

SOUTH ASIA

CONTAINER MARKET REPORT 2022

BY

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Drewry

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FOREWORD

What ever happened in the year 2022 will be the stepping stone for what to expect in 2023 – Be it the capacity added by shipping lines post-COVID which has now gone surplus, the rollercoaster ride of the freight rates, the US-China standoff or the Russian invasion of Ukraine. Much of these events have changed the sails of global supply chains, bringing into the spotlight a bunch of developing nations that form the South Asia.

While the US has sought to persuade countries to reduce their dependence on China, trade ties between this world's second-largest economy and the rest of Asia are deepening as economies grow and companies refashion supply chains. A lot of what moves through these supply chains will be decided by the Free Trade Agreements (FTAs) being entered into. These supply chains are also being made smarter – The Bangladesh Customs Authority is introducing 'business process reengineering' mechanism to curtail the number of import-clearance steps in sea, air and land ports. Time and cost of import-export trade will be reduced by 30 to 40 per cent once the reengineering is completed.

Nepal is cutting out smart from the complicated Customs procedures, transshipment and trade finance issues which were once a drag on its cargo movement through land ports and is giving a stronger second dimension to logistics by flexing aviation capabilities. The Himalayan nation has signed air service pacts with 40 countries including Australia, Africa and Switzerland being the latest.

Pakistan with funding from China is pushing fast the execution of China Pakistan Economic Corridor (CPEC), under which business-to-business deals are being planned. Sri Lanka is seriously considering this corridor as a passage to boost trade with Central Asian Republics. India is the proverbial elephant in the room, as many countries including Iran and Russia are making a beeline to shun the mighty Dollar and trade in Rupees. Over the next two decades India aspires to join the league of the developed nations.

Given these developments, the South Asia with its huge population and growing consumption is right now the most happening part of the globe. Understanding these markets, their infrastructure and logistics needs holds the key to unlocking huge business opportunities. Thus, the scope of our container market report has been magnified for the first time to provide a comprehensive view of the container trade and performance of the ports and shipping sector in the South Asia.

Sincerely

Ramprasad Ravi

Editor-in-chief and Publisher
Maritime Gateway

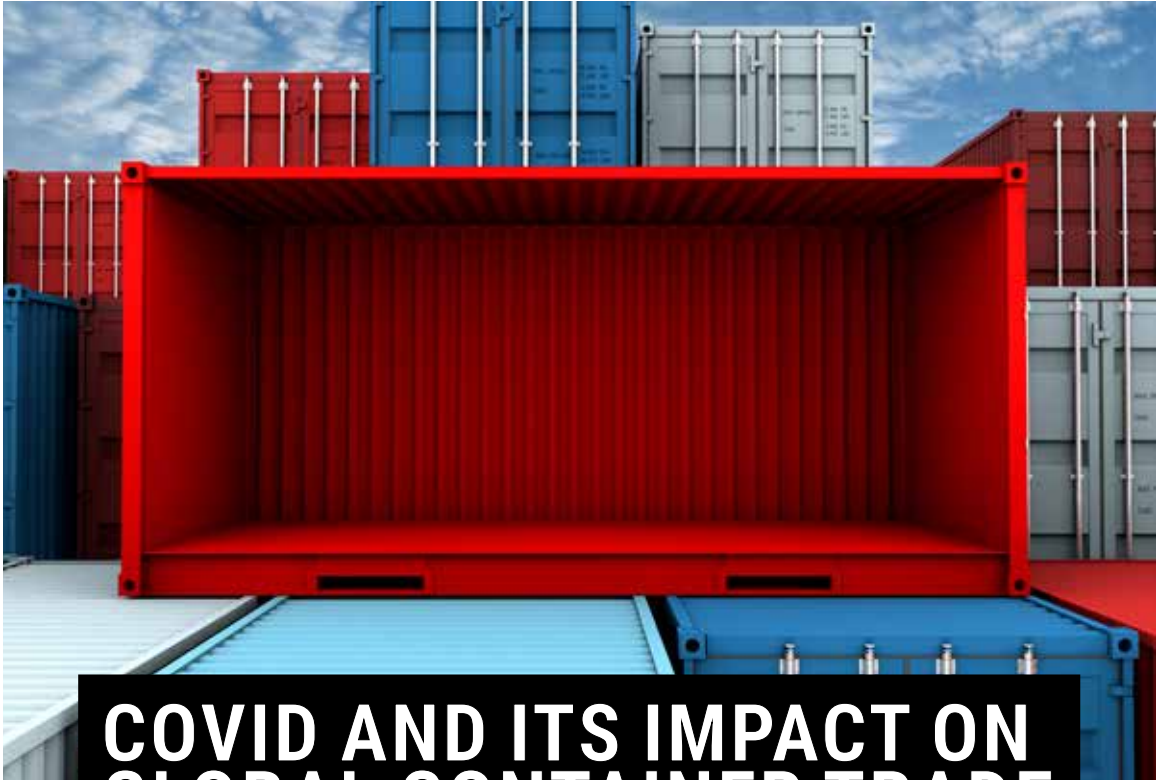


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COVID AND ITS IMPACT ON GLOBAL CONTAINER TRADE

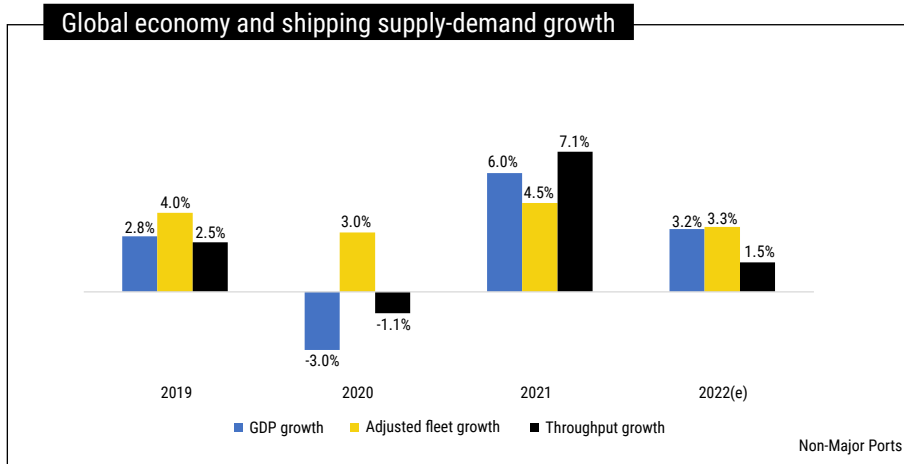
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Supply-demand situation

It's a no-brainer that economic growth propels the demand for more goods, raising the demand for shipping. Hence, any disruption in economic activities, be it the financial crisis of 2008 or the outbreak of the global pandemic of 2020, is bound to affect the shipping demand adversely. Let's try to understand global container shipping during the Covid pandemic starting from 2020 with the help of the three basic parameters: GDP growth, adjusted containership fleet growth and growth in global port throughput.

Lockdowns were imposed in most countries in 2020, although timings varied depending on the intensities of the Coronavirus spread. Firstly, economic activities were stopped in China, the major producing and exporting region. By the time China eased the lockdown moderately, most of the importing regions like the USA and Europe went into lockdown mode, significantly affecting global trade. Besides adversely affecting global trade, the sequence of lockdowns imbalanced the supply chain of container trade. It started with an imbalance in container equipment (boxes) where there was a stockpile of empty containers in the importing regions like the USA and Europe and a scarcity of boxes in the exporting regions like China and Southeast Asia. One problem led to another, and so on.

From the macro point of view, the global economy contracted by 3% in 2020, which compelled port handling by 1.1%. However, with the partial easing of lockdowns in 2021, demand for consumer goods greatly boosted when people started spending more on goods (more than usual) as leisure and other experience-based spending were avoided or unavailable. The global economy bounced by 6% in 2021, resulting in a 7.1% growth in port handling globally, which was way above the growth in supply/shipping capacity (4.5%). This phenomenon resulted in historically high freight rates, as described later in this report.



Source: World Economic Outlook, IMF and Drewry Maritime Research

The rising cost of living (inflation) in 2022, especially in the importing regions, curtailed consumers' buying powers. IMF estimated global GDP growth of 3.2% and we at Drewry estimated a throughput growth of just 1.5% for 2022.

Liner connectivity

Shipping lines successfully responded to the fast-changing market dynamics, sometimes by very high blank sailing and sometimes by deploying extra loaders, and could maintain historically high freight rates on all major trade routes. Following are some of the recent trends observed.

Global Trends

1. Regional trades reported a drop in capacity in the last year as a result of cascading to deep sea trades; total capacity deployed on intra-European services is down by 14% Y-o-Y in Aug-22. Similarly, deployment on the intra-Asia route declined by 10%.
2. The rise in total capacity of non-cellular ships to deep sea liner services increased by 21% Y-o-Y in Aug-22
3. The transpacific route received the most ships in the last two years as port congestion on US West Coast ports sustained for too long in 2021, and that opened the opportunity for new entrants (regional and non-cellular carriers).

South Asia

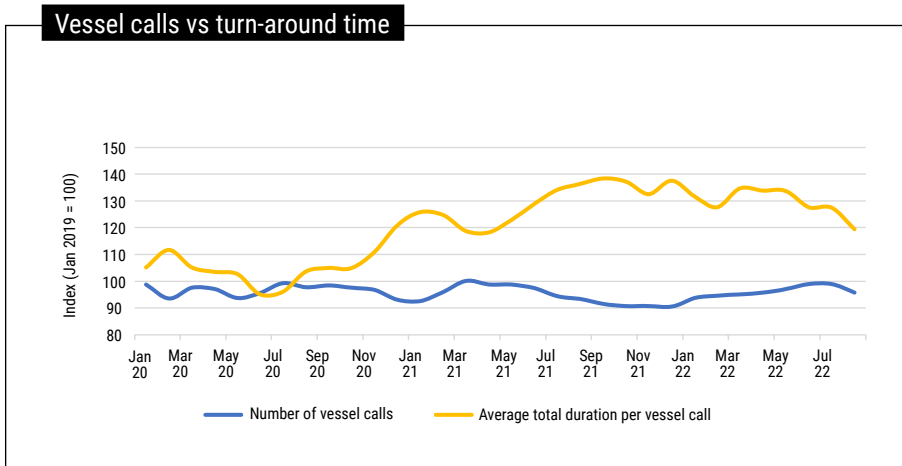
1. Among all South Asian routes, trade with the US has significantly increased in the last two and half years, and so has the shipping capacity; thus, net capacity has increased by 110% westbound and approx. 150% eastbound between January 2020 and August 2022. The second largest trade route, South Asia to Europe, experienced 19% net capacity addition for westbound during the same period.
2. Since October 2019, two new weekly loops (12,500 weekly nominal teu) have been added on South Asian routes, which offer direct connectivity from South East Coast of India to North Europe.

Ship calls and congestion

Partial relaxation of the lockdown surged the trade volume and resulted in congestion at all the major ports of the world, both in importing and exporting regions. The Automatic Identification System (AIS) data captured by Drewry indicate wide variations in the turn-

around time of ships worldwide. As seen from the chart, Drewry's Global Vessel Call Index has varied marginally and well within a range from Jan 2020 to Aug 2022. However, the time spent at the ports has increased significantly since the start of 2021.

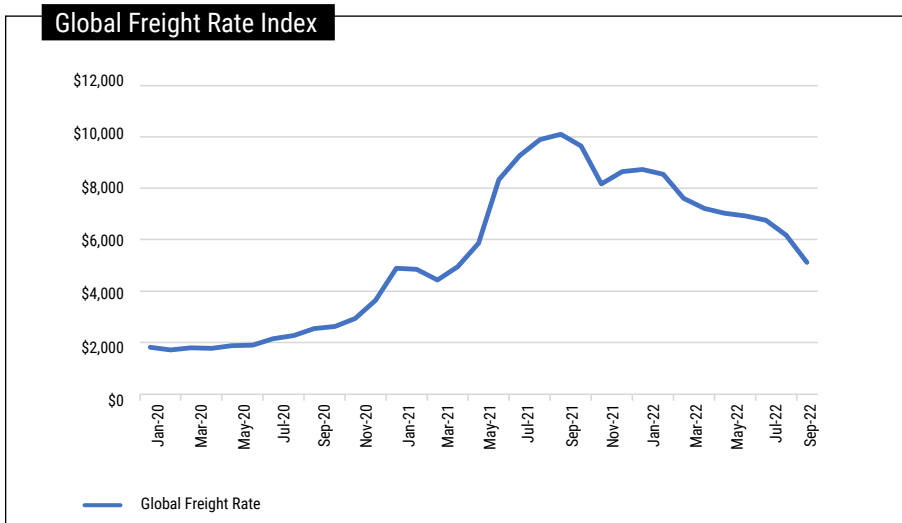
With the inflation-induced decline in consumer goods, the congestion level has eased a bit, and expected it to decline further during the rest of 2022.



Source: Drewry Maritime Research

Freight rate fluctuations

The freight rate underwent a massive surge starting in Jan 2021, with demand for goods increasing instantly. Drewry's Global Freight Rate Index peaked in Sep 2021 where the index stood more than five times that of Jan 2020. Carrier managed their capacity well, which resulted in such historical high freight rates.

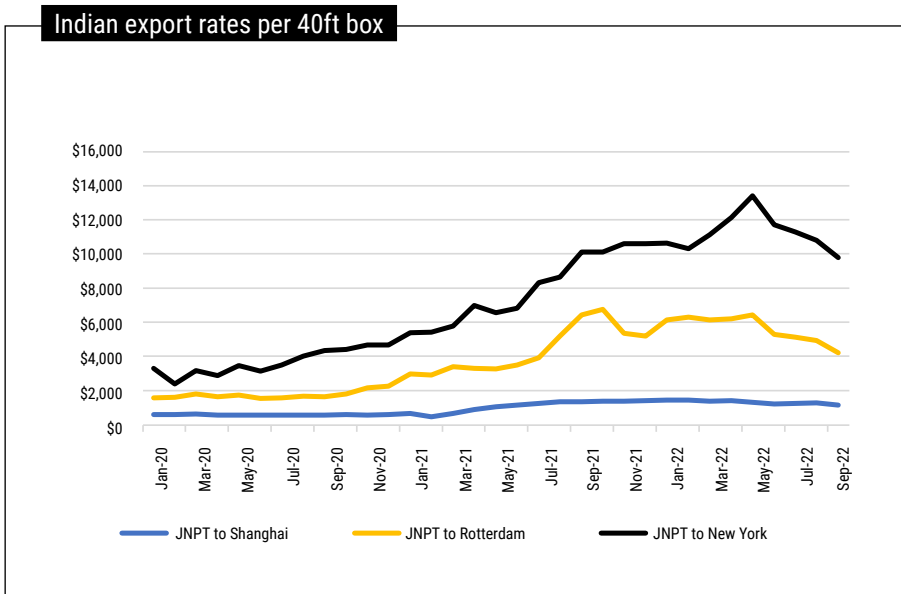


Source: Container Freight Rate Insight, Drewry Maritime Research

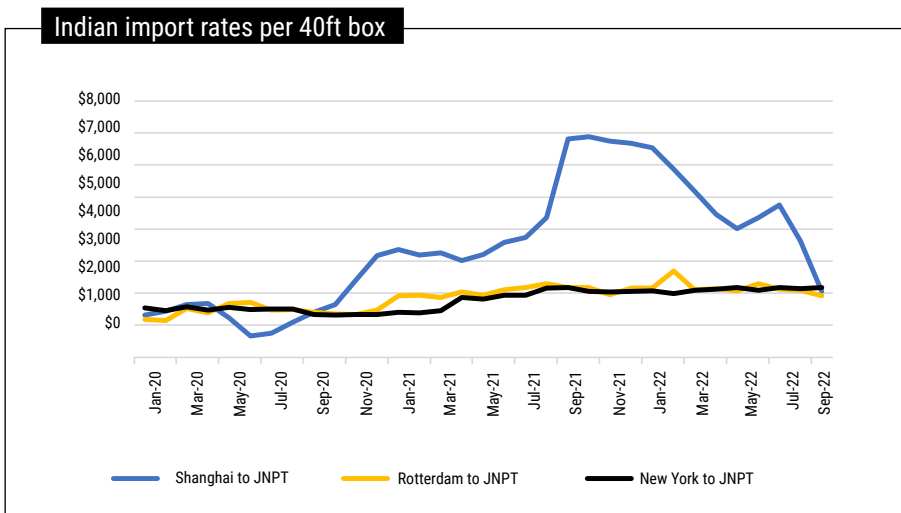


Regarding rates for India-based routes, a huge variation was observed between the export and import rates. Export rates to the USA, Europe and China increased three times between Jan 2020 and May 2022. On the other hand, rates for imports from the USA and Europe increased marginally, although import rates from China increased by four to five times compared to Jan 2020 rates.

As the global rates are moderating (but still very high), rates for India origin/destined cargo are also declining during the last four months.



Source: Drewry Maritime Research



Source: Drewry Maritime Research



GEO-POLITICAL ISSUES AND IMPACTS

India-China relations

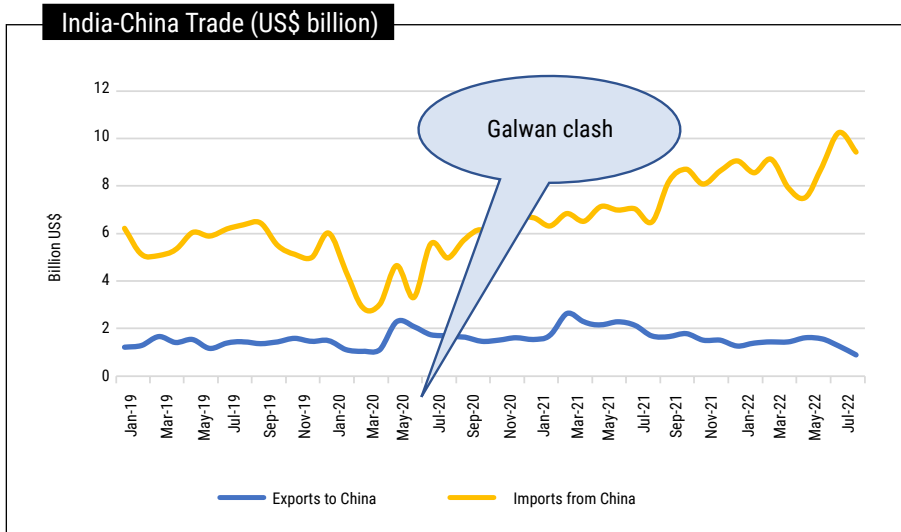
Following the clashes between Indian and Chinese military in Galwan (Ladakh) and Sikkim, there is a general sentiment in the public to avoid Chinese goods. The Government of India has also made some policy changes to minimise the dependency on Chinese goods.

However, the data suggest an increase in India's imports from China to 31% (in \$ terms) during the first eight months of 2022 compared to the same period last year. On the other hand, exports to China declined by 34% during the same period.

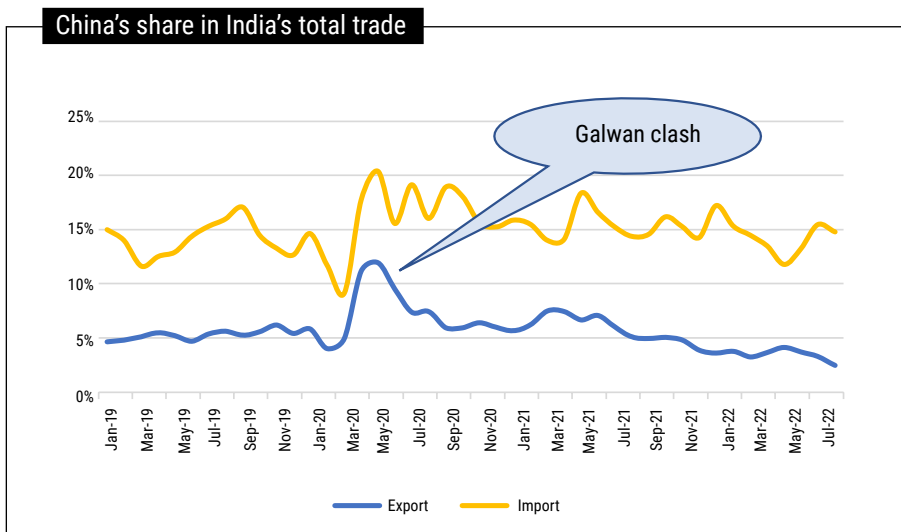
It is difficult to reduce dependency on China in the short term. However, the government is trying to reduce dependence on China by encouraging Make in India and other such policy initiatives like Production Linked Incentive Scheme for Large Scale Electronics Manufacturing.

From the market share perspective, the share of China in India's total imports has marginally declined since the Galwan crisis. However, the share of China as an export destination has declined substantially from 9.5% in June 2020 (violent clash between the Armies of India and China in Galwan) to 2.5% in Aug 2022.

The popular slogan in India, "boycott Chinese", seem to have adversely impacted Indian exporters but hardly lessened the dependence on China on the import side.



Source: TradeStat, Ministry of Commerce, Government of India



Source: TradeStat, Ministry of Commerce, Government of India

Russia-Ukraine war

Russia's invasion of Ukraine, which started in February 2022, has impacted India's trade. For example, India's exports to Russia; the major commodities involved here are pharmaceuticals, telecom devices, iron and steel, tea and chemical products. On the import side, items like pearls, semi-precious stones, fertilisers and vegetable oils were also affected.

On the positive side, India's global wheat exports have increased since the start of the Russia-Ukraine war. Russia and Ukraine together comprise 25 per cent of the world's wheat exports. Even though India is one of the largest wheat exporters, its share has been below 1% of the global wheat exports.

On the shipping side, bunker prices have gone up due to the Russia-Ukraine crisis, which has slowed down the downward trend of container freight rates to some extent.



SOUTH ASIA INTRODUCTION

Growth in South Asia, already uneven and fragile, due to the impacts of the war in Ukraine and persistent economic challenges. However, South Asia is estimated to grow at 6.3 - 6.5% in fiscal year (FY) 2022 and 6.1 - 6.3% in FY2023. Inflation in South Asia, caused by elevated global food and energy prices and trade restrictions that worsened food insecurity in the region, is expected to rise to 9.2% in 2022 before gradually subsiding.

Weak exports and high inflation are hampering recovery in Bangladesh, while in Bhutan, agriculture and construction are projected to support economic growth. In India, growth is projected at 7.0% in FY2022 and 7.2% in FY2023, sustained by public reform and public and private investment. Maldives tourist arrivals and construction continue to pick up. In Nepal, the 2023 budget aims to improve agriculture, industry, and social protection. Economic contraction is expected in Sri Lanka with marked declines in industry and agriculture.

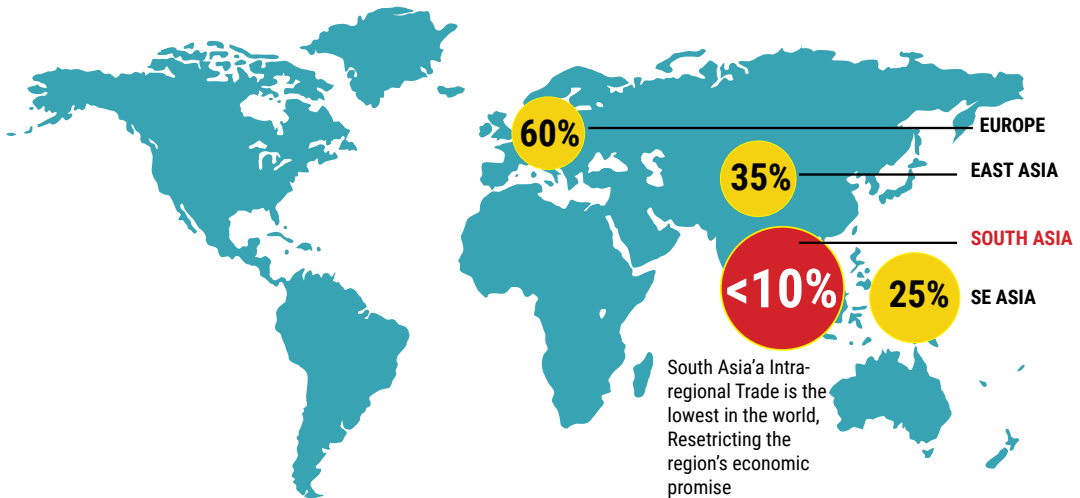
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Country fiscal year	Calendar year basis	Real GDP growth at constant market prices (percent)			
		2021	2022(f)	2023(f)	2024(f)
South Asia region (excluding Afghanistan)		7.8	5.8	5.8	5.8
Maldives	January to December	37.0	12.4	8.2	8.1
Sri Lanka	January to December	3.3	-9.2	-4.2	1.0
Country	Fiscal year basis	FY21/22	FY22/23(e)	FY23/24(f)	FY24/25(f)
India	April to March	8.7	6.5	7.0	6.1
Country	Fiscal year basis	FY20/21	FY21/22(e)	FY22/23(f)	FY23/24(f)
Bangladesh	July to June	6.9	7.2	6.1	6.2
Bhutan	July to June	-3.3	4.6	4.1	3.7
Nepal	Mid-July to Mid-July	4.2	5.8	5.1	4.9
Pakistan	July to June	5.7	6.0	2.0	3.2



TRADE IN SOUTH ASIA

INTRA REGIONAL TRADE AS A PERCENTAGE OF TOTAL TRADE



SOUTH ASIA: DISCONNECTED REGION

Intra-regional trade in South Asia has remained below 10% of the global trade whereas intra-regional trade within other major regional trading arrangements have achieved very high share of their global trade. For example, South East Asia's intra-regional trade makes up to 25%. For any company in India, it is about 20% cheaper to trade with Brazil instead of trading with a neighboring country Pakistan due land border issues.

In South Asia, small countries like Nepal and Bhutan are mostly dependent on their neighbours for both imports and exports. Large economies like India and Pakistan are more dependent on countries outside the region.

South Asia Trade Limitations

- High Trade costs and Investment Restrictions
- Limited transport connectivity, logistics and regulatory impediments
- Policy decisions governed by politics rather than economics, Lack of trust initiatives
- Relative asymmetry in size among South Asian nations

- Volatile geo-political environment Security concerns
- Trading with in South Asia costs more than trading outside the region even thousands of miles away

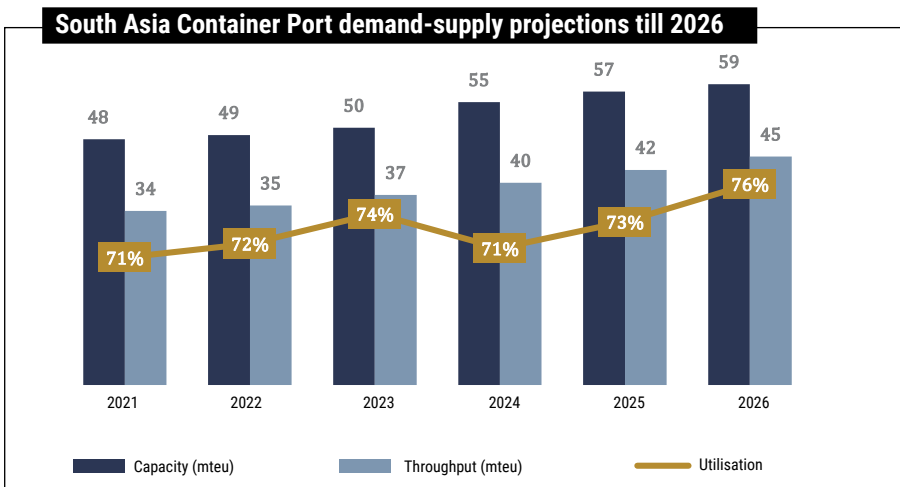
Ease of Doing Business Ranking - South Asia	
Afghanistan	173
Bangladesh	168
Bhutan	89
Nepal	94
Sri Lanka	99
India	62
Maldives	147
Pakistan	108
Myanmar	165



PORT DEVELOPMENT IN SOUTH ASIA - BY COUNTRY (CAPACITIES/EXPANSION/NEW PORTS)

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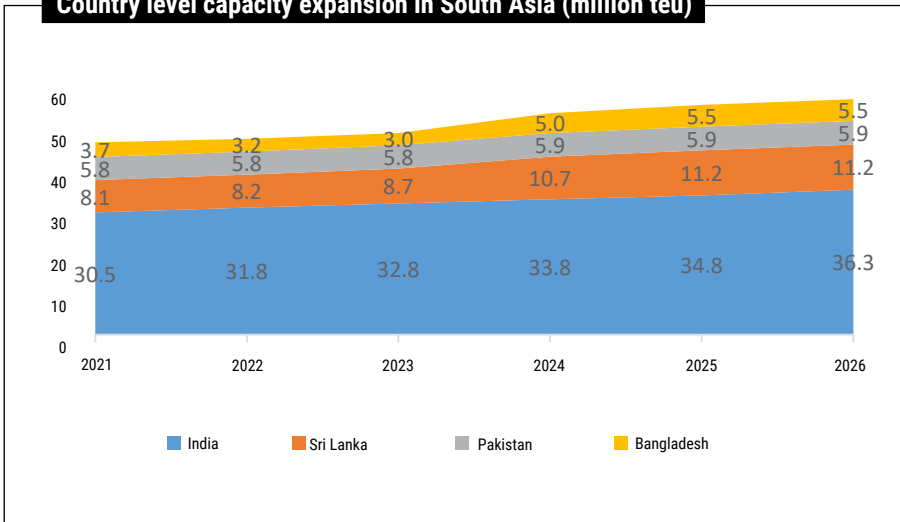
In south Asia, capacity utilization is hovering around 70% in 2021 and projected to continue the range of 70-76% in the next five years. Installed capacity is expected to grow by CAGR of 4.2% during 2021-2026, where as throughput is forecast to increase by CAGR 5.8% in the same period.



Source: Global Container Terminal Operators Annual Review and Forecast

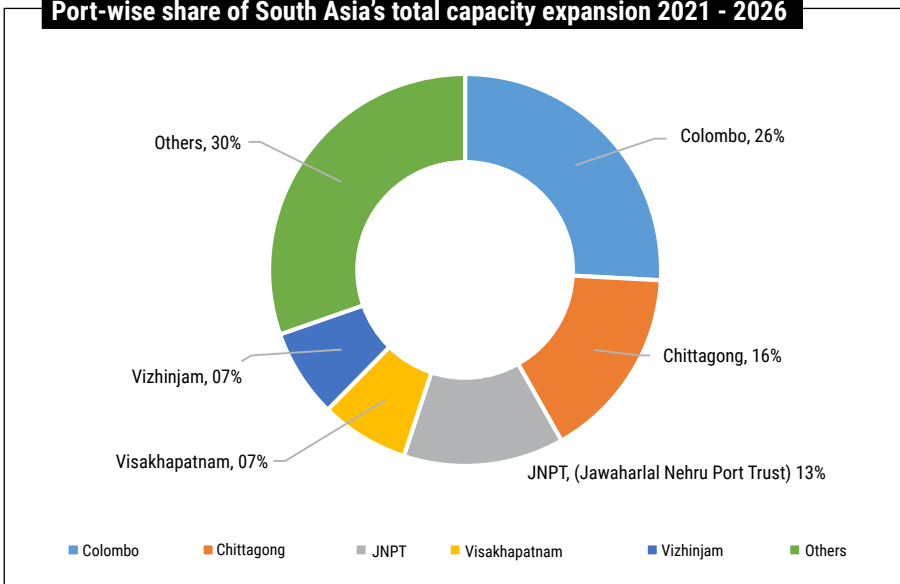


Country level capacity expansion in South Asia (million teu)



Source: Global Container Terminal Operators Annual Review and Forecast

Port-wise share of South Asia's total capacity expansion 2021 - 2026



Source: Global Container Terminal Operators Annual Review and Forecast

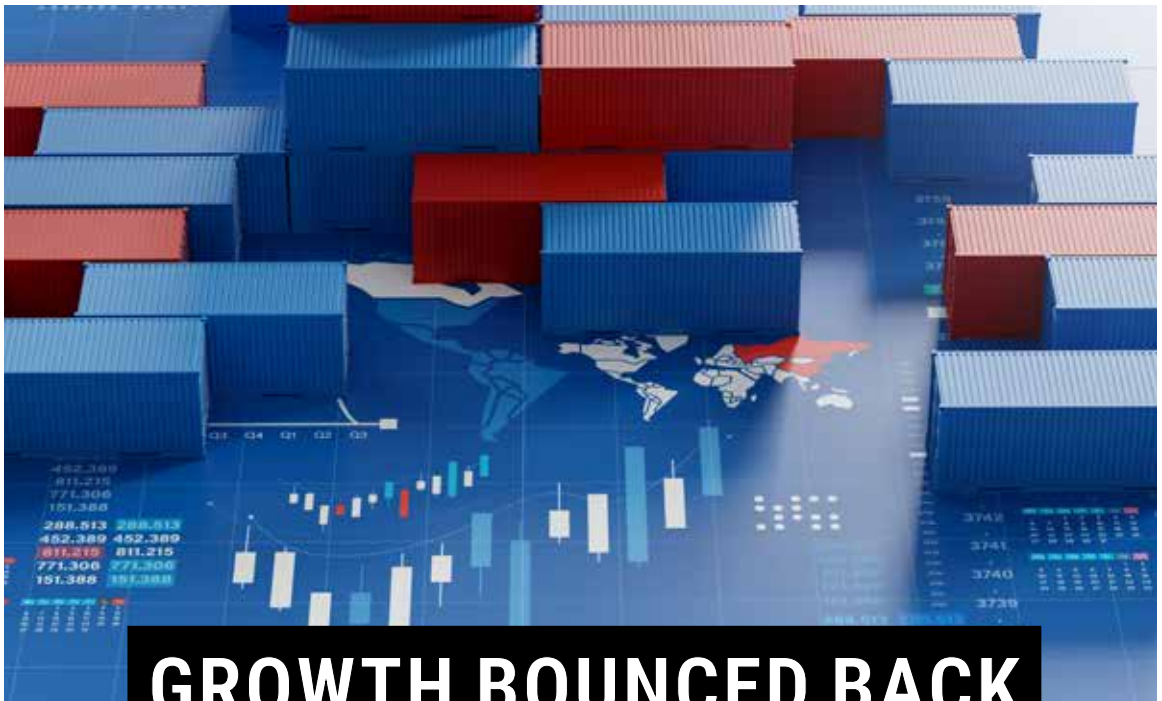
East & West Container Terminal will add 2.8 mn teu in Colombo
 Greenfield projects at Chittagong will add 1.8 mn teu by 2026
 PSA commences work on Phase II expansion of Bharat Mumbai Container Terminals (Jawaharlal Nehru) in 2022.

S O U T H A S I A C O N T

COUNTRIES	Container Terminal Name	Called as	Operator	Port/Dock	Year of Commission	Draft (m)	Berths	Quay Length
SRI LANKA	East Container Terminal	ECT	Sri Lanka Ports Authority (SLPA)	Colombo Port	2015	18	1	600/12
	Jaya Container Terminal	JCT	Sri Lanka Ports Authority	Colombo Port	1985	15	6	1,64
	Unity Container Terminal	UCT	Sri Lanka Ports Authority	Colombo Port	2004	10.5	3	590
	South Asia Gateway Terminal	SAGT	John Keells Holdings, Maersk/ APM Terminals, SLPA and Evergreen Marine Corporation.	Colombo Port	1999	15	3	940
	Colombo International Container Terminal	CICT	China Merchants Port Holdings Company (85%) and SLPA	Colombo Port	2014	18	4	70
BANGLADESH	Chittagong Port Terminals (GCB+CCT+NCT+NCY+SCY+NOY)		Saif Powertec & Chittagong Port Authority	Chittagong Port	1954-2007	8.5-9.2	21	3,55
	Pangaon Inland Container Terminal	ICT Pangaon	Bangladesh Inland Water Transport Authority (BIWTA) & Chittagong Port Authority	Chittagong Port	2013	4.5	2	180
	Mongla Port Containers		Mongla Port Authority	Mongla Port	2010	7	5	225
	Kamalapur ICD, Dhaka	ICD Dhaka	Bangladesh Railway and Chittagong Port Authority	Chittagong Port	1987	NA	NA	NA
PAKISTAN	Qasim International Container Terminal	QICT-I	DP World	Port of Qasim	1997	12	3	610
	Qasim International Container Terminal- T2	QICT-II	DP World	Port of Qasim	2011	13	2	715
	Pakistan International container terminal	PICT	International Container Terminal Services, Inc.	Port of Karachi	2002	13.5	2	600
	Karachi International Container Terminal	KICT	Hutchison Port holding(HPH)	Port of Karachi	1996	13.5	3	963
	South Asia Pakistan Terminal	SAPT	Hutchison Port holding(HPH)	Port of Karachi	2017	16.5	4	1,500
MALDIVES	Male Commercial Harbour	MCH	Maldives Port Limited	Port of Male	1986	WLB - 3.5m ELB - 2.5-3m Berth(NP) - 9m	3	WLB - 210m NP - 100m
	Hulumale Terminal	HMT	Maldives Port Limited	Port of Male	2013	5.5m	1	472.44m
	Kulhudhufushi Regional Port	KRP	Kulhudhufushi Port Limited	Port of Kulhudhufushi City	2005	5m	1	171.5m
	Hithadhoo Regional Port	HRP	Hithadhoo Port Limited	Port of Addu City	2005	7.5m	1	130m
NEPAL	Birgunj ICD		Himalayan Terminal Pvt Ltd for ICD;Nepal Intermodal Transport Development Board for ICP	NA	2001	NA	NA	NA

NA - Not Available; TEU- Twenty Foot equivalent Unit; M-Meter

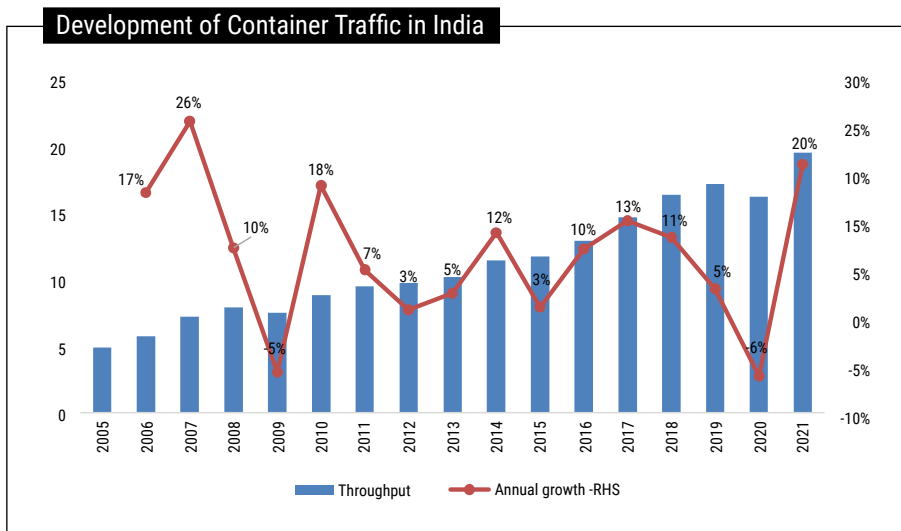
A I N E R T E R M I N A L S											
Port / (m)	Installed Capacity (TEUs)	Throughput in TEUs 2022 (Year)	Yard Area (Hectares)	Terminal Area (Hectares)	Total Ground Slots (TGS)	Reefer Plugs	Quay Cranes	Rubber Tyred Gantry Cranes (RTGC)	Rail Mounted Gantry Cranes (RMGC)	Reach Stackers	Fork Lifts
00	24,00,000	22,00,000 (2021)	18	26	2,400	NA	4	12	1	NA	NA
2	2,00,000	NA	45.5	45.5	9,800	1,548	20(Panamax and Super post panamax)	59	4	12	24
	3,00,000	NA	NA	1.53	1,020	NA	3	8	NA	2	NA
	18,00,000	18,40,000 (2021)	NA	20	5,430	540	11 Super Post Panamax , 3 Post Panamax	36	NA	2	2
	24,00,000	32,10,000 (2021)	10	57	NA	NA	14	46	NA	2	NA
0	6,92,780	31,27,856	40+15+29+5.7+6.1+11.9	NA	NA	900	14 quay cranes +5 mobile harbour cranes	41	1	26	4
	1,16,000	25,370	5.5	NA	NA	48	1 Mobile Harbour Crane	NA	NA	NA	9
	2,00,000	43,959 (2021)	3.6	NA	NA	160	4 Mobile Harbour Crane	NA	NA	4	24
	90,000	1,02,132	13.7	NA	NA	NA	NA	NA	NA	3	10
	9,00,000	12,80,000	NA	24	NA	1000	9	27	NA	12	NA
	11,75,000	NA	16	35	NA	NA	NA	24	NA	NA	NA
	7,50,000	6,10,000	NA	21	3910	450	4 Super Post Panamax and 2 Post Panamax	20	NA	11	16
	7,00,000	16,00,000	NA	26.03	NA	480	11	29	NA	10	8
0	31,00,000	NA	NA	85	NA	1000	16 Super Post Panamax	52	NA	8	NA
70m 1m	2,200	1,01,772	1.95	5	500 TEUs	125	NA	2	NA	8	20
m	1,613	40,370	1.2	3.5	459 TEUs	20	NA	NA	NA	2	11
m	320	554	0.5	1.5	80 TEUs	3	NA	NA	NA	1	4
n	400	1,653	0.9	2	100 TEUs	9	NA	NA	NA	1	4
	20,000	1,26,448	1.7	38	656	NA	10 Mobile Cranes	NA	NA	7	4



GROWTH BOUNCED BACK

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Overall Global trade bore the brunt of Covid-19 outbreak which resulted a slowdown in container throughput globally as well as Indian ports. Though all ports were allowed to operate during pandemic but overall supply chain felt a major setback due to covid restrictions, which resulted a 6% decline in overall container throughput at Indian ports in 2020 when most of the container terminal witnessed a negative YoY growth. However, it bounced back with a strong 20% YoY growth in 2021. Overall, India's container traffic grew at CAGR of 8.6% during the six-year period from 2016 to 2021.



Source: TradeStat, Ministry of Commerce, Government of India

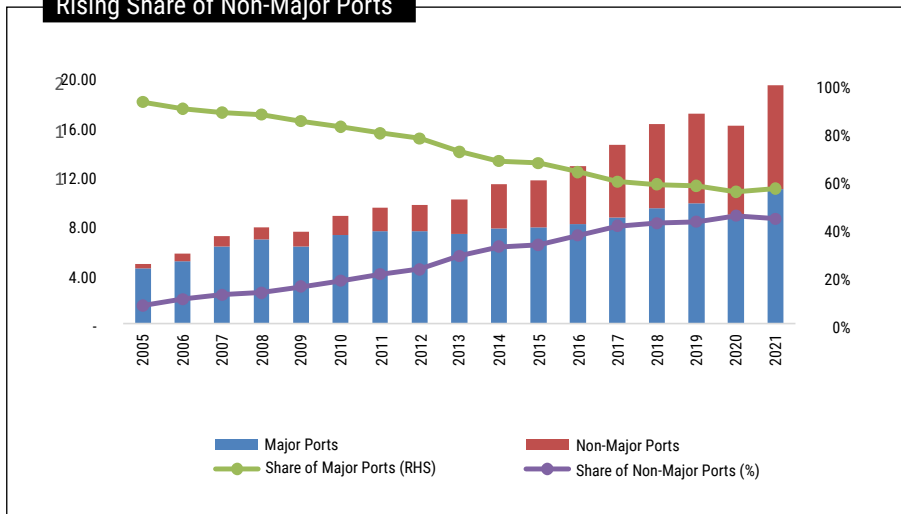


Market Segmentation-2021

Major Vs Non-major ports

It is clearly evident from below chart that non-major ports are continuously gaining share from major ports in last few years. Since 2005, the market share of non-major ports has increased by more than five times. Rapid expansion of private terminal operators in the non-major ports diverted significant chunk of cargo to these private ports. Mundra in upper west coast surpassed the largest port JNPT in 2020 and handle 31% share of overall Indian container traffic whereas JNPT share has reduced to 27.1% in 2020. Mundra share has further increased to 33.7% in 2021. In last six years (2016-2021), JNPT lost the maximum 5.7% share and Mundra's gain was maximum at 8.8% in the same period. Till 2009 JNPT was handling almost half of the total throughput of India which has reduced to less than 30% in 2021.

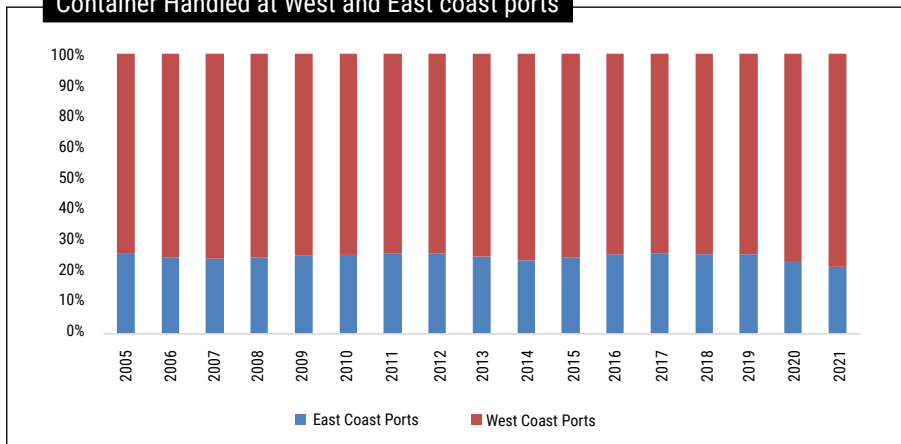
Rising Share of Non-Major Ports



East coast ports vs West coast ports

Ports on west coast will continue to dominate in total container throughput, so as in the container infrastructure. Around 76% of the country's container throughput is handled at the west coast ports.

Container Handled at West and East coast ports



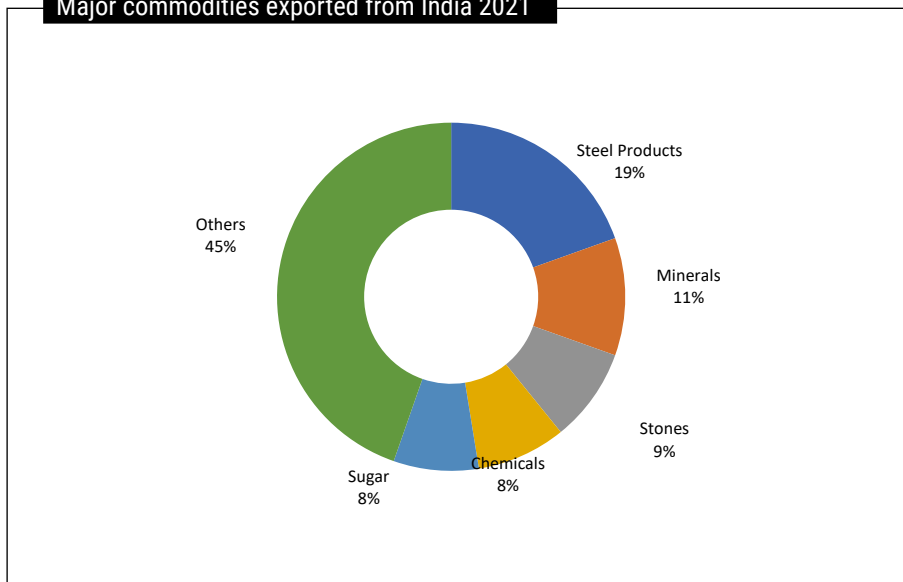
Major containerised/containerisable exim cargo

For analysis, we have divided all traded commodities into 33 major categories, such as Pharmaceuticals, Fabric/Yarn, Steel Products, Reefer Food Products and Readymade Garments (RMG)/Textiles. As we do not have precise definitions of containerised and non-containerised cargo from any authoritative source, the data has some subjectivity built in. We have used the volume of cargo (tonnes) as our basis of analysis.

In terms of volume, various steel products which are either containerised or containerisable are the major product group being exported from India. In 2021, this product group constituted 19.5% of the total containerised or containerisable exports of India. This product group's export volume has increased from 12.4 million tonnes in 2011 to 27.3 million tonnes in 2021, more than double over the decade.

Minerals follow the steel products and constitute 11% of India's total exports. As per the data available to us, export volume of minerals also doubled over the decade from 7.1 million tonnes in 2011 to 15.2 million tonnes in 2021.

Major commodities exported from India 2021



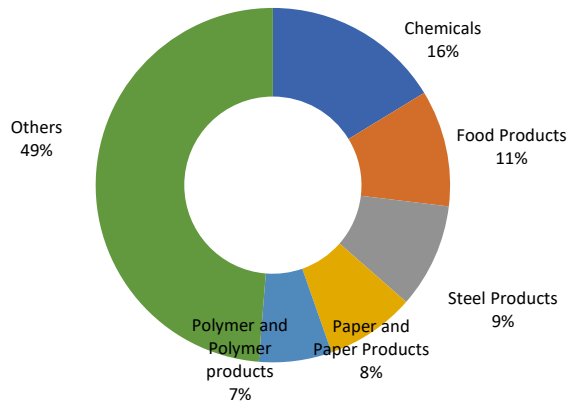
On the import side, chemicals segment is the largest group of commodities being imported in India. In 2021, the country imported 22.4 million tonnes of chemicals compared with 9.8 million tonnes in 2011.

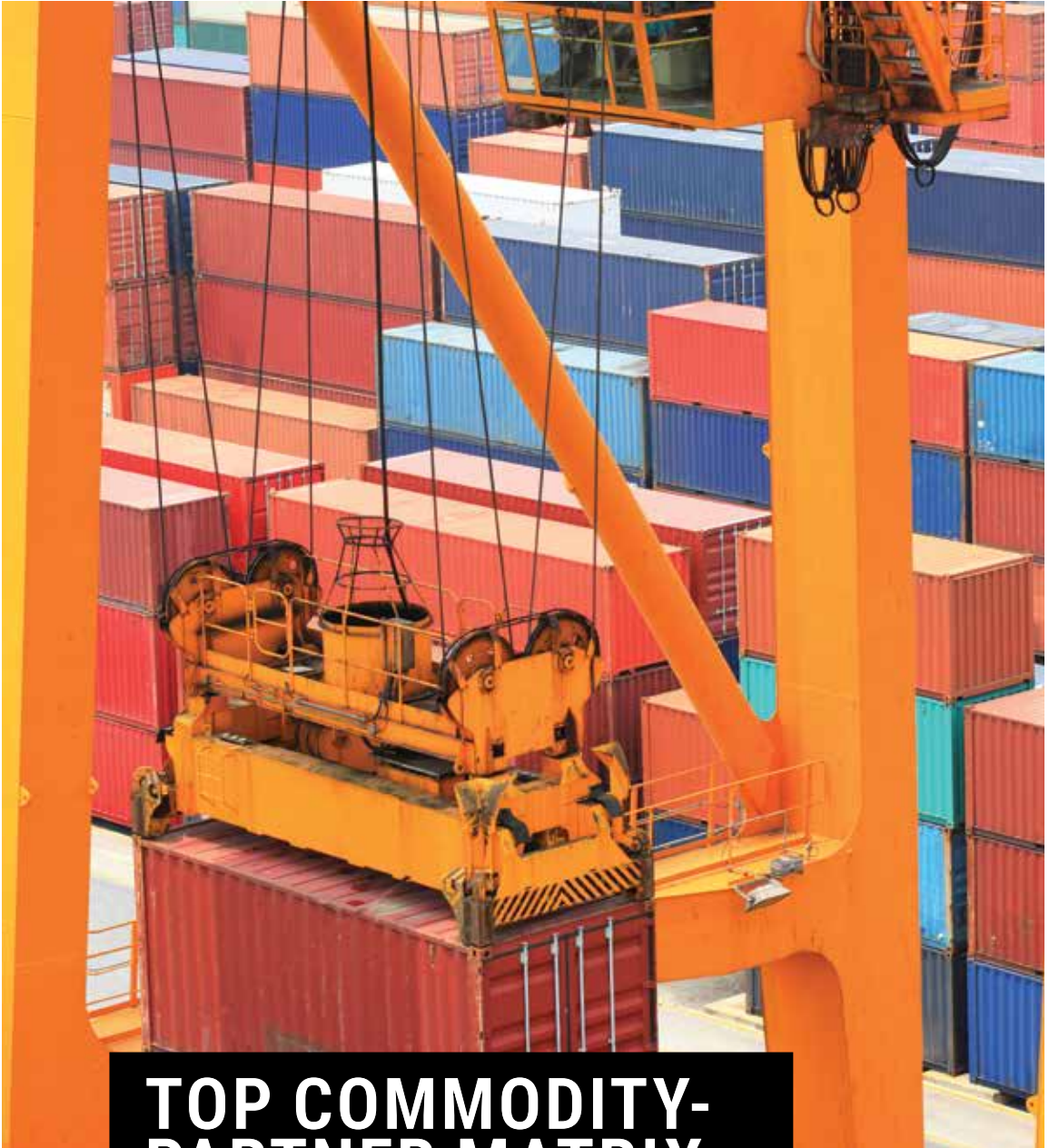
Rising income levels in the country has given rise to increased demand for imported food products. Food products ranks second in the list of imports in India. Imports of this commodity group increased from 8.0 million tonnes in 2011 to 14.6 million tonnes in 2021.

Steel products are third largest commodity group imported by India in 2021 although the volume has decreased from 16.7 million tonnes in 2011 to 13.1 million tonnes in 2021.



Major commodities imported by India 2021





TOP COMMODITY-PARTNER MATRIX

As discussed in the previous chapter on major exports and imports, Steel products captures the highest share in India's exports. More than 37% of the total steel products exports are concentrated to top five countries. They are: Nepal, Italy, China, the USA and Vietnam.

Minerals are the second largest exported product. China, Korea and Japan are the major demand drivers for Indian minerals followed by Indonesia and Bangladesh. These countries import more than half of the minerals that India exports.



India's top exported products and their respective top destinations, 2021 (million tonnes)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	World Exports	Top 5 share
Steel Products	Nepal	Italy	China	USA	Vietnam		
	2.4	2.3	2.1	1.8	1.7	27.3	37.5%
Minerals	China	Korea, Rep.	Japan	Indonesia	Bangladesh		
	3.3	2.2	1.2	1.2	1.0	15.2	57.9%
Stones	Bangladesh	China	Maldives	UK	United States		
	5.3	4.4	0.7	0.5	0.2	12.2	91.7%
Chemicals	China	USA	Saudi Arabia	UAE	Malaysia		
	1.6	1.2	1.1	0.7	0.6	11.6	44.7%
Sugar	Indonesia	Sudan	UAE	Bangladesh	Somalia		
	2.0	1.1	0.7	0.7	0.7	11.1	47.8%
Reefer food products	Bangladesh	Nepal	UAE	USA	Malaysia		
	1.0	0.8	0.7	0.6	0.4	7.7	45.9%
Fabric/Yarn	Bangladesh	China	US	Turkey	Vietnam		
	1.3	1.1	0.6	0.4	0.3	6.4	56.5%
Ores And Concentrates	Bangladesh	Nepal	Saudi Arabia	Bhutan	China		
	4.2	1.1	0.1	0.1	0.1	6.0	93.9%
Ceramic Products	Nepal	Saudi Arabia	USA	UAE	Indonesia		
	0.4	0.3	0.3	0.3	0.2	5.0	30.8%
Polymer and Polymer products	USA	China	UAE	Nepal	Bangladesh		
	0.5	0.3	0.3	0.2	0.2	4.3	34.0%

Source: UNCOMTRADE database, 2021, compiled by Drewry Maritime Research



India's top imported products and their respective top destinations, 2021 (million tonnes)

On the import side, Chemical products are the top most cargo being imported by India. In 2021, the country imported 22.4 million tonnes of chemicals out of which half of the quantity was from its top five import sources. They are China, USA, Saudi Arabia, UAE and Malaysia.

Food products are the second major commodity group which India imports. In 2021, about 80% of the import requirements were sourced from top five countries with about 25% being imported from Malaysia and Indonesia (25% each).

India's top imported products and their respective top destinations, 2021 (million tonnes)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	World Imports	Top 5 share
Chemicals	China	United States	Saudi Arabia	United Arab Emirates	Malaysia		
	4.3	2.4	1.9	1.5	1.3	22.4	50.4%
Food Products	Malaysia	Indonesia	Argentina	Ukraine	Nepal		
	3.6	3.6	2.3	1.4	0.6	14.6	79.1%
Steel Products	Korea, Rep.	China	UAE	Japan	United States		
	2.5	1.7	1.3	0.9	0.6	13.1	53.1%
Paper and Paper Products	United States	Canada	United Kingdom	South Africa	Spain		
	3.5	1.0	1.0	0.4	0.4	11.2	55.5%
Polymer and Polymer products	China	United Arab Emirates	Korea, Rep.	Singapore	Other Asia, nes		
	1.7	1.0	1.0	0.7	0.6	9.1	54.7%
Minerals	UAE	Bhutan	Qatar	Oman	China		
	3.7	2.0	0.6	0.4	0.3	8.9	79.6%
Ceramic products	China	Netherlands	Germany	Austria	France		
	5.0	0.4	0.4	0.2	0.1	6.3	97.5%
Wood & wood products	Uruguay	Australia	China	Malaysia	New Zealand		
	1.4	1.0	0.3	0.3	0.3	6.0	55.8%
Reefer food products	Myanmar	Canada	Tanzania	United Arab Emirates	Mozambique		
	0.7	0.6	0.4	0.3	0.3	5.3	43.1%
Aluminum & aluminum products	United States	China	UAE	United Kingdom	Saudi Arabia		
	0.4	0.3	0.2	0.2	0.2	2.4	51.9%



Major trade partners

China remains as the top import source for India. However, on the export side, Bangladesh tops in terms of export destination. China has been consistently on the top position over the last decade. Bangladesh however, has increased its ranking in India's export from 5th position in 2011 to 1st position in 2021.

The US has consistently remained at the third position in India's export market while export to Nepal has increased in last decade. Nepal was at the 15th position in 2011 and reached 4th position in 2021.

India's top 20 export destinations in 2021

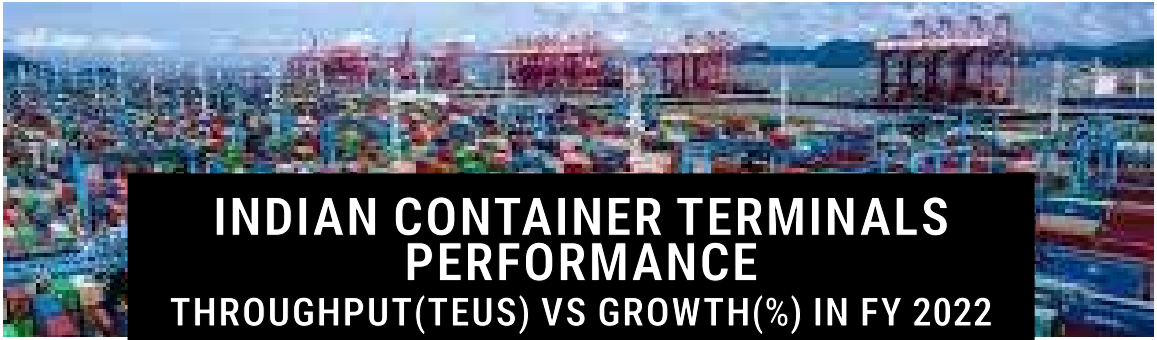
Rank 2011	Rank 2021	Trend	Country	Share in India's total exports
5	1	↑	Bangladesh	12.2%
2	2	→	China	11.6%
3	3	→	United States	7.4%
15	4	↑	Nepal	5.2%
4	5	↓	United Arab Emirates	4.5%
6	6	→	Indonesia	4.4%
8	7	↑	Vietnam	3.6%
11	8	↑	Korea, Rep	3.5%
9	9	→	Saudi Arabia	2.7%
1	10	↓	Italy	2.6%
10	11	↓	Malaysia	2.2%
14	12	↑	United Kingdom	2.0%
13	13	→	Belgium	1.9%
20	14	↑	Turkey	1.8%
18	15	↑	Thailand	1.7%
12	16	↓	Sri Lanka	1.6%
7	17	↓	Japan	1.5%
22	18	↑	Other Asian	1.5%
17	19	↓	Netherlands	1.5%
19	20	↓	Germany	1.1%

On the import side, China retained its first position over the last decade. In 2021, India sourced 17.5% of its requirements from China followed by the UAE (7.2%) and the USA (6.3%).

The noteworthy trend as seen from the below figure, is that the country has started to import more from Southeast Asian countries over the past decade. For example, Singapore increased its rank from 19th position in 2011 to 8th in 2021. Similarly, Thailand increased its rank from 15th position in 2011 to 9th in 2021. Malaysia and Indonesia are still in the top 5 import sources, however there has been a slight dip of one rank for each country in 2021.

India's top 20 import sources in 2021

Rank 2011	Rank 2021	Trend	Country	Share in India's total imports
1	1	➡	China	17.5%
6	2	⬆	United Arab Emirates	7.2%
2	3	⬇	United States	6.3%
3	4	⬇	Indonesia	4.9%
4	5	⬇	Malaysia	4.7%
9	6	⬆	Saudi Arabia	4.1%
5	7	⬇	Korea, Rep	4.0%
19	8	⬆	Singapore	2.6%
15	9	⬆	Thailand	2.4%
27	10	⬆	Argentina	2.2%
14	11	⬆	Japan	2.1%
8	12	⬇	Canada	2.0%
13	13	➡	Oman	2.0%
11	14	⬇	Ukraine	1.8%
10	15	⬇	Russian Federation	1.7%
18	16	⬆	Qatar	1.7%
59	17	⬆	Bhutan	1.6%
16	18	⬇	Germany	1.5%
17	19	⬇	United Kingdom	1.4%
21	20	⬆	Other Asian	1.4%



INDIAN CONTAINER TERMINALS PERFORMANCE THROUGHPUT(TEUS) VS GROWTH(%) IN FY 2022

Growth Y-O-Y (%) (FY 2021-22)	HIGH	AECT, AMCT-T2	NSIGT, CCT, BMCT
	MEDIUM		NSICT
	LOW	AKCT, HICT, KCT, NMCT, PICT, TCT	AHCT, AKP, APMT-P, BKCT, DBGT, JNPCT, KICT, VCT
	LOW	MEDIUM	HIGH

Throughput (TEUs), FY 2021-22

High Throughput, High Growth Terminals:
NSIGT, CCT, BMCT

Medium Throughput, High Growth Terminals:
AECT, AMCT-T2

High Throughput, Low Growth Terminals:
**ACMT, AICT, AMCT, APMT-M, CIT,
ICTT, MICT**

Low Throughput, Low Growth Terminals:
AKCT, HICT, KCT, NMCT, PICT, TCT

- APMT-M : APM Terminals - Mumbai
- AICT : Adani International Container Terminal
- AMCT : Adani Mundra Container Terminal
- AMCT-T2 : Adani Mundra Container Terminal - 2
- NSIGT : Nhava Sheva India Gateway Terminal
- ACMT : Adani CMA Mundra Terminal
- MICT : Mundra International Container Terminal
- CIT : Chennai International Terminal
- APMT-P : APM Terminal - Pipavav
- BMCT : Bharat Mumbai Container Terminal
- JNPCT : Jawaharlal Nehru Port Container Terminals
- AKP : Adani Kattupalli Container Terminal
- DBGT : Dakshin Bharat Gateway Terminal
- ICTT : Vallarpadam International Container Transshipment Terminal
- AHCT : Adani Hazira Container Terminal
- BKCT : Bharat Kolkata Container Terminal
- HICT : Haldia International Container Terminal
- AKCT : Adani Krishanapatnam Container Terminal
- NSICT : Nhava Sheva International Container Terminal
- VCT : Visakha Container Terminal
- CCT : Chennai Container Terminal
- KICT : Kandla International Container Terminal
- TCT : PSA SICAL Tuticorin Container Terminal
- AECT : Adani Ennore Container Terminal
- KCT : Kakinada Container Terminal
- NMCT : New Mangalore Container Terminal
- PICT : Paradip International Container Terminal

Reference	Throughput (TEUs)	Growth (Y-O-Y) (%)
High	>723,000	>31%
Medium	723,000-361,500	15-31%
Low	<361,500	<15%

I N D I A N C O N T A I N E R

Container Terminal Name	Called as	Operated by	Year of Commission	Draft (m)	Berths	Quay Length (m)	Yard Area (Hectares)	Storage Capacity (TEU)
APM Terminals Pipavav	GPPL	APM Terminals Pipavav	2002	15.5	2	735	36.00	10000
Mundra International Container Terminal	MICT	DP World	2003	14.5	2	632	25.00	10000
Adani Mundra Container Terminal 2	AMCT 2	APSEZ Pvt Ltd	2007	17.5	2	631	16.70	10000
Adani Mundra Container Terminal 2 Ext	AMCT 2 Ext	APSEZ Pvt Ltd	NA	NA	NA	NA	NA	10000
Adani International Container Terminal - CT3	AICTPL	APSEZ Pvt Ltd and MSC S A	2012	17.0	4	1460	65.00	10000
Adani CMA Mundra Terminal - CT4	ACMTPL	APSEZ Ltd and CMA CGM SA	2017	16.5	2	650	28.00	10000
Adani Hazira Container terminal	AHCT	APSEZ Pvt Ltd	2012	13.0	2	637	20.00	10000
Kandla International Container Terminal	KICTL	J M Baxi & Co.	2016	13.0	2	545	18.74	10000
Jawaharlal Nehru Port Container Terminal & Shallow berth	JNPCT	J M Baxi-CMA Terminals	1989	15 & 10	3	680 & 445	61.49	10000
Nhava Sheva International Container Terminal	NSICT	DP World	1999	14.0	2	600	25.84	10000
Nhava Sheva India Gateway Terminal	NSIGT	DP World	2015	14.0	1	330	27.00	10000
APM Terminals Mumbai	APMT-GTIPL	APM Terminals and CONCOR	2006	14.0	2	840	63.00	10000
Bharat Mumbai Container Terminal	BMCTPL	PSA International	2018	16.5	3	1000	100.00	10000
Mangalore Container Terminal Pvt. Ltd	MCTPL	JSW	NA	14.0	1	350	15.50	10000
Mormugao Port - Containers		Mormugao Port Trust	NA	13.1	1	250	1.50	10000
Mumbai Port - Containers		Mumbai Port Trust	NA	9.1	5	812	NA	10000
Vallarpadam International Container Transhipment Terminal	ICTT	DP World	2011	14.5	2	605	65.00	10000
Paradip Port - Containers	PICT	J M Baxi & Co.	NA	14.5	2	450	4.80	10000
Chennai Container Terminal	CCTL	DP World	2001	15.0	4	885	21.00	10000
Chennai International Terminal	CITPL	PSA Chennai	2009	15.5	3	832	35.00	10000
Adani Ennore Container Terminal	AECTPL	APSEZ Pvt Ltd	2017	18.0	1	400	15.00	10000
Visakha Container Terminal 1	VCTPL	J M Baxi & Co.	2003	16.5	2	450	24.00	10000
Visakha Container Terminal 2	VCTPL	J M Baxi & Co.	2022	16.5	1	395	NA	10000
Krishnapatnam Port Container Terminal	KPCT	APSEZ Pvt Ltd	2012	13.5	2	650	15.00	10000
Kattupalli International Container Terminal	KICT	APSEZ Pvt Ltd	2013	14.0	2	710	20.00	10000
Bharat Kolkata Container Terminal	BKCT	PSA International	1979	8.5	5	812	13.30	10000
Haldia International Container Terminal	HICT	J M Baxi & Co.	1977	8.5	2	432	9.00	10000
PSA SICAL Tuticorin Container Terminal	TCT	Sical and PSA International	1999	10.9	1	370	4.00	10000
Dakshin Bharat Gateway Terminal	DBGT	Dakshin Bharat Gateway Terminal Pvt Ltd	2014	12.8	1	345	6.50	10000
Kakinada Container Terminal	KCTPL	Bothra Shipping & Kakinada Infrastructure Holdings	2015	14.5	1	300	5.00	10000

NA - Not Available

T E R M I N A L S										
Total Ground ts (TGS)	Reefer Plugs	Quay Cranes	Rubber Tyred Gantry Cranes (RTGC)	Rail Mounted Gantry Cranes (RMGC)	Reach Stackers	Fork Lifts	Installed Capacity (TEUs) 2021-22	Through-put(TEUs) 2021-22	Capacity Utilization (%)	Growth Rate
3,409	525	3 Panamax and 5 Post Panamax	20	4	9	2	13,50,000	6,29,471	47%	-15.9%
5,400	366	4 Super post panamax and 3 Post panamax	22	2	2	4	13,00,000	11,07,070	85%	8.2%
4,014	366	6 Super Post Panamax	20	NA	3	NA	13,00,000	10,06,866	77%	13.4%
NA	NA	3 Super Post Panamax	NA	NA	NA	NA	5,00,000	3,90,042	78%	697.4%
3,903	405	15 Super Post Panamax	45	3	3	NA	31,00,000	29,12,737	94%	10.7%
6,500	400	4 Super Post Panamax	12	NA	NA	NA	13,00,000	10,98,486	84%	2.9%
3,500	120	4 Post Panamax and 2 Super Post Panamax	16	NA	2	NA	10,00,000	6,27,357	63%	-4.9%
2,688	68	5 Super Post Panamax	8	NA	6	3	6,00,000	4,94,003	82%	-4.0%
0,482	576	6 Super Post panamax and 2 Post Panamax	27	3	10	3	15,00,000	4,40,240	29%	-17.9%
6,222	778	6 Post Panamax	33	3	3	2	12,00,000	9,49,886	79%	28.9%
NA	336	4 Super Post Panamax	17	Nil	1	NA	8,00,000	11,86,183	148%	55.0%
9,723	880	10 Post Panamx	45	3	2	6	18,00,000	18,64,434	104%	13.7%
9,366	1620	12 Super Post Panamax	4	38	NA	NA	24,00,000	12,44,564	52%	33.4%
NA	150	3 Mobile Harbour cranes	NA	NA	8	NA	2,40,000	1,52,482	64%	1.4%
489	84	2 Mobile Harbour Cranes	NA	NA	2	NA	70,000	9956	14%	-36.9%
NA	NA	6 Mobile Harbour Cranes	NA	NA	NA	30	NA	22,251	NA	-9.8%
2,500	450	4 Super Post Panamax	15	NA	3	NA	10,00,000	7,35,577	74%	6.7%
NA	96	3 Mobile Harbour Crane	2	NA	7	26	2,00,000	9,807	5%	-39.9%
3,960	355	4 Super Post Panamx and 5 Post Panamax	23	3	2	1	16,00,000	7,29,530	46%	35.3%
5,424	306	4 Super Post Panamx and 3 Post Panamax	20	NA	6	NA	15,00,000	8,72,637	58%	2.9%
4,000	NA	4 Super Post Panamax	12	NA	1	NA	8,00,000	4,80,255	60%	139.6%
2,500	350	2 Panamax and 2 Post Panamax	6	NA	5	3	6,00,000	5,11,471	85%	6.8%
NA	300	3 Super Post Panamax	9	NA	NA	NA	7,50,000	NA	NA	NA
4,600	400	5 Super Post Panamax	4	NA	10	2	20,00,000	1,44,016	7%	-57.0%
5,120	360	6 Super Post Panamax	15	NA	3	4	12,00,000	4,30,807	36%	-20.3%
3,000	NA	Mobile Harbour Cranes	NA	NA	9	NA	8,50,000	5,64,034	66%	6.5%
3,000	24	2 Panamax	4	NA	2	NA	2,50,000	1,65,662	66%	9.3%
1,000	84	3 Post Panamax	8	0	2	1	4,50,000	1,85,034	41%	-13.3%
1,838	NA	3 Cranes	9	0	2	0	7,50,000	5,98,279	80%	9.0%
400	90	2 Post Panamax	0	0	2	NA	1,00,000	3,236	3%	-85.0%

INDIAN CONTAINER TERMINAL RANKINGS 2021 - 2022

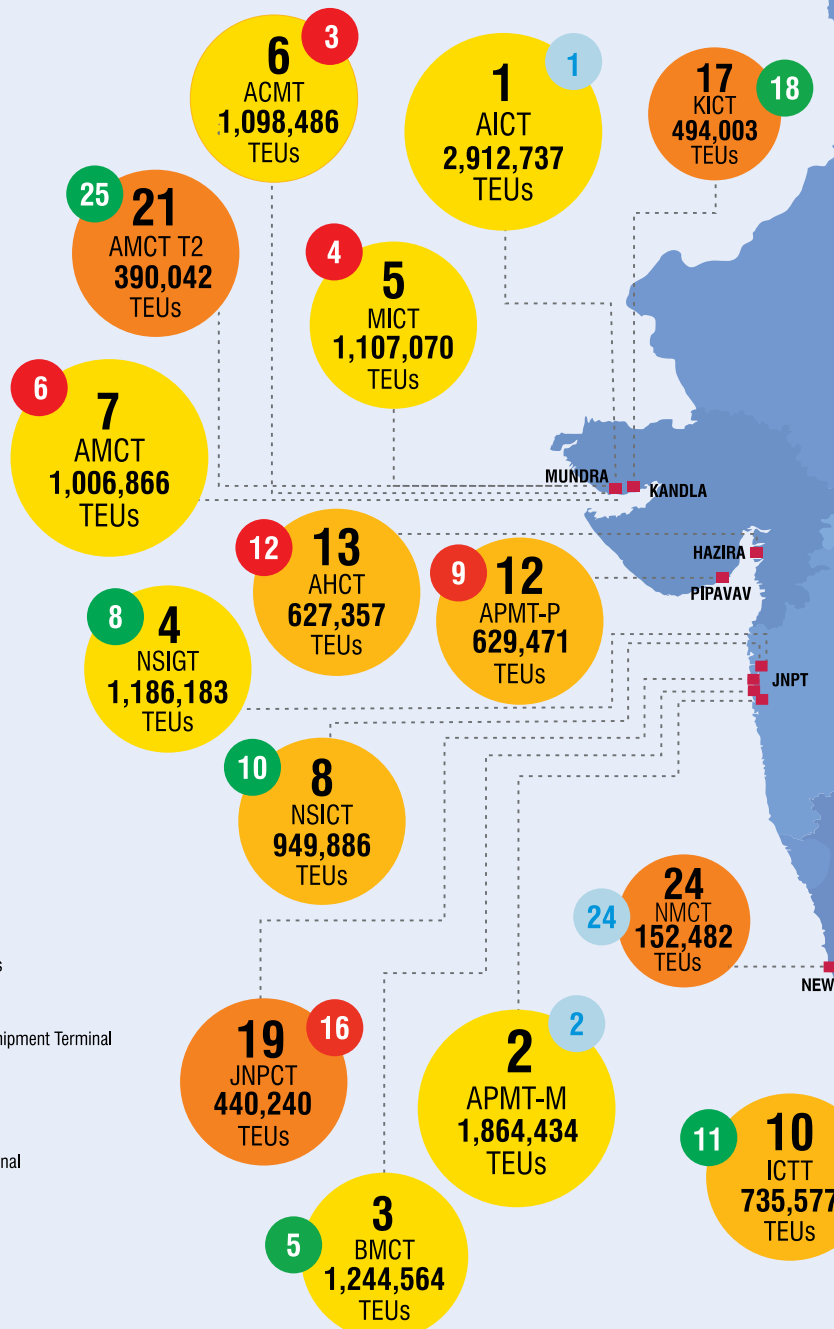
Total Installed Capacity

30,280,000 TEUs

Total Throughput

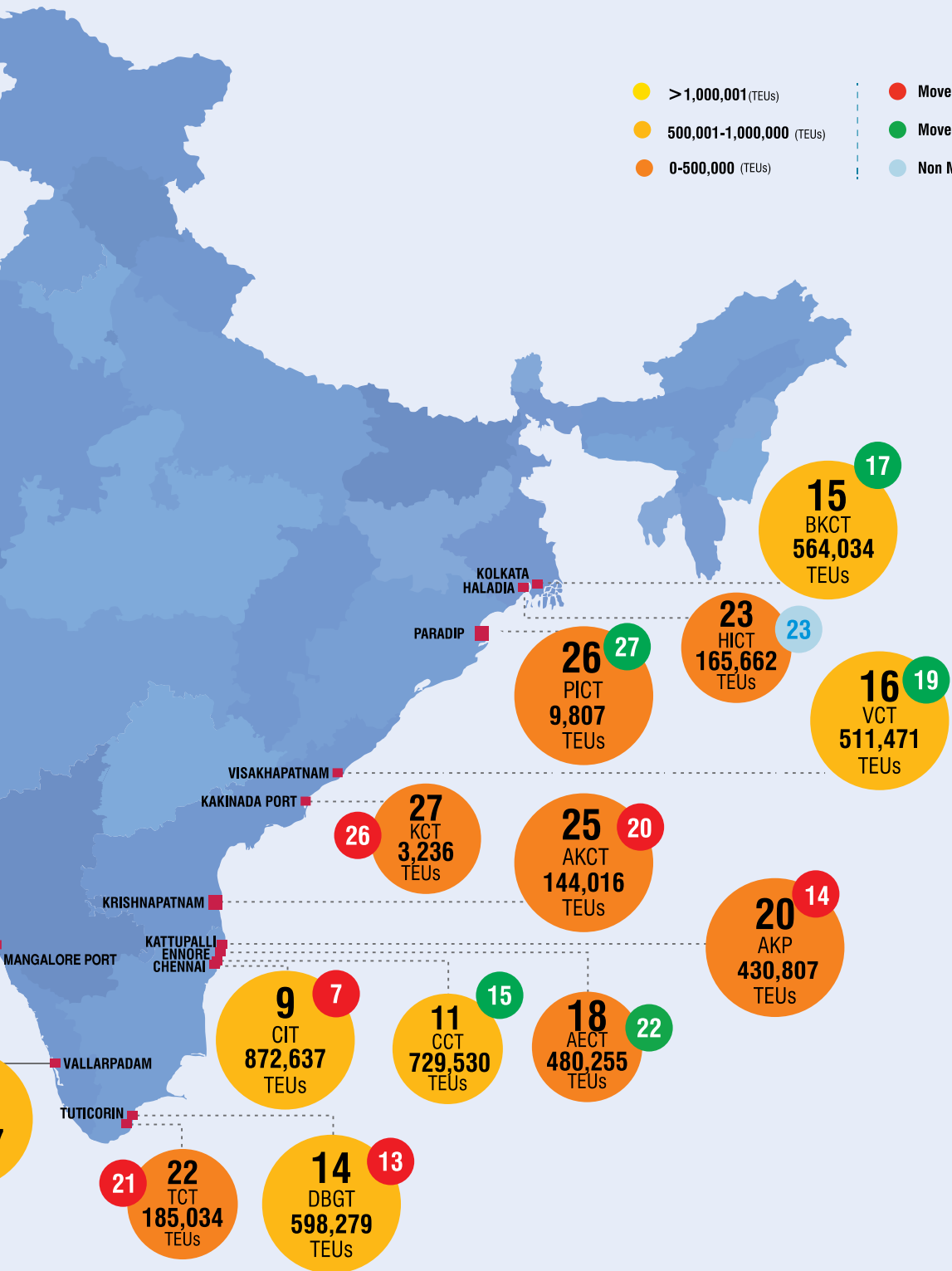
19,534,166 TEUs

APMT-M	: APM Terminals - Mumbai
AICT	: Adani International Container Terminal
AMCT	: Adani Mundra Container Terminal
AMCT-T2	: Adani Mundra Container Terminal - 2
NSIGT	: Nhava Sheva India Gateway Terminal
ACMT	: Adani CMA Mundra Terminal
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PICT	: Paradip International Container Terminal



- >1,000,001 (TEUs)
- 500,001-1,000,000 (TEUs)
- 0-500,000 (TEUs)

- Moved Down
- Moved Up
- Non Mover





BANGLADESH

Flexing infrastructure to fuel economic growth

Infrastructure and capacity at land and seaports is being increased. Time and cost of import-export trade clearance will be reduced by 30 to 40 per cent.

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Bangladesh has demonstrated remarkable development performance over the past few decades, with consistent growth averaging 6% a year since 2000. The country has attained 'lower-middle income status' in 2015 and is on the run for graduating into a 'developing country' by 2026. The grand vision is to become a 'High-Income Country' by 2041.

Bangladesh's stellar development so far has been primarily export-led. Over the years, Bangladesh has become an important player in the global textile and ready-made garments value chain. Records of Bangladesh's exports show an annual average growth of about 10.25% since 2001. The target is to achieve \$100 billion worth of RMG exports by 2030. This requires uninterrupted supply chain in terms of raw material procurement and assured shipping schedules for exports. There is no room for consignments missing shipping targets due to port congestion or disruptions in supply chain.

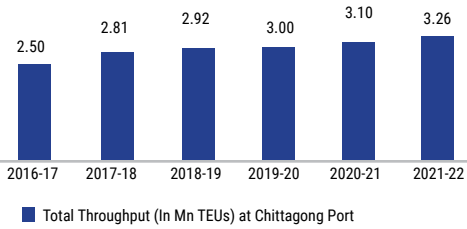
Bangladesh's port sector is in the cusp of massive expansion that prompts stakeholders to suggest bigger private-sector involvement to ensure efficiency in operation of the seaports. The country's ports have a combined capacity to handle around 4 million TEUs, which is expected to rise to more than eight-million teus by 2026.

"After the engagement of the private sector, we have seen improvement in operations in Chittagong port," said Dr. Mustafizur Rahaman, Distinguished Fellow, Centre for Policy Dialogue. Presently, Chittagong seaport alone dominates the port sector by handling 97 per cent of the country's export-import cargoes. The port's present capacity is around 4.0 million TEUs, and with the construction of the Bay terminal, the capacity will expand by over 2.0 million TEUs. And the commencement of Matarbari deep-sea port will add another 2.5 million TEUs to the capacity. Mongla seaport is also having two modernisation projects under which it is going to have another six jetties for trade handling.

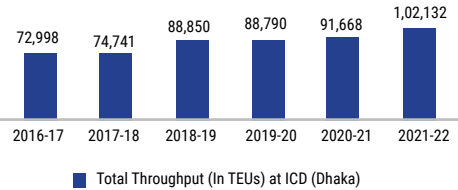
Mongla Port is gradually flexing its capacity to welcome larger ships, such as the MV Tokyo with 8-metre draught (the first of its size) that berthed at the port last year. Mongla is now set to become a key player after the opening of the Padma Bridge, which establishes direct 170km road link between the capital and the seaport. The port is being upgraded to make it a regional trading hub for India, Nepal and Bhutan. The port has a capacity to handle 0.1 million TEUs with 50 berthing facilities, 153 cargo-handling pieces of equipment and 38 assisting vessels. The port will be able to handle 24.9 million tonnes of



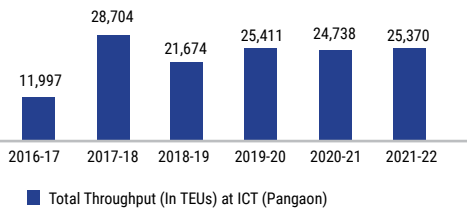
Total Throughput (In Mn Teus) at Chittagong Port



Total Throughput (In Teus) at ICD (Dhaka)



Total Throughput (In Teus) at ICT (Pangaon)



India - Bangladesh Connectivity Projects

Project	Type
Agartala Akhaura Rail	Railway
Chilahati - Haldibari Rail link	Railway
Coastal Shipping Routes	Railway
Inland Waterway 1 (Ganga) and 2 (Brahmaputra)	Inland Waterways

goods in 2030 and 47.4 million tonnes in 2040.

Payra Port Authority has also taken up expansion project to increase its 80-metre jetty to 600-metre one. Completion of the ongoing dredging project would allow ships with 40-50 thousand DWT for berthing in the seaport.

“Chittagong Port was once plagued by labour unrest, but now the same port has advanced three steps in a year and became world’s 64th busiest port in terms of annual throughput of containers in 2021. It was ranked 87th in 2014,” recalled Mahbubul Alam, President of Chittagong Chamber.

The 2022 edition of Lloyd’s List’s One Hundred Ports showed the Chittagong port handled a total of 3,214,548 TEUs of containers in 2021, up from 2,839,977 TEUs in the previous year, posting 13.2-per cent year-on-year growth in container handling.

Cargo handling by the port posted 13-percent year-on-year growth in 2021 as the port handled a total of 116.6 million tonnes of cargoes in 2021, up from 103.2 million tonnes in the previous year.

To increase the capacity of the Chittagong port, last year, Saudi company RGST was selected for construction of the Bay Terminal beside the Chittagong Port.

The new facility will feature a 600-metre quay and will be able to handle three vessels simultaneously. The Bay Terminal, capable of handling domestic and regional cargo passage in the Bay of Bengal area, can help increase Chattagram Port’s capacity from the current 3.2 million TEUs, to the expected 5.6 million TEU containers by the year 2036.

Streamlining the exim mechanism

The Bangladesh Export Processing Zones Authority (BEPZA) has hit an all-time high growth in its journey of 40 years in the fiscal year 2021-22. Exports & investment increased by 30.4% and 20%, respectively. Bangladesh is going to start moving exports to India by rail. Imports through rail from India saw a sharp rise in the last two years. In the first 10 months of fiscal 2021- 22, the Bangladesh Rail brought in 29.92 lakh tonnes of goods from India. Earlier this year, India lifted the restrictions on importing goods from Bangladesh via trains, and Bangladesh Railway (BR) fixed the shipping costs. Sri Lanka has already allowed Bangladesh to use the Hambantota port. Bangladesh- Sri Lanka annual trade volume currently stands at \$61 million.

The Customs authority under the National Board of Revenue (NBR) is going to introduce ‘business

process reengineering' mechanism with the support of USAID to curtail the number of import-clearance steps in sea, air and land ports. Time and cost of import-export trade will be reduced by 30 to 40 per cent once the reengineering is completed, officials said.

USAID is providing technical assistance to the NBR and already has submitted a report by sorting out the unnecessary steps occupying import-export process. A Time Release Study-2022, conducted by Customs officials revealed that importers have to complete the import-clearing process by passing through - 32 steps at Chattogram seaport, 28 steps at Benapole and 25 steps at Hazrat Shahjalal International Airport.

During fiscal year 2013-2022, the number of import bills of entry processed by CCH registered a 161.1-percent rise. In FY 2022, imports worth \$ 73.3 billion and exports worth \$ 37.6 billion were processed through CCH.

However, manpower and infrastructure have not been developed on that scale to manage such large volumes of export-import goods. Influx of appropriate digitalisation along with skilled human resources will expedite import/export clearance, while bringing down the cost.

Rising inflation

The forwarding charges for each import bill have increased from \$20 in 2010 to \$35 in 2013 and it currently stands at \$55 per import bill. Rising fuel charges is causing this ripple effect which pushed the rate increases by the Bangladesh Inland Depots Association (BICDA) for diesel-linked service charges by 25%. Importers are the primary payee of the additional forwarding costs, which will raise the price of imported goods at a consumer level, while the export industry will also suffer, as raw material sourcing will cost more. Businesses have also been hit hard by rising trucking costs, as the majority of transport runs on diesel, which has seen a 42.5% price rise.

Bangladesh has also been in the spotlight recently for emerging as an important transshipment hub for connecting the north-eastern states of India.

Connecting India's northeast

A transit agreement between Bangladesh and Bhutan has been finalised enabling Bhutan to use Mongla seaport and Banglabandha and Sonarhaat land ports for moving its cargo. Bangladesh will impose a transit fee on Bhutanese vehicles for using the ports as per standard practices.

During a visit of Prime Minister Sheikh Hasina to India in 2019, a SOP (Standard Operating Procedure) was

“The Bay Terminal, capable of supporting domestic cargo as well as enabling passage of regional cargo in the Bay of Bengal area, can help increase Chattogram Port’s handling capacity from the current 3.2 million TEUs, taking it close to the expected 5.6 million TEU containers by the year 2036.”

signed to operationalize the agreement for transshipment of good to northeast states via Bangladesh. There are eight approved routes for transit of goods, namely Chittagong/Mongla port to Agartala via Akhaura, Chittagong/Mongla port to Dawkivia Tamabil, Chittagong/Mongla port to Sutarkandi via Sheola, Chittagong/Monglaport to Srimantapur via Bibirbazar and vice versa on all four routes.

The first trial movement on the route Chittagong-Akhaura-Agartala was successfully conducted in July 2020 wherein four containers, two each of TMT steel and pulses, were delivered at ICP Agartala from Kolkata through Chittagong Port. On September 3, CJ Darcl Logistics flagged of cargo ships from Kolkata Port. The cargo ships are scheduled to follow Kolkata – Chattogram - Sheol & Tamabil- Chattogram -Kolkata route as part of the trial run.

Post unloading at Chittagong Port, the goods will be sent to the state of Assembly road through the Sheola land port in Sylhet. India is eager to begin regular transits between Kolkata and key cities in its northeastern states through the ports in Bangladesh as it would cut the 1,200 KM distance by about half.

A similar transshipment trial was done on September 7 by cargo vessel named Trans Samudera that arrived at Chittagong port carrying an Indian transit container to be transported to the northeastern state of Assam via Bangladesh. The trial run was undertaken by Tata Steel and CJ Darcl Logistics Ltd on the Chittagong-Sheola-Sutarkandi route.



SRI LANKA

Metamorphosis from a transshipment hub to a maritime hub

Growing beyond transshipment, Sri Lanka plans to evolve into a full-fledged maritime hub where partly finished goods can be developed for re-export, ship repair services and maritime arbitration services can be offered

35

During the past few years Sri Lanka has been through a double whammy effect of the pandemic, followed by the political and economic turmoil. But the Port of Colombo, which caters mainly to transshipment cargo has always been almost entirely insulated from Sri Lanka's domestic issues, be they political, security or economic. Transshipment volumes over Colombo have grown at a historical CAGR of above 9% over the past 15 years. In this backdrop, the Port of Colombo has clearly charted out its growth plans and intent through the currently ongoing development of the West Container Terminal by Adani Ports led Consortium and the East Container Terminal by the SLPA; transshipment volumes over Colombo will continue to grow, particularly given the significant growth trajectories in South Asian economies led by India.

Disruption at the Colombo Port due to the pandemic

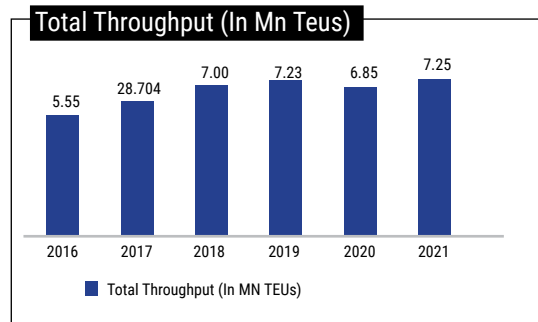
and economic crisis saw certain maritime traffic diverting to Indian ports temporarily. The International Container Transshipment Terminal (ICTT) in Kochi, Kamarajar Port Limited and VOC Port had all reported increase in container traffic in the past few months. However, the Sri Lanka Ports Authority was quick to bring the port operations back into sync. Ted Muttiah, Chief Commercial Officer, SAGT shares, "The Port of Colombo consists of 3 terminals: CICT, the latest and the only deep draft facility in South Asia, SAGT is the first private terminal that was established in 1999 and of course, Jaya Container Terminal (JCT) which is a government operated terminal. All the 3 terminals, like many in the region and globally did, at the outset of the pandemic, had some disruptions, but the 3 terminals currently are working in close operational collaboration and have now normalized the port operations in Colombo. The disruptions were mainly because containers were not moving as importers and the

truck drivers could not clear them, as they were in the lockdown areas. Due to these reasons some container lines also skipped calls at the port temporarily, but all of it is now a distant past.” To facilitate trade, the Sri Lanka Ports Authority waived demurrage charges, storage charges and rent levied from shipping lines, consignees, importers and exporters.

With a stable government in place the island nation is busy flexing its maritime infrastructure to get ready for the future cargo growth. “The government wants more public-private partnerships (PPP) to take place enabling the private sector to invest in state sector and earn benefits,” opined Minister of Aviation and Shipping, Nimal Siripala de Silva. He added, “In the port of Colombo while we have our own two terminals, another one is being built at the ECT, and then there is this WICT, which we have given to Adani Group as a joint venture. The other terminal is SAGT which is jointly done with John Keells. We have another terminal also of JCT as JCT5. We have to invest \$75 million towards Eastern Terminal (ECT) development. We have a road map on how to find Dollars and ensure that the ECT becomes a reality. For the JCT, we are investing another \$400 million to expand the capacity and bring in automation.”

The sunny days are back in Sri Lanka as business in 2021 was good with the Port of Colombo (PoC) handling its all-time highest volume of 7.25 million TEUs in the calendar year, a YOY growth of almost 6% over 2020. This increase was mainly on the back of a 5% growth in transshipment volumes, which represented 84% of total throughput, primarily to/from India and Bangladesh and a 10% growth in domestic cargo, driven by a surge in imports. 59% of transshipment is coming from Indian market, lower than previous year share of 70% due to increased direct callings at west & east coast ports of India. The year 2022 has yielded a mixed bag, with volumes growing steadily until April 2022 and thereafter beginning to taper slightly on the back of an easing in global demand.

Sri Lanka’s container transshipment volumes fell 4.5% from a year ago to 4,83,070 TEUs in June 2022 (Total containers handled in June fell 9.3% to 577,082 TEUs) as domestic imports also fell, as the economy was contracted to stabilize a soft-peg which collapsed due to earlier money printing. The Colombo Port saw volume increases of about 6% in 2021, while transshipment volumes grew by 4.2% to 5.85 Mn TEUs. In early 2022, Colombo Port began phase two of its Eastern Terminal extension which will allow it to handle the largest container vessels.



Ports & Terminals	Throughput (Mn TEUs) in 2021	Y-O-Y Growth (%)
CICT*	3.2	11%
JCT* & ECT*	2.2	5%
SAGT*	1.8	-2%

*Colombo International Container Terminal (CICT), *Jaya Container Terminal (JCT), *East Container Terminal (ECT), *South Asia Gateway Terminal (SAGT)

Feeder services get costly

As freight rates continue to rise with rising oil prices, feeder services get costly. Southern India shippers – predominantly tethered to foreign transshipment in the absence of sufficient direct mainline connections out of home ports – are facing a new challenge: rocketing feeder charges at Sri Lanka’s Colombo Port. As reported in February 2022, average feeder fees from Cochin or Tuticorin to Colombo have doubled in recent weeks, hitting \$200 per TEU, as compared to \$95 per teu a few weeks ago. Feeder and short-sea carrier sources attributed the increase to high charter costs because of deteriorating vessel turn times caused by port slowdowns and rising fuel prices. Sources said feeder vessels are incurring an average waiting time of two to three days at Colombo.

Other factors constraining feeder shipments from India and timely removal of containers at Colombo include the tightening foreign exchange situation in Sri Lanka after the local rupee sharply depreciated against the US dollar, while internal remittances – mostly generated by the country’s mainstay tourism industry – declined amidst the pandemic disruption.



The same is the scenario with Bangladesh. Raw material from Colombo is shipped to Bangladesh and mostly apparel exports from Bangladesh are shipped to Europe and US via Colombo Port. As the freight charges have shot up the feeder business has become very lucrative.

Ocean Network Express (ONE) has announced the start of a new feeder service between India, Sri Lanka and Singapore. In January 2022, the Ceylon Shipping Corporation started a container feeder service between Colombo and Bangladesh and this will be followed by a second service between Colombo and Oman. Ceylon Shipping Corporation (CSC) Chairman Sudhammika Wineendra said they have already approved a MoU to be signed with the Bangladeshi Shipping Corporation soon. Talks are in progress with the Oman Ambassador in Sri Lanka to launch a feeder service from Colombo to Oman for containerised cargo. Two container ships that could carry around 1,000 to 1,500 TEUs will be hired for this operation. Soon RFP's will be invited in this regard.

Bangladesh-based container ship operator HR Lines Ltd has also launched the Colombo-Chatto gram feeder service with two container vessels initially with a capacity of 1,454 TEU each.

Few years back Qatar-based Milaha had started direct feeder service between Sri Lanka and Bangladesh. Called the BCX service, it operates two vessels with a capacity of 1,200 TEUs, following a Colombo-Chittagong-Colombo rotation with a transit time of five days.

Reforms to lift the economy

As the new government headed by President Ranil Wickremesinghe came into power he focused on debt-restructuring in collaboration with the IMF.

A National Economic Policy for the next 25 years is being prepared to bring down the public debt to GDP ratio to less than 100. He said focus on logistics and nuclear energy will be required to revive the bankrupt economy. The FTA between Sri Lanka and India will be revived and upgraded to a comprehensive economic and technological partnership. The Sri Lankan Government has decided to open the fuel import and retail sales market to companies from oil producing nations. The Ceylon Petroleum Corporation (CPC) will be the service provider for logistics, stocking and distribution with a service fee charged from the companies.

With infrastructure upgrade plans in place Colombo Port plans to increase its container handling capacity to 14 million TEUs in 2025-26. The existing capacity at Colombo Port is 8 Mn TEU, to which 6 million TEUs will be added by 2025 by developing the East and West container terminals with a depth of 20 meters and having Quay Cranes of 26 across reach. Another 10 Mn TEUs will be added in the North Port which will give a total of 24 million TEUs capacity at Colombo Port by 2040.

The port of Colombo looks forward to position itself as an international flow centre where you can bring partially completed goods and finish them off in Port of Colombo within the customs-controlled area and then re-ship them out. So, this is re-shipping of transit for re-export. The port also has potential for ship repair and maintenance operations, without the need for a ship to get into a dry dock. Maritime arbitration is another aspect, Singapore has done a wonderful job in that regard as to providing maritime arbitration. All of these factors contribute to positioning a location as being an effective maritime hub, and not just a transshipment hub.



PAKISTAN

Negative Growth

Pakistan total throughput witnessed a negative trend from 2016-17 to 2019-20, however, it was able to register a positive growth in 2020-21, but again fell in 2021-22.

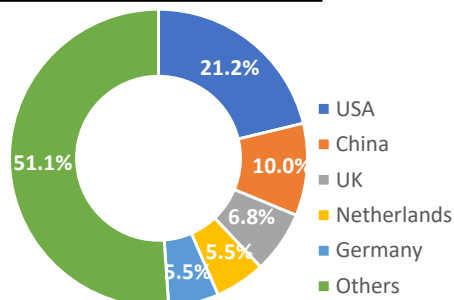
Pakistan International Container Terminal (PICT), has handled its first ever export shipment from Uzbekistan. The shipment was transported by land to the Port of Karachi where it prepared for export to India.

The cargo-containership Messina Line's JOLLY QUARZO, the first ro-ro vessel docked at the facility on 1 February 2022 and marked the resumption of ro-ro services at the Port of Karachi after 20 years. PICT hopes this development would encourage other countries to leverage Pakistan's trade route.

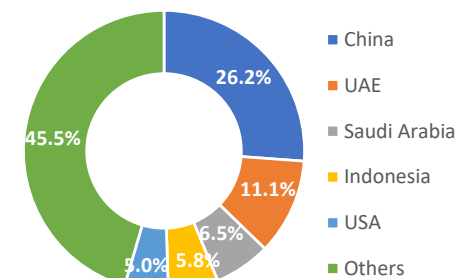
The freight charges are soaring due to logistics imbalance of container shortages, skipping port calls, reduction of vessel capacity and partial closure of major ports around the world. Thus, ultimately increased exports from Pakistan on the back of importing raw material, machinery items etc. to meet the demand.

Till 3QFY21, the country was also affected by lockdowns, but port cargo handling picked up momentum from the fourth quarter after local situation improved and exports to the US, European Union and China recorded significant increases.

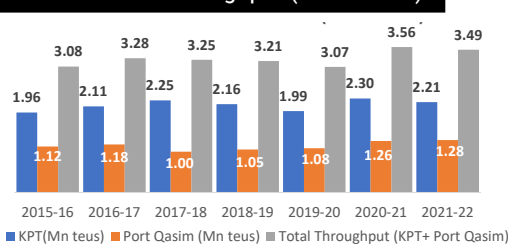
Pakistan Exports (Share of countries in %) 2022



Pakistan Imports (Share of countries in %) 2022



Pakistan Total Throughput (in MN Teus)





MALDIVES

Upcoming Transshipment Port

Maldives is planning to develop an international container transshipment port to handle a capacity of 1.8 million TEU's/year in the first phase by 2024.

Maldives has a flourishing tourism market and offers an excellent opportunity for global trade. Interestingly, about 90% of Maldives' trade is import and spearheaded by China, India, and Sri Lanka.

Maersk Line has been serving Maldives with a direct, weekly feeder link between Colombo (Sri Lanka), and Male (Maldives) for better trade to/from South Asia.

In spite of political turmoil, new shipping links and year on year growth of container volumes helping the trade to grow further.

Maldives is planning to develop an international container transshipment port and it is open for interested parties to build a 900 meter quay.

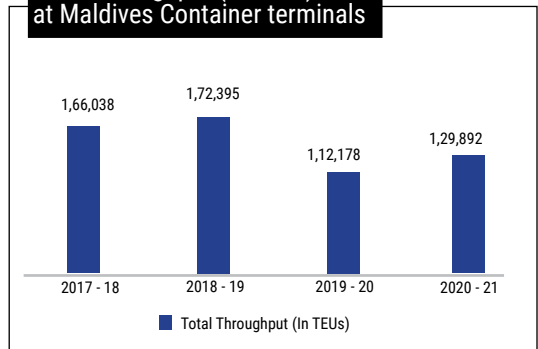
The port will be able to handle a capacity of 1.8 million TEU's/year in the first phase of the project with its operations to start by 2024.

Container shipping prices currently range from MVR 30,000 to upwards of MVR 80,000, with prices based on the type of goods or the weather.

Maldives Ports Limited (MPL) began container ferry services to atolls in an attempt to facilitate transport of goods brought to the Malé North harbour and the islands.

The service will transport containers to the Hitadhoo port in Addu City and to Kulhudhuffushi City Port, with plans to expand services to Thinadhoo once the island's harbour is completed.

Total Throughput (In TEUs) at Maldives Container terminals



Throughput includes all 4 Maldives terminals mentioned above

- Male Commercial Harbour
- Hulhumale Terminal
- Kulhudhufushi Regional Port
- Hithadhoo Regional Port



NEPAL

Trade performance tangled in multiple issues

The foreign trade of Nepal is tangled in multiple issues plaguing since decades – be it inadequate infrastructure, Customs procedures, transshipment issues, trade finance and export product quality concerns.

40

The exim trade of Nepal has been down last year and through the first half of this year. Generally exports have been very slow and import restrictions by government have also decreased imports from third countries. Import and export with India has been slightly decreased.

Nepal imported goods from 164 countries during the fiscal year 2021-22, valued at \$14.63 million (Rs 1,920 billion). Of this, imports worth \$9.14 million (Rs.1,200 billion) were from India alone, while the export was worth \$1.18 billion (Rs 155 billion). It means the country's trade deficit with India alone was over \$7.96 billion (Rs 1,044 billion) last fiscal year.

In the FY22, Nepal handled 61,301 import containers, 1,030 export containers.

The COVID had a big effect to Nepal trade and the situation currently as well is not very good due to increase in logistics cost (specially ocean freights). The effect of pandemic has been very hard as the government was not prepared for smooth operations and easy connectivity at transit points beyond borders and within.

Recently, the logistics cost has increased and there

has also been scarcity of empty containers. Such situation has led to cancellation of orders or less placement of orders as regards exports. But in case of imports, very little change is seen as demand of imported goods is high and customers are willing to pay the price.

The rail transit time has reduced with private railways operating but cost benefits have not been passed on to the Nepalese importers. The decrease in rail freight from Kolkata and Vizag has been enjoyed by shipping lines as terms of import is C and F or CIF and it is beyond the hands of Nepalese importers or freight forwarders. In such terms of dealing the upper hand is on the exporters in foreign countries where as liabilities are for the importers of Nepal.

Nepal is looking to enhance the logistic performance by adopting to Coordinated Border Management system as well as standardization of ICPs and ICDs through Standard Operating Procedures (SOPs). It is believed that this will enable all terminal operators remain in the same system and monitoring and evaluation will be much easier. Container terminal in the Western region (Dodhara Chadani) is being worked out and waiting for environmental approval.



Trade at ICP Raxaul		
Year	Total Trade (Crores)	Total Cargo Movement (Nos)
2016-17	21,305	1,05,165
2017-18	19,625	1,25,631
2018-19	25,200	1,25,912
2019-20	24,821	1,48,630
2020-21	22,099	1,62,577
2021-22	NA	2,11,257

Total Throughput (2021-22): 126,448 TEUs

Nepal Government is also looking forward to establishing mini logistics centers in some small Customs points like Bhadrapur via Galgalia and Krishnagar etc. Some works on enhancing terminals of Biratnagar for Railway connectivity is also underway. Further study is being conducted to establish warehouses in all 7 Provinces as well as for Agro hubs. Policy for logistics is almost complete and laws and regulations related to logistics like warehouse act, MTO act (amendment) Cargo or Freight Forwarders, Good carriers act, etc, are underway.

The government has decided to set up the Nepal National Single Window (NNSW) and converge it with the regional single window to interchange data and information for paperless trade facilitation. Similarly, the Exim Code has already been implemented. Initiatives in customs modernization such as ASYCUDA World and ASYCUDA++ are also moving ahead side by side. Now all these initiatives need to be integrated with the regional mechanisms in order to ensure a smooth flow of logistics.

Electronic Container Tracking System (ECTS)

ECTS has been introduced to cut down the time and cost of moving containers from Indian ports to Nepal, while ensuring safety. Customs formalities, procedural compliance and paper work are reduced, but at a much higher cost. The device is installed only after port formalities are completed, thus it does not reduce port formalities. The monitoring can be done only when installed by its agent and not the importers. It is functional up to Indian border customs and not beyond. It is just a mechanism to permit Indian counterparts to monitor containers and check diversion. Moreover, the containers are carried by Indian rail and loaded with two containers facing the door. As it is, chance of pilferage or diversion should

India - Nepal Connectivity Projects	
Project	Type
Jogbani-Biratnagar - Katakari	Railway
Jayanagar Bardibas	Railway
DPR for inland waterways	Inland Waterways
Siliguri (India) Jhapa (Nepal) Petroleum pipeline	Pipelines

Major ICDs: Bhairahawa, Biratnagar, Birgunj, Kakarbhitta/Tatopani

be next to Impossible. The challenge is in linking this simple tracking system to international transshipment.

Logistics infrastructure enhancements

Nepal is looking to enhance the logistic performance by adopting Coordinated Boarder Management system as well as standardization of ICPs and ICDs through SOP for terminal operators to monitor and evaluate the overall supply chain easily. Nepal Government is planning to establish mini logistics centers in small custom points like Bhadrapur via Galgalia and Krishnagar etc. Logistics policy is also shaping up that includes warehouse act, MTO act (amendment) Cargo or Freight Forwarders, Good carriers act, etc. German container carrier Hapag-Lloyd deployed a new Nepal-India inland freight service linking Birgunj ICD to the Ports of Kolkata and Visakhapatnam to offer greater flexibility to regional shippers. Developing Siliguri in northern West Bengal will accelerate sustainable transit transport connectivity for the Bangladesh, Bhutan, India, Nepal (BBIN) sub-region. Nepal is just 700km from Kolkata but trucks take 7 days due to poor road conditions, it should be reduced to 3 days.

Growing trade in Southeast Asia

First, we need to identify tradable items in the markets across Southeast Asia. Even if we have exportable items, it will be quite difficult to export our products to markets such as India, Bangladesh and beyond, as their compliance and standards for domestic as well as foreign goods have gone up in recent years. With the changing context in trade and transit, we need to relook the overall strategy and give special focus to address the biggest constraints related to quality compliance and certification of products. Our endeavours in identifying and pro-

moting exportable items through the Nepal Trade Integration Strategy (NTIS) haven't born fruits. The goods exported from Nepal should not be supplied in raw forms. Oranges and betel nut, for example, should not be picked from the trees and supplied directly to the market after little or no value addition. Such items need to be well processed, sanitized, packaged and labelled before they are supplied to the market. The absence of accredited labs adds to our problems in exports.

Customs

Nepali importers have to clear five layers of customs at border points in Bangladesh, India and Nepal if they are to export goods originating from a third country from the Bangladeshi Port. Now there is a need for the countries to adopt automation and start using IT for customs and border clearance processes. This will harmonise the customs procedures eventually reducing the cost of cross border trade in the region.

Trade finance

Three factors play key role in smooth transportation of any logistics with the first being seamless movement of goods followed by flow of information and flow of finance. While we've been emphasizing on seamless flow of goods, the other two factors have been quite neglected. Even among them, the flow of finance is the most neglected one which is particularly due to our existing foreign exchange control mechanism. We often face problems in transferring Indian currency to make payments to Indian suppliers because of the recurring shortage of INR in the domestic banking system. Similarly, we are required to carry out transactions with Bangladesh in US dollars. There is a need for establishing a mechanism which would enable traders to transfer additional money to suppliers and freighters during noticeable fluctuation in foreign exchange rates after receiving permit from the Nepal Rastra Bank.

Transshipment via Bangladesh Ports

It is seen in many parts of the world that any transit providing country tries to have a hold on the delivery of the cargoes to the destinations. For instance, India's transshipment mechanism requires us to use Indian trucks and railways to import goods. The problems are particularly created by the sluggishness in the logistics services being provided by Indian logistics service providers. At present, sometimes it takes weeks for Nepal-bound cargo containers to reach the ICP at Raxaul from the Kolkata Port.

We have been importing goods from India on the Cost, Insurance and Freight (CIF) basis, wherein,

Nepal is looking to enhance the logistic performance by adopting to Coordinated Border Management system as well as standardization of ICPs and ICDs through SOP. It is believed that this will enable all terminal operators remain in the same system and monitoring and evaluation will be much easier.

costs of shipment, transit and insurance of goods are assumed by the suppliers. But once we start using the Bangladeshi port, Nepal-bound third country imports might not receive such coverage which will increase risks in our international trade.

Delivery at Terminal (DAT) is one of the 'incoterms' set and defined by the International Chamber of Commerce (ICC) in international shipment of goods. Under this, the supplier is responsible for the clearance of any consignment until it is received by the consignee. If Nepali importers can negotiate with their suppliers in DAT terms, the risks of demurrage and detention in transshipment of goods will be minimised.

Infrastructure

The major challenges are narrow roads due to hilly terrain, road maintenance issues, low capacity and old bridges. Lack of right vehicle type, handling equipment, maintenance stations and warehouse dry as well as cold. We also lack the distribution modalities of goods from one station to other, so heavy trucks within the city cause congestion. The cities lack intermodal transportation system.

The quality of service at inland ports/dry ports is not up to the standard as regards space management, handling equipment, cleanliness and pollution control, warehousing, labour management etc. Actually the ICDs were made with a very short vision of handling containerized cargo, but are made to handle more of loose or dirty cargo as the volume has increased. The ICP's made with a purpose of immediate clearing with automated system has come into operation in a traditional manner resulting into mismanagement, hap-hazard parking, lack of equipment like cranes and folk lifts. The customs duties being levied on the import of articulated vehicles should be reduced to enhance the inland delivery capacity of transport companies.



BHUTAN

Boosting bilateral trade

Preferential Trade Agreement and access to inland water routes is helping Bhutan expand bilateral trade with Bangladesh.

Bhutan's imports now increased to 61 countries from 43 countries, and export market expanded to 44 countries from 16 countries within a decade.

The new land route for movement of industrial raw materials and goods destined for Pasakha Industrial Estate in Bhutan from West Bengal's Jaigaon, is expected to not only boost bilateral trade and commerce but also lead to decongestion of vehicular traffic along the Jaigaon - Phuentsholing route.

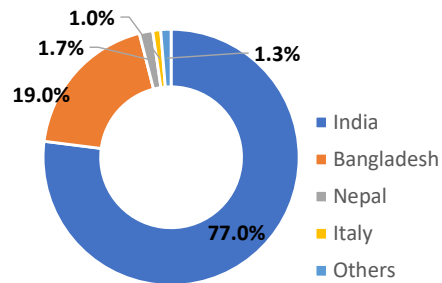
Unlike Bhutan's concentrated exports to Bangladesh, the variety of items imported from Bangladesh has increased considerably in the recent past. Import is expected to pick up in both volume and diversity of goods with further developments in bilateral trading arrangements between the two countries.

As per Preferential Trade Agreement (PTA) between Bhutan and Bangladesh, grant duty free market ac-

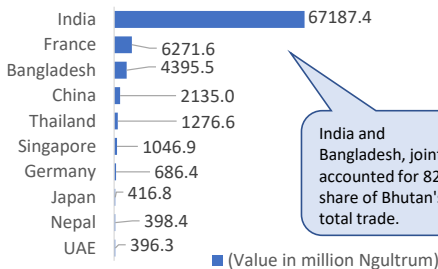
cess available to additional 16 products from Bhutan and 10 products from Bangladesh.

Bhutan has been able to gain access to use inland water transport routes in Bangladesh for bilateral trade and transit cargo.

Bhutan Exports (Share of countries in %) 2020

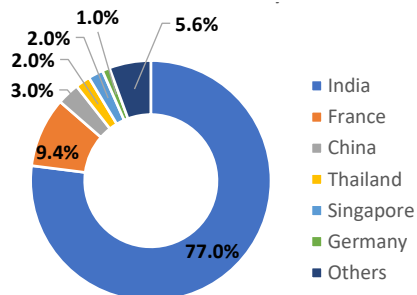


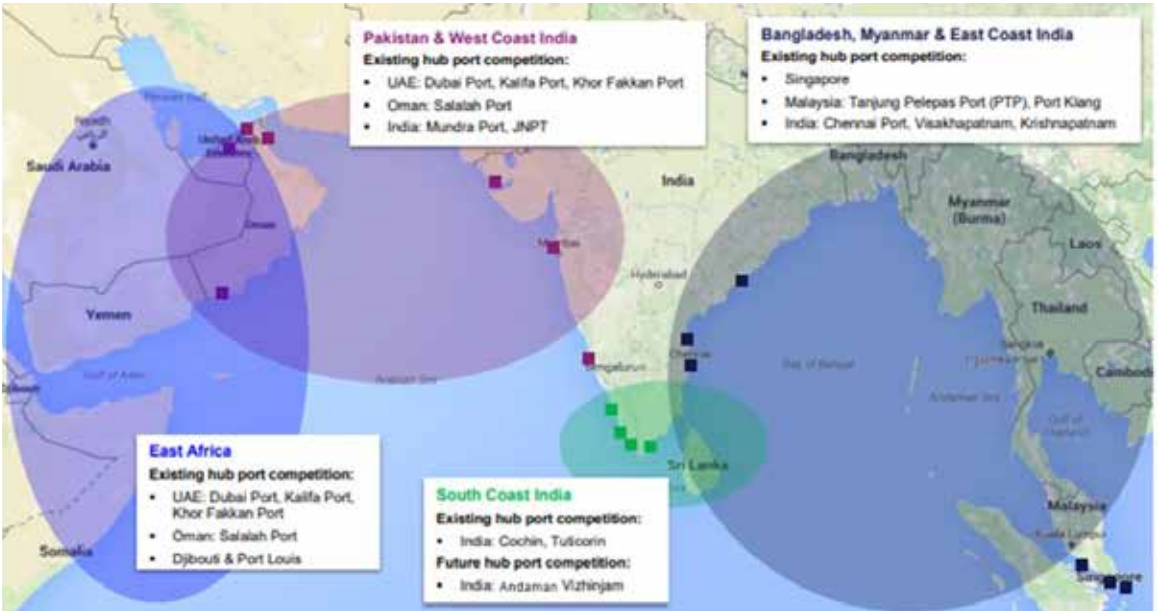
Bhutan Overall Trade Rankings country wise - Top 10 in 2020



India and Bangladesh, jointly accounted for 82% share of Bhutan's total trade.

Bhutan Imports (Share of countries in %) 2020

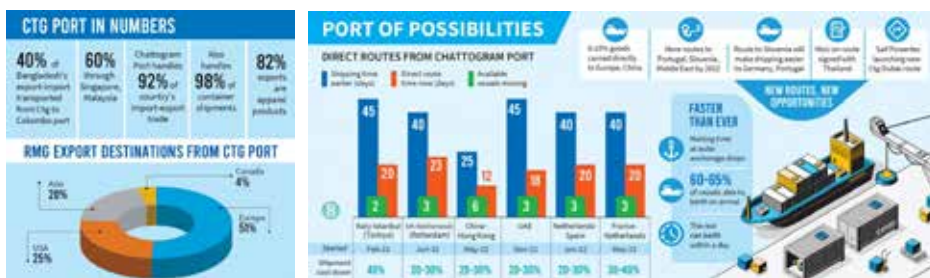




Transshipment Market & Regional Competition

BANGLADESH TRANSHIPMENT

Colombo is the main hub port in South Asia, with transshipment containers accounting for almost 85% of the total container throughput with a rise of 4 percentage points in 2022 against previous year. However it faces competition from other hub ports in the Middle East and South East Asia. Further, increasing direct calls and new port development in India are adding to the competition.



EMERGING TRENDS IN THE TRANSHIPMENT MARKET

CONSOLIDATION IN THE SHIPPING INDUSTRY :

- Reducing bargaining power of terminal operators
- Higher market risks
- Pressure on port pricing

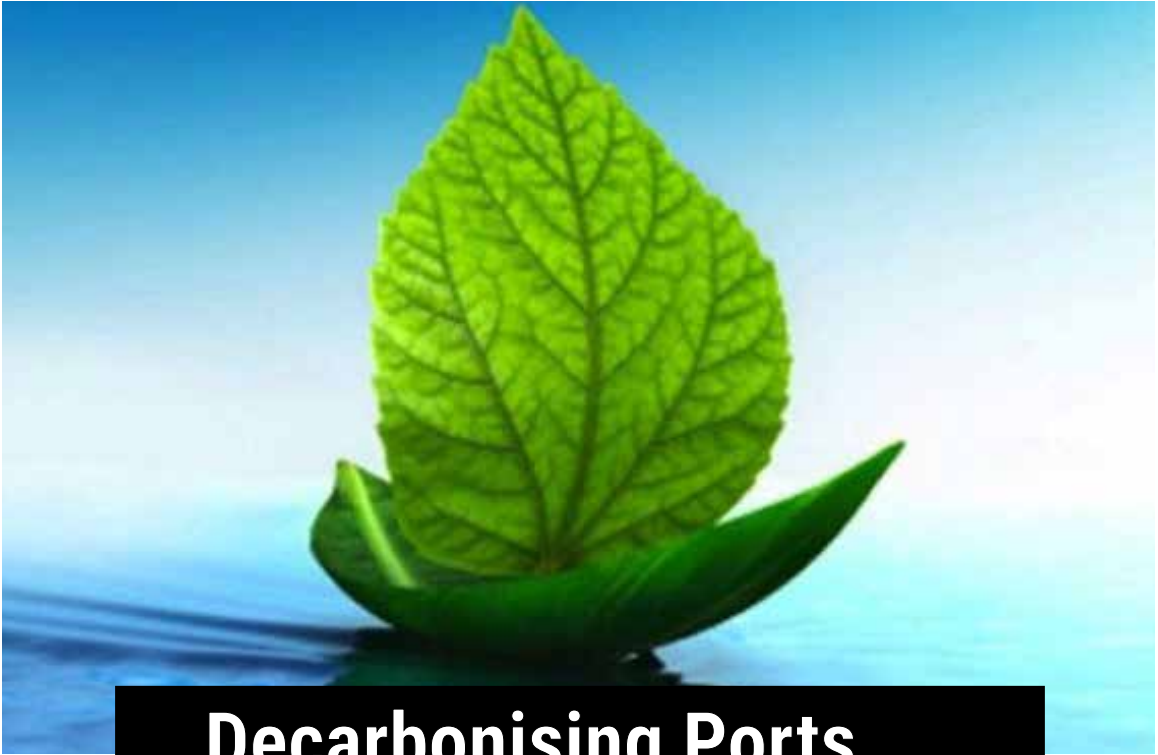
INCREASING VESSEL SIZE:

- Operational challenges in efficiently handling peak volume

- CAPEX - Dredging, Quay Cranes, Yard equipments,

INCREASING COMPETITION

- Capacity addition in South East Asia and Middle East
- Proposed new ports in South India
- Development on the West Coast of India



Decarbonising Ports, Shipping & Logistics

45

The emergence of zero-carbon bunker fuels and the decoupling of the energy supply for shipping from crude oil reserves offer a unique opportunity for some countries to become bunkering hubs in the future.

By **Captain Hemant Gupta**, Principal Consultant, Drewry

In a door-to-door cargo move, the sea leg is the major contributor to Green House Gasses (GHG) emissions, contributing to about 90% share of the total emissions. Reducing emissions from ships is therefore an important task, resulting in a lot of buzz around green shipping and alternative fuel.

Sulphur, NOx and GHG are emitted from vessels due to fuel combustion; these gases are either harmful to humans or the planet. Moves to reduce the emission of CO2 and other GHG generated by shipping have been propelled by a combination of:

- **Regulatory push:** IMO's ambition to reduce emissions has resulted in the requirement for energy-efficient vessels with lower emissions.
- **Push from the financial institutes:** Adoption of the 'Poseidon Principles' by many banks, which means that they will only finance projects which are climate aligned.

- **Push from the end customers:** Charterers of the ships and cargo owners are also exerting pressure on shipowners and operators by the adoption of the 'Sea Cargo Charter' and coZEV (Cargo Owners for Zero Emission Vessels). This is in response to demand from end users so that the customer can get information on the emission for various products.

All these have resulted in innovations across the industry to reduce emissions.

The main ways to reduce emissions are by using:

- Alternative fuels have lower emissions than the conventional fuel oil
- Propulsion Improving Devices (PID) are modifications in front or behind the propeller
- Energy Efficient Technologies (EET) for example, wind-assisted propulsion

- Others include various operational measures (like hull cleaning, engine power limitation etc.)

What are alternative fuels and how they help in decarbonisation

Out of the above methods to reduce emissions, the key method is to use alternative fuels, supported by all the others.

Alternative fuels include various fuels other than the conventional fuel oil. Alternative fuels are further categorised into different colours depending on the feedstock used. Some of the colours are:

- Grey fuels are fossil fuel based and produce carbon emissions that are not captured.
- Blue fuels are those in which carbon emissions are captured using the carbon capture and storage (CCS) process.
- Green fuels, which are non-fossil fuels, and therefore either do not have any carbon in them or else the carbon molecule required for its production is captured from the air by a process called Direct Air capture (DAC).

According to Drewry Maritime Advisors, only 1059 vessels are capable to use alternative fuels. (this includes 496 LNG vessels capable of burning LNG). Out of these, over 86% is capable of burning LNG. Among the vessels under construction, 20% vessels are dual fuel vessels. Around 84% of orderbook are capable of burning LNG.

Overview of the key alternative fuels

LNG: It has gained considerable popularity as an alternative fuel in the last few years as it is the most easily available alternative fuel at the moment, with lesser CO₂ emissions. In addition, it has negligible sulphur emissions and very less other air pollutants.

But, it needs more storage space than Heavy Fuel Oil (HFO). In addition, there are controversies about the capability of LNG to contribute to GHG reductions due to possible methane slip (gas leakage during extraction, combustion, etc.). Although, methane slip does not cause any CO₂ emission but results in the emission of methane, which is about 30 times more harmful GHG than CO₂.

Since LNG is still a fossil fuel and emits CO₂, it alone will not be able to meet the long-term IMO targets. Therefore vessels will have to change over to bio-LNG and thereafter to synthetic LNG. Bio-LNG is produced from biomass and there are concerns about its sufficient availability in the long run.

Synthetic LNG is expected to be more expensive than other alternative fuels like ammonia. This is because carbon required for the production of synthetic LNG is obtained by DAC, which is an energy-intensive process, thereby increasing its production cost.

Therefore, there is a lack of a clear case for LNG as an alternative fuel in the long run. Hence, it may be regarded as a transition fuel. During the next few years, LNG is still

likely to remain popular fuel while the other alternative fuel evolves and their production, as well as the bunkering facilities, are ramped up.

Biofuels: These are liquid hydrocarbon fuels that are produced from sources such as vegetable and animal oils or their waste. Although, they do not result in carbon emissions reduction during the combustion process, however, these emissions can be partially or fully offset during their production to create net-zero-carbon fuels.

They are a 'drop-in' fuel, which means that they can be directly used in place of an existing fuel with minimal alterations to the engine and other equipment. Biofuel is a good alternative fuel for the short to medium term, especially because minimum alteration is required in engines for regular usage.

Biofuels require sustainable biomass, whose availability is limited. In addition, its sustainable production is also a cause of concern. Therefore, biofuel will not be an alternative fuel in the long run, and hence it may also be regarded as a transition fuel.

Methanol: Currently, methanol is produced using natural gas and coal and is slowly becoming popular alternative fuel at the moment due to its ease of handling and lesser emissions. In addition, low-carbon methanol can also be produced from biomass and green methanol can be produced from renewable electricity along with DAC.

However, it requires more storage space than conventional fuels. Therefore, there is a possibility of reduced cargo carrying space due to larger fuel tank requirements. Hence, Maersk is working on a revolutionary design of the container vessel to prevent the loss of cargo space.

Methanol-fuelled vessels will have to change to green methanol in the long run. But green methanol is expected to be more expensive than other alternative fuels like ammonia. This is because carbon required for the production of green methanol is obtained by DAC, which is an energy-intensive process, thereby increasing its production cost.

Potential of India to become a key bunkering hub for green ammonia

Hydrogen: If it is produced from natural gas in conjunction with 100% CCS, it is called blue hydrogen and if produced using renewable electricity it is called green hydrogen.

Although this is a zero-carbon fuel, it requires a larger storage area, resulting in a compromise in the cargo space. Also, special storage tanks are required which can store the liquid hydrogen at -253°C and these tanks have to be made of special material. This results in a higher overall cost for hydrogen, although the production cost has been reducing, due to the decreasing cost of renewable energy.

Due to the additional cost and higher loss of cargo carrying space, hydrogen is not expected to be the fuel of choice for deep sea vessels.



However, for vessels on short sailing or ferries, hydrogen may be used, especially in fuel cells, provided that the vessel design does not result in lesser cargo capacity.

Ammonia: Hydrogen and nitrogen are combined to produce ammonia. Green hydrogen is required to produce green ammonia. It is also a zero-carbon fuel as it has no carbon in it. In addition, it virtually eliminates sulfur emissions, particulate matter and black carbon emissions.

Ammonia engine is expected to be ready by 2024. There are a few safety issues associated with this fuel as it is highly toxic. However, since it is already carried as cargo, these issues are not expected to be a major hurdle.

Alternative fuel in the long run for the maritime sector

Ammonia and hydrogen are the only two zero carbon fuels for the long run as of now due to the fact that they do not contain any carbon. Out of these, Ammonia is expected to be the clear winner for the maritime sector. Although hydrogen is used as a feedstock for ammonia, the main reasons for preference for ammonia over hydrogen are the following:

- Ammonia can be stored at a lower temperature of -34°C as against -253°C required for liquid hydrogen.
- Ammonia is much easier to store and requires less space onboard a vessel.
- The cost for hydrogen storage infrastructure needs a higher capex as it requires special material for construction, insulation, refrigeration system, etc.
- The production costs of ammonia are higher than that of hydrogen due to a more complex method of production. However, due to its much lower costs for storage/distribution, the delivered cost of ammonia fuel may be significantly lower than Hydrogen.
- Nitrogen feedstock for ammonia is readily available from the atmosphere and is cheaper to obtain than the carbon needed for carbon-based fuels. Therefore, ammonia is expected to be much cheaper than other green fuels in the long run.

Conclusion: Although, green ammonia is expected to be the cheapest zero carbon fuel in long term, the picture will be clearer by around 2024-26 once engines for ammonia are ready and used for some time. The major concern with ammonia is its highly toxic nature so proper precautions are needed. Any accidental leakages of ammonia in pilot projects may delay the popularity of ammonia.

Developments toward green shipping will continue at an increasing pace. It must be highlighted that there are a lot of emerging technologies like nuclear, fuel cells, battery etc. Therefore, it is possible that some other fuels may become more popular than the one mentioned in this article.

It must also be noted that every fuel option comes with its own hindrances and issues, and it must be empha-

sized that there is no perfect solution. The long-term alternative fuel is still not known and therefore, it seems more likely that there will probably be a multi-fuel scenario, in which more than one fuel will be popular and they may be specific for different regions/trade routes. The choice of fuel may also depend on how prices of different fuel develop.

Presently IMO targets are only for CO₂ and all the Green House Gasses (GHG) together, without any specific regulations for the emission of methane. IMO regulations are only covering the emissions from the vessel's tank to its combustion in the engine. There is a consensus developing to measure emission from well to combustion. IMO is expected to come with the revised GHG strategy by 2023 and issues will become clearer once this is made and this may change the alternative fuel landscape.

The emergence of zero-carbon bunker fuels and the decoupling of the energy supply for shipping from crude oil reserves offer a unique opportunity for some countries to become bunkering hubs in the future. The key driver of competitiveness in the production of zero-carbon fuels is the low-cost supply of zero-carbon hydrogen, which in turn depends on low-costs of renewable electricity.

Due to its favourable location, India is one of the best recipients of solar energy. As a potential economic superpower, which is located on the trade route between China and Europe, India is geographically well placed to meet the future demand for zero-carbon bunker fuels produced via solar energy, provided the bunkering hubs are located in appropriate maritime trade lanes.

The abundant possible supply of solar energy would still leave excess renewable electricity for other sectors. Therefore, India is suitable for the manufacture of green ammonia for shipping, whose key feedstock is green hydrogen. This will require large capital investment in the range of USD 147 to 385 billion for 10% to 27% of global ammonia demand in 2050.

Existing scenario of renewable energy production and investment in India

National Hydrogen Mission

In India, National Hydrogen Mission was launched in Aug 2021 and in line with this, a green hydrogen/green ammonia policy has been framed to boost the production of green hydrogen and green ammonia. There is a need of a national strategy for the development of green hydrogen and green ammonia bunkering hub at realistic locations, taking the maritime trade routes into consideration.

Overview of emission reduction in ports

A multi-pronged approach is adopted by ports to reduce emissions from vessels. For examples:

- Heavy duty vehicles are the main source of emission in the ports and globally the ports equipment are changing over to electric equipment
- Some ports like Los Angeles have mandatory speed

limits for the vessels in the port area to reduce emissions.

- Ports also play their part in incentivising green ships, by charging them lower port dues.
- Shore power is increasingly being adopted to reduce the emission from the vessel at berth.
- Just In Time arrival is a new concept being progressively adopted by the ports to reduce emissions from vessels at anchorages.
- LNG dual fuelled tugs and electric tugs are becoming popular in ports. The world's first hydrogen-fuelled tugboat was launched in May this year and is scheduled to become operational in the first quarter of 2023.
- Renewable energy is being used in ports. For example, Jurong Port of Singapore is the largest port-based solar energy generation facility in the world.
- Ports also have to invest in infrastructure to enable bunkering of alternative fuels.

Example of emission reduction initiatives in the Indian port sector

- **LNG Bunkering in India:** Petronet LNG Ltd intends to start bunkering services to vessels from its 5 million tonnes capacity at Kochi terminal in India. The terminal has already provided LNG bunkering to two Norwegian ships in 2015 and intends to deploy bunker barges for it. It is studying the expected customer base before finalizing the decision.
- **Lower port dues:** From August 2021, the Adani Group's Mundra Port offer a 50% discount on port dues, pilotage and berth hire charges to ships running on LNG.
- **Emission reduction target:** Adani Ports and Special Economic Zone (APSEZ) has chalked out a detailed plan to become a green port and logistic company towards its goal to become carbon-neutral by 2025.
- **LNG-fuelled fishing vessels in India;** The Central Institute of Fisheries Technology carried out a trial of substituting high-speed diesel (HSD) with LNG on fishing vessels. LNG was substituted up to 40% of the total quantity during the trial. The trial concluded that LNG may be a viable choice for at least 40% substitution of HSD,
- **Other pilot projects in India:** In Dec 2021, the Central Institute of Fisheries Technology started a trial of using XtraGreen diesel fuel of IOCL on a fishing vessel (XtraGreen diesel uses a modified diesel multi-functional additive which offers several benefits over the regular diesel).

Indian port policy

India's maritime sector plays a crucial role in the overall trade and growth with 95% share in trade volume and 65% share in trade value. Therefore, Indian ports need to undertake green initiatives in line with the broad vision of the country to reduce emissions.

Accordingly, the Government of India has developed the Maritime India Vision (MIV) 2030 and aims to strengthen the Ports, Shipping and Waterways sectors of India through concerted interventions. 'Safe, Sustainable and Green Maritime Sector' is one of the focus areas under the MIV.

MIV 2030 has identified key interventions like increasing usage of renewable energy, reducing air emissions, optimizing water usage, improving solid waste management, etc. To take forward this agenda of 'Safe, Sustainable and Green ports', the Ministry of Ports, Shipping and Waterways has made a draft green port policy. This draft policy includes proposed projects which can be undertaken by various ports as a part of this strategic action plan. These projects will provide an impetus towards a greener maritime sector. It is now taking stakeholder inputs for this policy.

Further recommendations from Indian context

The draft policy has a number of interesting recommendations in the areas mentioned above. However, the following could also be considered to further enhance the implementation

A roadmap should be developed for each port, incorporating short/mid/long term measures.

- **Short-term measures** (within the next 2 years) could include a thorough review of each and every step of the vessel operation to look for the scope of improving productivity. Improvement of operational productivity reduces the port stay of the vessel and therefore, reduces the emission from the ship during the port stay.
 - Many times, productivity can be improved without sinking any capex by sweating resources more efficiently and taking simple measures, especially in dry bulk port operations.
- **Mid-term measures** (2025-2030) could include the following:
 - o KPIs could be considered for pilots to board the vessels on time to reduce the vessel's turnaround time within the port limits. Such KPIs are there in Singapore port.
 - o Overstay dockage policy may be considered for implementation in the ports, to prevent longer stay of the vessels at berth, which in turn reduces the port stay of the vessel, and therefore, reduces berth utilisation and reduces emissions. Such policy exists at Jurong Port of Singapore
 - o Speed reduction policies within port limits should be adopted to reduce emissions. For example, the port of Los Angeles has mandatory speed limits in the port area.
 - o Ports also play their part in incentivising green ships, by charging them lower port dues, as is being followed at Mundra port.
 - o Provide cold ironing facility for some berths which



have vessels on a regular run. However, shore power should not be imposed unilaterally for all vessels, but should be explored for specific berths and for specific types of vessels. For example, cruise vessels or refrigerated vessels or container vessels on a regular run.

- o All new tug boats should run on alternative fuels
- **Long-term measures** beyond 2030 could include the following:
 - o Ports should explore multi-party collaboration for alternative fuels production near the ports and alternative fuel bunkering facilities to be provided by ports, especially in the port near busy trade lanes. This is especially for ammonia, which is expected to be the main zero-emission fuel in the long run for the maritime sector. Also, due to cost-effective production because of solar energy, it is expected to provide good returns for such facilities in India
 - o For example, waste fuel could be used to make biofuel, which could be used by the tugboats or supplied to the vessels. This is a cost-effective method as vessels do not need any retrofitting to use a limited quantity of biofuels.
- **Other recommendations:**
 - o Upgradation of the old berth at the major port should consider adopting Jurong Port's green berth concept of berth upgradation. In this, some of the old concrete is recycled and involves the usage of green cement.
 - o When making a new PPP agreement or extending an existing agreement, the port authority should consider adding some clauses to motivate the port operators to reduce emissions. However, capex required for these may have to come from the operator or both from the port authority and the operator and the same needs to be agreed upon and documented clearly.

BEHIND THE REPORT

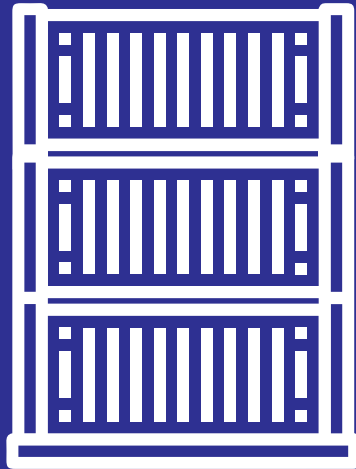
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Dr. Subrata Kumar Behera with an industry experience of 15 years is well versed in international trade and transport. He works in the container and ports team at Drewry. He has worked on the India and other emerging market Container Business Analysis. He is a Doctorate from the School of International Studies, Jawaharlal Nehru University, New Delhi. Besides his doctoral thesis, he has number of research publications to his credit.

Drewry is proud to be associated with Maritime Gateway as Knowledge Partner for South Asia Containers Market Report 2022. It is our pleasure to present this white paper.

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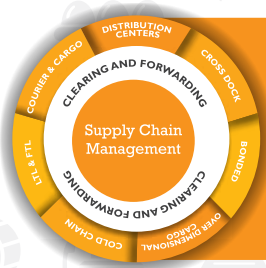
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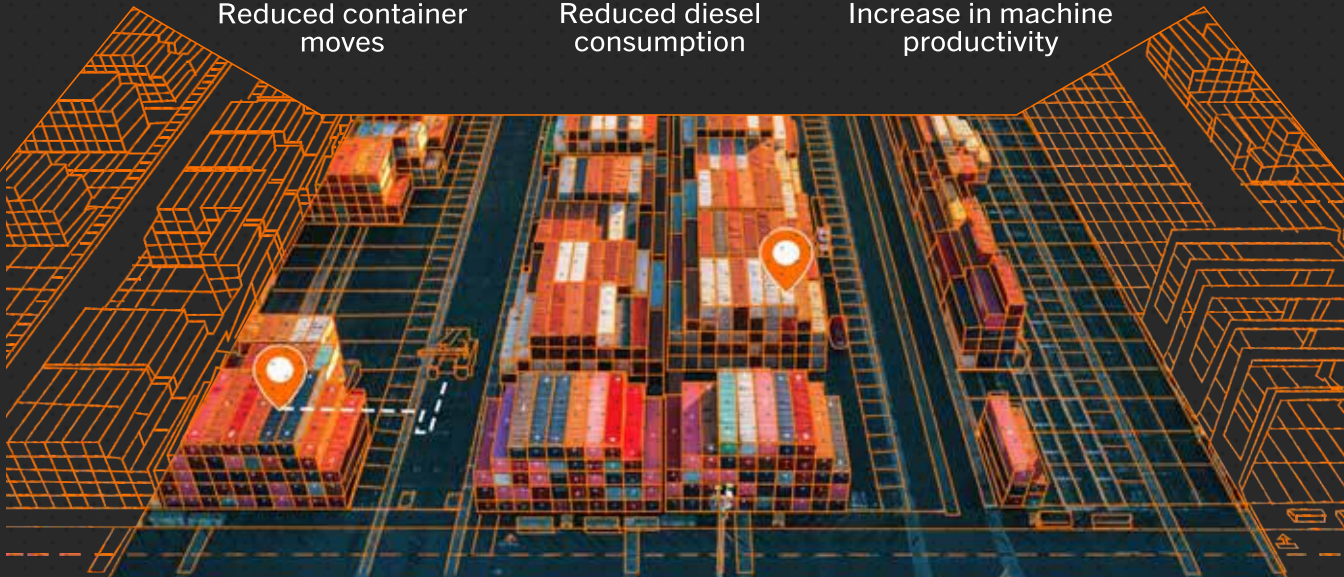
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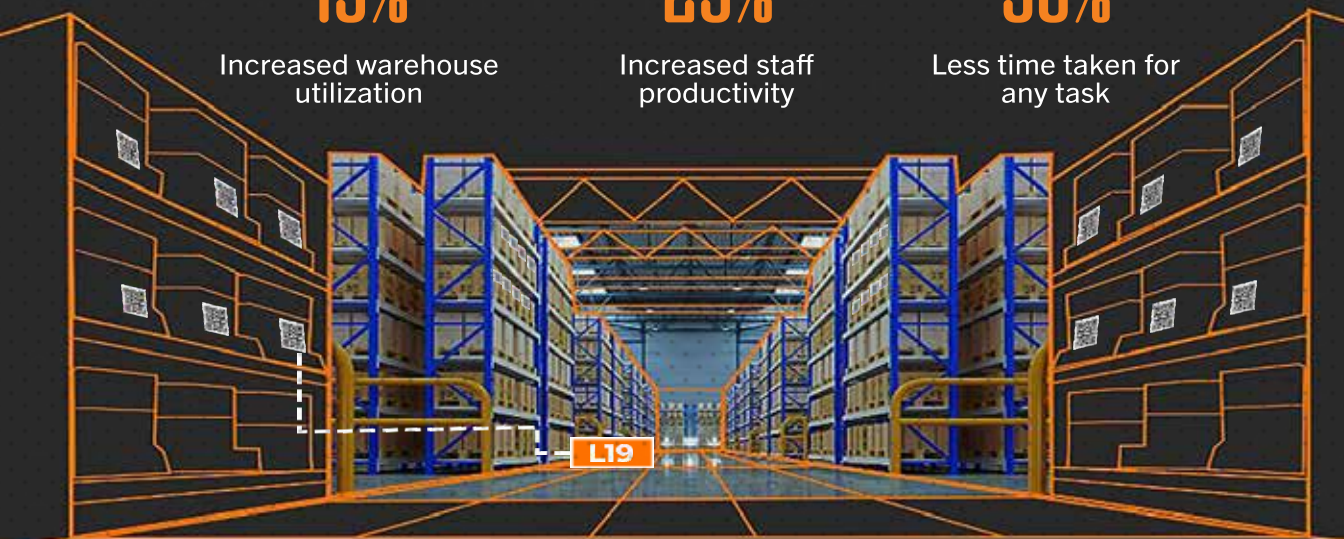
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