ease of doing business, Indian ports have established port community system, logistics data bank, direct port delivery and direct port entry facilities, which have reduced the cost and dwell-time of cargo clearance in ports. To expedite the customs clearance process, the ports have deployed container scanner, procured advance

Figure 2: Forecast of Export and Import Cargo in Ports of India



Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India

Figure 3: Forecast of Container Traffic in Ports of India



Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India

equipment and digital solutions and initiatives. Radio Frequency Identification (RFID) tags are also being used to track and identify the cargo in ships.

3. Actual and Potential Cargo and Container Traffic of Ports in Bangladesh

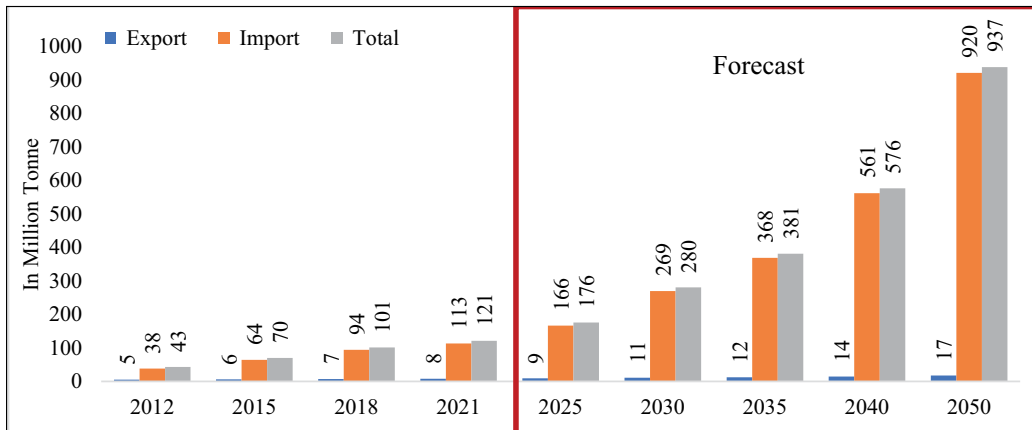
Sea transportation plays a vital role for economic activities in Bangladesh. Despite the Covid-19 pandemic, the export and import cargo in Bangladesh increased from 7 and 94 million tonnes in 2018 to 8 and 113 million tonnes in 2021, respectively (Figure 4). To forecast the export and import cargo, total cargo and container traffic in ports of Bangladesh, first, we estimate Bangladesh's export, import, total cargo and container traffic against Bangladesh's GDP based on a linear regression model (see Appendix 2). Next, we assume Bangladesh's GDP to grow at 8 per cent till 2030, 7 per cent till 2040 and 6 per cent till 2050 and use the multiplier to get projected values of port traffic till 2050.

According to the port traffic forecast of this study, export cargo to be handled at Bangladesh ports is anticipated to increase from 8 million tonnes in 2021 to 11 million tonnes in 2030 and 17 million tonnes in 2050, respectively (Figure 4). Similarly, import cargo traffic to be handled at Bangladesh ports is anticipated to increase from 113 million tonnes in 2021 to 269 million tonnes in 2030 and 920 million tonnes in 2050, respectively (Figure 4). Import cargo traffic will continue to dominate the cargo profile at Chattogram and Mongla ports.

The forecast of container cargo indicates that container traffic at Chattogram Port and Mongla Port is expected to increase from 4,332,778 TEUs in 2021 to 6,049,693 TEUs in 2030 and 9,707,404 TEUs in 2050, respectively (Figure 5). The rise in export and import cargo has several implications for trade in the region. The construction and modernization work are underway to enhance the capacity and efficiency of handling capacity of the ports. However, due to the restriction of area expansion in its present location, this is not possible in case of Chattogram Port. Besides, siltation in Karnaphuli River has

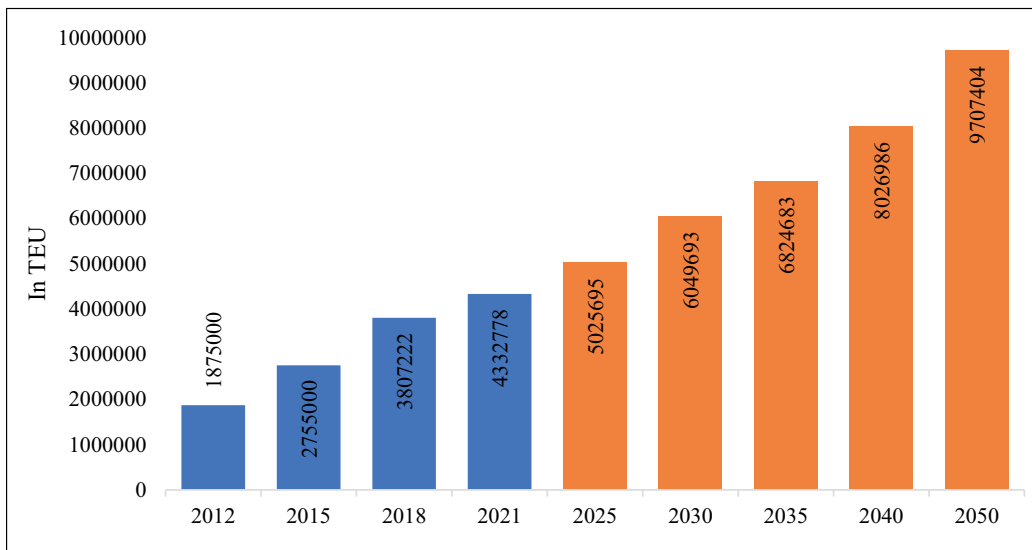
Siltation in Karnaphuli River has forced the Bangladesh to construct a Deep Sea Port (DSP) further downstream to meet the future demand of international trade.

Figure 4: Forecast of Export and Import Cargo in Ports of Bangladesh



Source: Calculated Based on Data from Chattogram and Mongla Port Authorities, Bangladesh

Figure 5: Forecast of Container Traffic at Ports of Bangladesh



Source: Calculated Based on Data from Chattogram and Mongla Port Authorities, Bangladesh

forced the Bangladesh to construct a Deep Sea Port (DSP) further downstream to meet the future demand of international trade.

As a result, Bangladesh is setting up its first DSP at Matarbari with Japanese assistance. The DSP is expected to strengthen the port logistics capacity of Bangladesh, thereby contributing to the acceleration of logistics with neighbouring countries. The 18-meter-

deep port under construction at Matarbari in Maheshkhali Upazila of Chattogram will play an essential role in reducing the cost of international goods. The DSP will support Bangladesh's elevation to the developing world and build strong maritime connectivity to facilitate Bangladesh's global trade and also strengthen regional connectivity in the neighbourhood.

4. Actual and Potential Port Cargo in Bangladesh Plus NER

To forecast the export and import cargo as well as total cargo and container cargo of ports in Bangladesh plus NER states, we first estimate the export and import cargo, total cargo and container cargo to be handled by ports of Bangladesh against Bangladesh GDP till 2050 based on a linear regression model (discussed in Section 3). Next, we estimate the export and import cargo, total cargo and container cargo to be handled by Kolkata/Haldia Port (representing NER states cargo and container traffic)⁶ against NER states GDP (including West Bengal) till 2050 based on a linear regression model (see Appendix 3) and then we add the forecast estimates of the Bangladesh Ports and Kolkata/Haldia Ports to get the export and import cargo, total cargo and container traffic to be handled for the combined region of NER and Bangladesh.

The port cargo forecast of this study shows that export cargo of Bangladesh ports is anticipated to increase to 9 million tonnes in 2025, 14 million tonnes by 2040 and 17 million tonnes by 2050, whereas export cargo of NER ports is anticipated to increase to 17 million tonnes in 2025, 21 million tonnes by 2040 and 33 million tonnes by 2050 (Table 1). The export cargo for the NER+Bangladesh

region is projected to increase to 27 million tonnes in 2025, 43 million tonnes by 2040 and 51 million tonnes in 2050, respectively, *ceteris paribus* (Figure 6). Similarly, import cargo traffic for the NER is anticipated to increase to 56 million tonnes in 2025 to 104 million tonnes by 2040 and 125 million tonnes by 2050. The import cargo traffic to be handled for the NER+Bangladesh region is anticipated to increase to 222 million tonnes in 2025 to 665 million tonnes by 2040 and 1,045 million tonnes by 2050, respectively (Figure 6). The projected values show that Bangladesh ports would be handling more of import cargo, whereas Indian ports would be handling more of export traffic (Table 1). The analysis of this study indicates that the export cargo to be handled by the ports in the NER+Bangladesh region is expected to be more than twice the export cargo to be handled by Bangladesh in 2025 and 2030, respectively. Similarly, the import cargo to be handled by the ports in the NER+Bangladesh region is expected to rise significantly, compared to Bangladesh alone. Therefore, export cargo to be handled for the NER+Bangladesh region shows a substantial rise as compared to import cargo to be handled by the ports of the region.

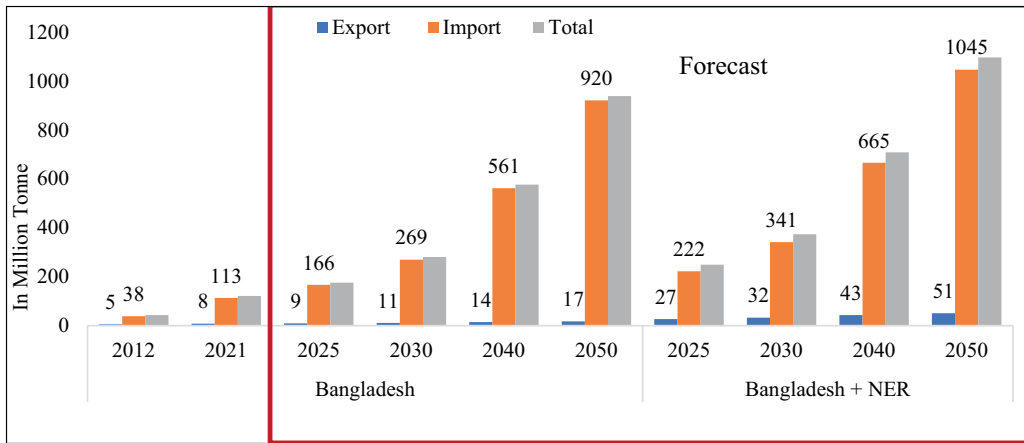
The total cargo projections of the ports in the NER+Bangladesh region are anticipated to increase to 411 million tonnes by 2030 and 1,308 million tonnes by 2050, respectively (Figure 7). The forecast of container traffic to

Table 1: Forecast of Export and Import Cargo of Ports of Bangladesh Plus NER

Country/ Region	Export Cargo (Million Tonne)						Import Cargo (Million Tonne)					
	2012	2021	2025	2030	2040	2050	2012	2021	2025	2030	2040	2050
India	312	408	490	589	779	899	602	842	1028	1260	1711	2001
Bangladesh	5	8	9	11	14	17	38	113	166	269	561	920
NER	13	14	17	21	29	33	27	44	56	71	104	125
Bangladesh+NER	18	22	27	32	43	51	65	157	222	341	665	1045

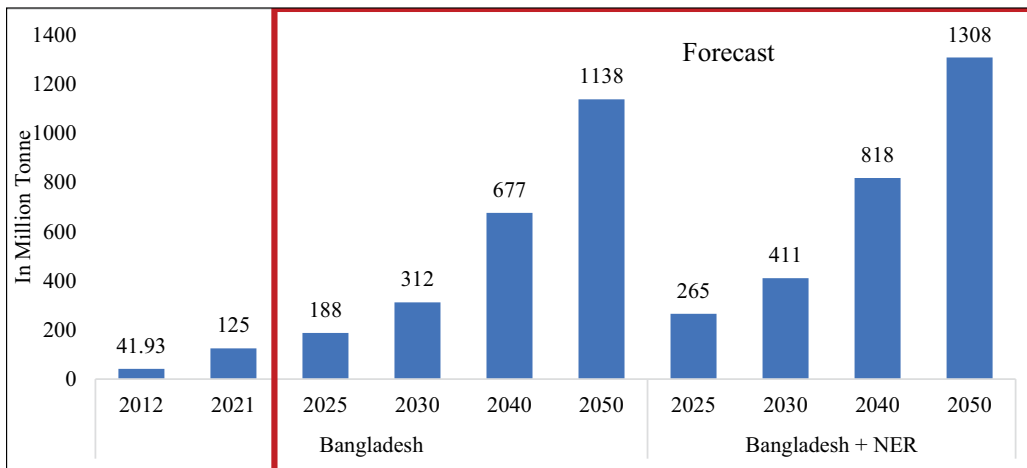
Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India and Chattogram and Mongla Port Authorities, Bangladesh

Figure 6: Forecast of Export and Import Cargo Traffic of Ports of Bangladesh Plus NER



Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India and Chattogram and Mongla Port Authorities, Bangladesh

Figure 7: Forecast of Cargo Traffic in Ports of Bangladesh Plus NER



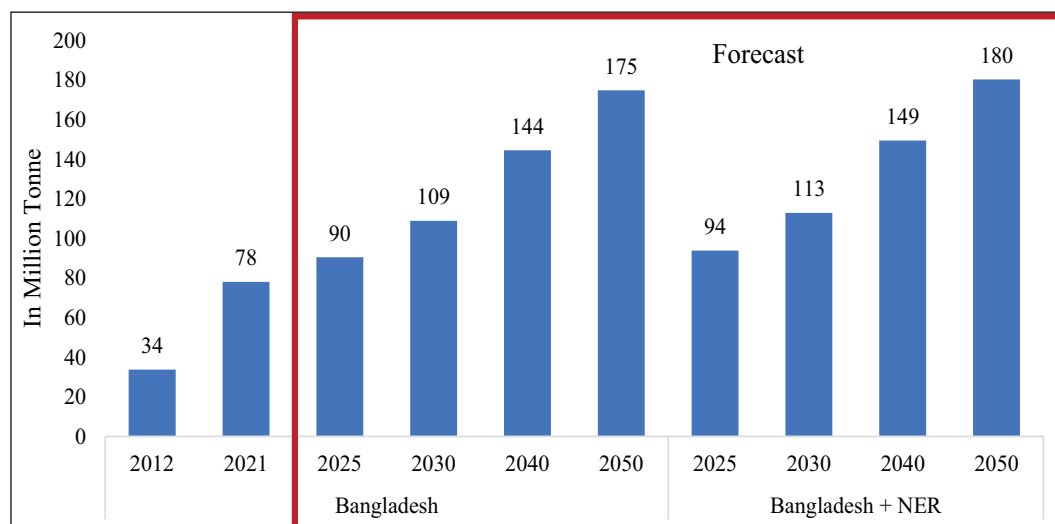
Note: See Appendix Table 1 for Detailed Simulations

Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India and Chattogram and Mongla Port Authorities, Bangladesh

be handled by the ports of NER+Bangladesh region is expected to increase to 94 million tonnes in 2025 to 113 million tonnes by 2030 and 180 million tonnes by 2050, respectively (Figure 8). The forecast results for the ports in the NER+Bangladesh region indicate that the cargo and container traffic are expected to increase significantly in the coming years.

The expected rise in port cargo has several implications for connectivity, trade and investment between the NER and Bangladesh. The region possesses tremendous growth potential. To reap the benefits arising from the expected economic growth in the NER-Bangladesh region, both India and Bangladesh shall make joint efforts to

Figure 8: Forecast of Container Traffic in Ports of Bangladesh Plus NER



Note: See Appendix Table 2 for Detailed Simulations

Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India and Chattogram and Mongla Port Authorities, Bangladesh

strengthen the economic linkages. Here are some suggested options.

First, the upcoming Matarbari DSP in Bangladesh has the potential to become a regional hub for industrial value chains connecting Northeast India through Tripura. Once the Matarbari DSP becomes operational and connectivity improves, majority of the items presently being imported through Kolkata/Haldia Port might be shipped through the Matarbari DSP.

Second, widening the scope of the India-Bangladesh Bilateral Agreement for the use of the Chattogram and Mongla Ports (ACMP) and Protocol of Inland Water Trade and Transit (PIWTT) to allow India for third-country trade via Bangladesh as transit will not just facilitate trade through upcoming Sabroom ICP to Chattogram port and/or upcoming Matarbari port, but also reduce time and logistics costs. Third-country trade will not just boost upcoming industries in Tripura and other parts of the NER, it will also enhance trade and strengthen the supply chains.

Third, expanding Coastal Shipping Agreement of 2015 will facilitate third-country trade via Bangladesh. Therefore, amending the transshipment agreement for third-country trade will be beneficial for both countries as it may reduce transportation cost.

Fourth, implementing the India-Bangladesh Comprehensive Economic Partnership Agreement (CEPA) is expected to enhance bilateral trade with removal of non-tariff measures and port restrictions, re-opening of border haats, harmonisation and mutual recognition of standards and upgradation of trade infrastructure. Overall trade volume will rise between the two countries, thereby benefitting both.

5. Conclusions

Seaports serve as a catalytic force to enhance trade and economic development, which in turn assures prosperity of a country or region. This happens in a mutually reinforcing manner. Maritime transportation has been playing a vital role in reshaping both India

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and Bangladesh's trade as well as growth. The total cargo and container traffic handled by the ports in India and Bangladesh have increased substantially in the last decade. To meet the future demand of cargo transportation, there has been high pressure on the existing capacities of ports in the region. The cargo and container traffic forecasts for the ports in India and Bangladesh show a more than two-fold rise in maritime cargo in the coming

years. Therefore, development of Matarbari DSP in Bangladesh along with other ports and terminals in Bay of Bengal is an imperative for rejuvenating the regional connectivity. To facilitate the port-led growth, India and Bangladesh may undertake bold and futuristic initiatives to strengthen border infrastructure, multi-modal transportation and reformed policies including soft infrastructure. Gains are enormous for the NER.

Appendix 1

GDP Forecast Model

To estimate the potential growth of India's Northeast Region (NER) and Bangladesh, we have used a linear forecast model based on simple autoregressive model of order one AR (1) model for gross domestic product (GDP) as given in equation (1) using time series data from the year 1991 to 2021.

$$\ln y_t = \ln y_{t-1} + e_t, \quad t = 1, 2, \dots, T \quad (1)$$

where,

t is time

y_t is GDP at time t

y_{t-1} is GDP of the country at time $t-1$

e_t is random error

We let the historical data be denoted by y_1, y_2, \dots, y_T and then simply set all forecasts to be the value to be equal to the average or mean value of the historical data as given in equation (2). That is,

$$\hat{Y}(T+h|T) = (y_1 + \dots + y_T) / T \quad (2)$$

The notation is $\hat{Y}(T+h|T)$ a short-hand for the estimate of y_{T+h} based on the data y_1, \dots, y_T .

The GDP data for India and Bangladesh is primarily drawn from the IMF World Economic Outlook (WEO). The GDP data for NER states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal) is primarily drawn from Reserve Bank of India (RBI).

Appendix 2

Port Traffic Forecast Model for India and Bangladesh

To estimate the future cargo and container traffic in ports of India and Bangladesh, we have used a linear regression model where the export cargo handled, import cargo handled, total cargo handled and container handled is regressed against the GDP of respective countries as given in equation (1) using time series data from the year 2012 to 2021.

$$\ln y_i = \beta_0 + \beta_1 \ln x_i + e_i, \quad t = 1, 2, \dots, T \quad (1)$$

where,

i is the country

y_i is export cargo, import cargo, total cargo and container cargo for country i .

x_i is GDP of the country i

e_i is the error term

Next, we assume India's GDP to grow at 6.7 per cent till 2025, 6 per cent till 2030, 5 per cent till 2040 and 4 per cent till 2050 and use the multiplier to get projections for potential port traffic till 2050. Similarly, we assume Bangladesh's GDP to grow at 8 per cent till 2030, 7 per cent till 2040 and 6 per cent till 2050 and use the multiplier to get projections for potential port traffic till 2050.

The export cargo handled, import cargo handled, total cargo handled and container handled data for India is taken from the annual reports of the Ministry of Ports, Shipping and Waterways, Government of India. The export cargo handled, import cargo handled, total cargo handled and container handled data for Bangladesh is taken from the statistics of Chattogram Port Authority and Mongla Port Authority, Bangladesh.

The GDP data for India and Bangladesh is primarily drawn from the IMF World Economic Outlook (WEO). The GDP data for NER states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal) is primarily drawn from Reserve Bank of India (RBI).

Appendix 3

Port Traffic Forecast Model for Bangladesh Plus NER

To estimate the future cargo and container traffic in Kolkata/Haldia Port (representing Northeast Region (NER) states port traffic handling capacity) and Bangladesh ports, we have used a linear regression model where the export cargo, import cargo, total cargo and container cargo is regressed against the aggregate GDP of eight NER states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura including West Bengal) and Bangladesh as given in equation (1) using time series data from the year 2012 to 2021.

$$\ln y_i = \beta_0 + \beta_1 \ln x_i + e_i, \quad t = 1, 2, \dots, T \quad (1)$$

where,

i is the country

y_i is export cargo, import cargo, total cargo and container cargo for country/states i .

x_i is GDP of the country/states i

e_i is the error term

Next, we assume NER states GDP to grow at 6.7 per cent till 2025, 6 per cent till 2030, 5 per cent till 2040 and 4 per cent till 2050 and use the multiplier to get projections for potential port traffic till 2050. Similarly, we assume Bangladesh's GDP to grow at 8 per cent till 2030, 7 per cent till 2040 and 6 per cent till 2050 and use the multiplier to get projections for potential port traffic till 2050. At last, we add the forecast results of NER states and Bangladesh to get the projections for port traffic handled in the NER and Bangladesh region.

The export cargo handled, import cargo handled, total cargo handled and container handled data for India is taken from the annual reports of the Ministry of Ports, Shipping and Waterways, Government of India. The export cargo handled, import cargo handled, total cargo handled and container handled data for Bangladesh is taken from the statistics of Chattogram Port Authority and Mongla Port Authority, Bangladesh.

The GDP data for Bangladesh is primarily drawn from the IMF World Economic Outlook (WEO). The GDP data for NER states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal) is primarily drawn from Reserve Bank of India (RBI).

Appendix Table 1: Forecast of Cargo of Ports of Bangladesh Plus NER (Million Tonne)

Country/Region	2012	2021	2025	2030	2040	2050
India	914	673	778	901	1124	1260
Bangladesh	42	125	188	312	677	1138
NER	43	61	78	99	141	170
Bangladesh+NER	85	186	265	411	818	1308

Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India and Chattogram and Mongla Port Authorities, Bangladesh

Appendix Table 2: Forecast of Container Traffic of Ports of Bangladesh Plus NER (Million Tonne)

Country/Region	2012	2021	2025	2030	2040	2050
India	120.3	143.7	162.7	184.6	223.2	246.1
Bangladesh	33.8	78.0	91.5	108.9	144.5	174.7
NER	2.6	2.9	3.4	3.9	4.9	5.5
Bangladesh+NER	36.4	80.9	93.9	112.8	149.4	180.3

Source: Calculated Based on Data from Ministry of Ports, Shipping and Waterways, Government of India and Chattogram and Mongla Port Authorities, Bangladesh

Endnotes

- ¹ West Bengal is well-positioned to gain significantly from improved connectivity between India and Bangladesh as it will divert the overland and riverine cargo traffic and passenger movement from to Agartala, Tripura.
- ² Trade, transit, transshipment of cargo and passenger movement between NER and Bangladesh majorly happens through West Bengal. Therefore, this study incorporates West Bengal in all the analysis as it is well-positioned to gain significantly from improved connectivity between India and Bangladesh.
- ³ The usual caveat is that this GDP forecast is based on business-as-usual model and one has to be careful while explaining the forecasted data.
- ⁴ Refer Appendix 1 for the methodology
- ⁵ Refer Chapter 5 for details on Indian Ports
- ⁶ We have used Kolkata/Haldia Port export and import cargo, total cargo and container handled data for NER states as majority of NER's export and import of goods takes place through these ports.