

**A COMPARITIVE STUDY OF CARGO HANDLED IN MAJOR
PORTS PRE AND POST COVID-19**

*Project report submitted for partial fulfilment of the requirement for the
degree of*

**Master Of Business Administration
(PORT AND SHIPPING MANAGEMENT)**

By

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SCHOOL OF MARITIME MANAGEMENT

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CHENNAI CAMPUS

May 2022

CERTIFICATE

School of Maritime Management

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This is to certify that the project report entitled "**A COMPARITIVE STUDY OF CARGO HANDLED IN MAJOR PORTS PRE AND POST COVID-19**", submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus., in partial fulfilment for the award of the degree of Master of Business Administration in Port & Shipping Management/ International Transportation and Logistics Management, is a record of work carried out entirely by **GRARA KURIAKOSE**, Reg. No. 2003304013.

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DECLARATION

I, **GRARA KURIAKOSE**, Registration No:2003304013, hereby declare that this project report titled "**A COMPARITIVE STUDY OF CARGO HANDLED IN MAJOR PORTS PRE AND POST COVID-19**" is a bonafide record of work carried out by me under the supervision of **Dr. M. Sekar, Assistant Professor**, School of Maritime Management, Indian Maritime University, submitted in partial fulfilment of the requirements for the award of the degree of **MASTER OF BUSINESS ADMINISTRATION (Port and Shipping Management)**. The information submitted is true and original to the best of my knowledge.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO INDIA AND PORTS

India, a South Asian country, is the world's seventh-largest country by total land, the second-most populous with around 1.38 billion of people, and the world's most populous democracy. India has a culturally diverse legacy that includes many languages, traditions, and people. The country's originality lies in its diversity, and as a result, it has managed worldwide developments with grace and ease. Since the 1990s, when the economy was liberalised, international corporations have been welcomed with open arms, but Indians have been cautious and proactive in embracing global approaches and talents. On the one hand, Indian villages are proudly embracing farming, improved agriculture, and distinctive handicrafts as a profession, while contemporary industry and professional services sectors are rapidly growing.

As a result of the wide range of industries, investment opportunities, and a supportive government, the country is drawing numerous global majors for strategic investments. A large population, primarily made up of youngsters, is a strong demand driver and a plentiful source of workforce.

Ports and shipping are critical components of a region's remarkable economic growth and development. A port is more than just a gateway between land and sea; it can also hold industrial complexes, communities, and warehouses to meet rising consumer demands. Ports will play a crucial part in many countries' efforts to achieve harmony among cities, industrial complexes, logistical facilities, and market gateways, which will be referred to as hinterland servicing. Most analysts believe that the global business climate will change more rapidly in the next ten years than it did in the previous 100. These changes will result in a fundamental shift in global companies' business operations, particularly in terms of logistics and ports. New distribution networks will arise as multinational enterprises attempt to gain a competitive advantage in the marketplace.

1.2 SIGNIFICANCE OF THE STUDY

A country's trade growth is a key predictor of its overall growth. A country's trade is a barometer of its economic health.

Internal commerce allows a country to not only meet the needs of its many regions, but also to foster balanced regional growth. Foreign commerce also serves two purposes: it allows a country's surplus items to be spent and it makes items that are not produced domestically available. It leads to a country's rapid economic development.

Since the dawn of time, water transportation has played a significant part in the Indian economy. It is a simple and inexpensive way to export and import big things. The importance of ports becomes even more apparent in this setting. A port is a way to get from the sea to land. In reality, a port is a location along a canal where a ship may dock to load and unload cargo. Ports serve as crossroads for land and maritime trade.

1.3 SCOPE OF THE STUDY

The scope of the study is to identify the impact of major ports towards economy and trade from the occurrence of COVID-19 and various parameters in which it can be measured, correlated and analyzed.

The study is limited to major in India and also to the availability of data accessible to public.

1.4 OBJECTIVES OF THE STUDY

The major objective of this research is to provide a wide understanding about the major ports in India and its impact on economy and trade by the pandemic.

- ❖ To study about cargo throughput of Major ports pre and post COVID.
- ❖ TO study about cargo throughput of individual commodity pre and

post COVID

- ❖ Suggest findings from the above study

1.5 RESEARCH METHEDODOLOGY

Type of Research

The type of research design used here is descriptive in nature. It means the detailed explanation of the characteristics of the study.

1.6 DATA COLLECTION

Secondary Data

- Ministry of Ports, Shipping and Waterways official website.
- Books, magazines and newspaper.
- Various publications of the central, state and local government.
- Technical and trade journals.
- Official government websites.

Data collected from the above secondary source were used to learn about the various impact of major and minor ports of India in economy and trade.

1.7 TOOLS FOR DATA PRESENTATION

The tools used for the research are diagrams, bar graphs line graphs, combined graphs and tables.

1.8 STATISTICAL TOOLS FOR ANALYSIS

The statistical tool used for the research is;

- Compound Annual Growth Rate (CAGR) of cargo handled.
- Efficiency parameter of number of ports and cargo handled.

1.9 LIMITATIONS OF THE STUDY

The limitations of the research are as follows:

- Limited time span of the project.
- Sources for collecting data were very limited.
- The research is limited to the availability of data which was not provided from higher officials.
- The accuracy of data is limited due to non-working of many non-major ports.
- Some of the data are also not available due to security reasons.

CHAPTER 2
REVIEW OF LITERATURE

2.1 REVIEW OF LITERATURE

Kinjal Patel, Jayesh Juremalani "Development of Satellite Seaports - A new initiative under Sagarmala Project" (2018), The importance of the sea route as a focal point of expansion in India has been clear from the birth of civilisation. As a consequence of population increase, economic growth, urbanisation, and technological improvements, many Indian cities have become metropolises. As a result of these changes, the role of sea ports has changed, and the current pattern of port development in India increasingly emphasises mixed-use development and recreation.

The purpose is to identify port development features and then construct port development standards from there. Many studies have emphasised the relevance of port development inside the nation-building process. This opportunity will boost economic growth, which will be reflected in the GDP of the country. The physical location of India is both strategic and vulnerable. Our first concern is the protection of our coastline, which is why the Sagar Mala Project is required. The port is being modernised. 2) Increased interconnection 3) Port-related industrialization 4) The growth of coastal settlements India has never placed a high priority on developing a good coast, thus the project stands a strong chance of succeeding.

Jeronimo Guilherme Remigio, "Measuring productivity and efficiency of seaports in India using DEA technique" (2018).

We are looking at major ports in the context of commerce and India's strategic role in the globe of trade since the onset of economic reforms in 1991. It uses actual data to calculate the productivity and efficiency of Indian seaports. The DEA approach is used in this study to assess the production and efficiency of Indian seaports. The DEA's findings, which are reported and published in the article, show how Indian ports have fared throughout time. This study is insufficient to set a standard for India's port system. Rather, a detailed review of the physical and financial performance of Indian ports would be advantageous. This study employed data

envelopment analysis (DEA) to generate efficiency standards and assessments for the Indian port industry. Various worries about India's port industry are revealed as a result of this fundamental inquiry, which might be further investigated and conclusions reached. When evaluating the performance of today's Indian ports, productivity and efficiency should be prioritised.

Bishal Dey Sarkar, Ravi Shankar, Arpan Kumar Kar, "Port logistic issues and challenges in the industry 4.0 era for emerging economies: an India perspective" (2022). Many current port logistics systems in industry are inconsistent, outdated, and insufficient, reducing port logistics' efficiency. Its purpose is to better understand the challenges that emerging-market port logistics providers confront, as well as to establish a conceptual framework for addressing port logistics issues and proposing alternative solutions.

It considers challenges including loading/unloading, transit, storage (warehouse), customs clearance, regulatory agencies, port management units, and inland transportation link providers, and uses SSM to create a final implementable model. It focuses on assessing and comprehending the complete communication and organisational structure of the port logistics system. It analyses the primary challenges, inefficiencies, and root causes that various port logistics actors confront during information sharing, cargo movement, cargo shipment arrangements, and so on. It uses SSM to examine the port logistics sector as a whole system in order to identify concerns and challenges faced by various port logistics actors in emerging nations. The research creates a comprehensive and integrated framework for minimising cost and time uncertainty in essential procedures. With addition, the framework gives a transparent platform and aids in port standardisation.

2.2 LITERATURE GAP

The study revolves around the cargo handled in major ports in India. From

the study we can analyze those major ports cargo handling are having significant impact on trade. As we are aware that sea trade contributes a huge proportion to the growth of Gross Domestic Product (GDP) of India. Trade growth is a key indicator of a country's overall development. The state of a country's economy is determined by its trade.

A country's internal trade not only meets the needs of its various areas, but it also encourages balanced regional growth. Foreign commerce also serves two purposes: it allows a country to spend surplus commodities and it makes items that are not produced domestically available. It contributes to a country's quick economic growth.

The major drawbacks of the study were that the data of the ports are cumulative of entire ports available but in real only few ports are actively having trade, therefore the analysis and interpretation is limited according to the data available. This study also gave an insight towards the Compound Annual Growth Rate (CAGR) of cargo handled in major ports which all ultimately contribute to the Gross Domestic Product (GDP) of India.

The future of Major ports and its relevance of cargo handled on trade need to be considered in a significant manner. For that, ports require development of infrastructure facilities to accommodate more vessels and need to increase the cargo handling capacity, as from the analysis we could conclude that total revenue is directly related to the cargo handled.

CHAPTER 3 INDUSTRY PROFILE

3.1 PORTS

A port is a safe site for ships to load and unload freight and passengers, according to the mariner. The commercial process of loading, unloading, and replenishing the ship takes place in a secure location. It can be done with barges and tenders alongside a quay or at anchoring. The business demand for the transportation of goods and people is the most important prerequisite for the location of a port. A safe site does not have to be a port, but a port must be a safe place. Ports have evolved in areas where natural safety exists, but today, safe harbours can be built if necessary. A port serves as the link between land and water transportation for a shipper or passenger. Good land transportation linkages, as well as storage and handling facilities for products and passenger processing, are essential. To encourage trade and stimulate port growth, port fees are kept as low as feasible. A port is a doorway to all the benefits of international trade, according to the national economist. Governments will subsidise and support their most vital ports. Ports may serve as a conduit for less desirable activities like smuggling and, after the turn of the century, terrorism. The port is a profit-making enterprise to the port manager. Financial loss can result from poor management. In a national context, a port's non-financial goals may be strategically important. Despite its transformation from a labor-intensive to a technology-intensive economy, a port provides direct and indirect employment to the many businesses involved in its operations. Port locations are chosen to maximise land and navigable water access, as well as economic demand and wind and wave protection. Both natural and man-made harbours exist. An artificial harbour may have purpose-built breakwaters, sea walls, or jetties, or it may have been constructed by dredging, and it must be dredged on a regular basis. On the other hand, a natural harbour is surrounded on three sides by land features.

Ports are the economic engines of any country since they handle the majority of the trade. Seaports remain an important conduit for access to the global commercial centre. The amount of freight transported by sea is expected to increase dramatically in the future decades.

International seaports, in particular, serve as exchange facilitators for the global economy. They are key domestic trade policy instruments, acting as a vital link between countries through the skillful and intelligent development of goods, people, and data. Ports have been vital hubs in the global trade network since the beginning of time. They're also sites where diverse societies interact, and things, data, and people arrange or raise the cloak of sway. Because of global exchange and venture streams, domestic political agents who formerly operated under permissive standards of behaviour now have greater options for lease chasing and consumer needs revamping. With the expansion of global trade, the port business, which is a component of the oceanic sector, has altered dramatically.

Transportation costs, which are a primary driving force in the global economy, have dropped dramatically, assisting global monetary growth greatly. The port sector began to respond to the issues of changing large boats as shipping acquired experience with vessel structure and increasing tonnage. When studying the policy impact on port organisation and development, it's also important to understand the fundamental elements of the stakeholders in the port community. This type of inquiry will aid in the identification of the various participants in the port community. The port community, which is made up of a number of subgroups, serves as a critical component in the increasingly complex and sophisticated logistical networks that enable worldwide product shipping.

More jobs will be created if the port infrastructure is improved, as will traffic congestion, pollution, and prosperity. The trading process is driven by supply, demand, and policy framework. The trade process requires the support of demographic, economic, and governance trends. This chapter provides an overview of ports as a global sector and provides information on the Indian Port Industry and Maritime Trade.

Ports are an integral aspect of the transportation business, and they are becoming increasingly intertwined with the global economy. Ports are fundamentally a means of joining the global economy. The shipping industry encompasses a vast range of services, the most essential of which is cargo and passenger transportation.

This sector also includes other port services (such as pilotage, towing and tug assistance, emergency repairs, anchorage berth and berthing services, and so on) as well as supplementary or basic infrastructure (such as storage and warehousing, maritime cargo handling services, customs clearance services, etc.). While many countries have opened up various auxiliary services, such as storage and warehousing, custom clearing is generally restricted by government regulations. A wide range of operations are carried out within the port region, including port infrastructure services, cargo handling services provided by private firms in most ports, and other services such as mooring, towage, and so on. Each of these duties has its own set of features and technological requirements.

3.2 PORT LOCATION

The economic necessity of transferring commodities between land and maritime modes of transportation necessitates the construction of a port. A port is made up of maritime approaches that provide access and shelter, as well as land infrastructure including quays, warehouses, and administrative facilities. A good natural port site will only become an efficient commercial port if there is commercial demand. There are numerous great port sites in the South West of England, but only a handful

succeed as commercial ports. Falmouth, for example, offers all you need for access and shelter, but the hinterland generates insufficient cargo quantities to operate a commercial cargo port.

The development of a commercial port is dependent on cargo generation. Early urban populations developed beside old ports, which were often placed at the lowest river crossing point. Ships were small and could anchor near to the settlement, allowing cargo to be transferred into and out of carts. As the colony increased, so did the demand for shipping services. It became necessary to construct river docks and linear quays for the transportation of commodities. The construction of artificial docks was aided by rising need for cargo storage, increased ship size, and building techniques connected with the industrial revolution. Closed dock systems arose in response to the need for steamships to run on a regular schedule. New docks were built down river, towards the sea, as trade boomed and ships grew larger. Most river ports have seen a shift in port activity towards the sea. The Pool of London used to be the location for cargo transfers in London. Enclosed docks capable of satisfying trade and shipping demands began to appear around the Thames Estuary, concentrating at the Port of Tilbury. The London Gateway Project, a new river berth container port currently in the development stages, will ensure that London and the South East of England have the necessary capacity to fulfil future needs of the containerized shipping sector.

Long after new technology has rendered old ports obsolete, they maintain a historical benefit. Disused historical docks in the city centre can be offered as ideal construction prospects to help pay for down river development. London, New York, Rotterdam, Hong Kong, and Shanghai are historic ports with considerable freight volumes in their hinterlands. They have access to finance as commercial centres, allowing them to create new facilities to fulfil modern needs and overcome natural disadvantages. Proclamation may have been used to establish a port. Governments have simply chosen locations for new ports and declared their legal status as ports in some cases. The grounds for site selection can be complex, and they may not be

wholly related to geographic or commercial convenience. The legal position of a port can generate demand, as well as drive growth and further demand. Ports established by proclamation can grow and thrive with little or no competition. Ports can be constructed or developed to handle a single commodity with consistent demand. Nouadhibou is a port in Mauritania, West Africa, that exports iron ore from interior sources via train. Harg Island is a rugged limestone island in the Gulf that serves as Iran's primary oil export port. Commodity ports do not require a large population or hinterland to function. Commodities refinement for efficient transit can be done at a commodity port. When demand for the commodity fails the port dies. Modern port development is increasingly taking place on green and brownfield locations where there is ample affordable land, short length, deep water approaches, and effective inland connectivity to a large hinterland. The availability of skilled labour, a strong industrial infrastructure, and a willingness to protect the environment are all considered crucial factors.

Geographical features or operational activity can be used to describe ports. The RIA, Delta, Tidal Estuary, and Coastal Postglacial Submergence are the most major geographical types of port. To ensure access to and from ports, maintenance dredging of accumulated silt is required. Artificial harbours can be built by extending walls into the water. In the Netherlands, Dover and Ijmuiden are successful ports of this type. The Amazon River and the Mississippi River both have non-tidal river ports.

3.3 MARKET SIZE

Cargo traffic at the country's principal ports was reported at 704.93 million tons in FY20 (MT). Non-major port cargo volume was anticipated to reach 615.05 million tons in FY20, up 7.18 percent from FY10 to FY20. By the end of FY20, the major ports had a capacity of 1534.91 million tons. The Maritime Agenda 2010-20 sets a port capacity goal of 3,130 MT. Through mechanisation, broadening the

draught, and quick evacuations, the government has taken many steps to increase operational efficiency.

3.4 CLASSIFICATION OF PORTS

Table 3.1 Major Ports (State wise)

| NAME OF THE PORT | STATE |
|--------------------|----------------|
| KOLKATA PORT | WEST BENGAL |
| PARADIP PORT | ORISSA |
| VISAKHAPATNAM PORT | ANDHRA PRADESH |
| KAMARAJAR PORT | TAMIL NADU |
| CHENNAI PORT | TAMIL NADU |
| TUTICORIN PORT | TAMIL NADU |
| COCHIN PORT | KERALA |
| NEW MANGALORE PORT | KARNATAKA |
| MORMUGAO PORT | GOA |
| MUMBAI PORT | MAHARASHTRA |

| | |
|------------------------------|-------------|
| JAWAHARLAL NEHRU PORT | MAHARASHTRA |
| KANDLA PORT | GUJARAT |

3.4.1 MAJOR PORTS IN EASTERN COAST OF INDIA

Between the Eastern Ghats and the Bay of Bengal are India's eastern coastal plains. It runs across Tamil Nadu, Andhra Pradesh, Orissa, and West Bengal states. It is divided into three coasts: the Coromandel Coast, the Andhra Coast, and the Utkal Coast.

The following are the important Indian ports located in the Eastern Coastal Plains:

1. Kolkata Port
2. Paradip Port
3. Visakhapatnam Port
4. Kamarajar Port
5. Chennai Port
6. Tuticorin Port

Kolkata Port

The British East India Company built the port at Kolkata. It is the only riverine port among India's 12 main ports. Iron ore, leather, coal, copper, steel, and tea are among the things it exports.

Paradip Port

The town of Paradip is situated at the confluence of the Mahanadi River and the Bay of Bengal. It was the first major port to open on India's east coast following independence.

Visakhapatnam Port

Andhra Pradesh's Visakhapatnam port, popularly known as Vizag port, is located there. It is a natural harbour port and one of the country's oldest ports. The Vizag port transports iron ore, oil, coal, alumina, and pellets, among other commodities.

Kamarajar Port

The port of Kamarajar, Ennore lies 24 kilometres north of Chennai. It is India's first corporate port and the country's 12th largest port. The Indian government owns 67 percent of the company.

Chennai Port

The Chennai port, formerly known as Madras port, is the country's second largest container port and the largest port in the Bay of Bengal. It is a man-made port. It was founded in 1881, making it India's third-oldest port. It was designated as India's first dedicated container terminal in 1983. Automobiles, iron ore, coal, granite, petroleum products, and fertilisers are among the many items traded at this port.

Tuticorin Port

The Tuticorin port is located in Tamil Nadu's Thoothukudi district. It is the country's fourth largest container terminal and Tamil Nadu, India's second largest port. It mostly trades items from and to Sri Lanka. The pearl fishery in the Bay of Bengal is well-known in this port.

3.4.2 Major Ports In Western Coast Of India

From Gujarat in the north to Kerala in the south, the Western Coastal Plains of India run through Maharashtra, Karnataka, and Goa. Between the Western Ghats and the Arabian Sea, it is located. It is separated into four coasts: the Kachchh and Kathiawar coast, the Konkan coast, the Kanara coast, and the Malabar coast.

The following are the important ports on India's western shores.

1. Kandla Port
2. Jawaharlal Nehru Port
3. Mumbai Port
4. Mormugao Port
5. New Mangalore Port
6. Cochin Port

Cochin Port

The Cochin port, commonly known as the Kochi port, is located in the Lake of Kochi, between Willingdon Island and Vallarpadam Island. The International Container Transshipment Terminal, also known as the Vallarpadam Terminal, was India's first transshipment terminal and the country's largest container shipping facility. The Cochin port includes this facility. It is one of the country's main ports as well as one of India's shipbuilding centres. The Kochi port primarily handles the import and export of coffee, tea, spices, salts, fertilisers, and other agricultural products.

New Mangalore Port

Mangalore, Karnataka, is home to the New Mangalore port. It is situated at the meeting point of the River Gurupura and the Arabian Sea. It is the country's seventh largest port and the only major port in the state of Karnataka. It is also India's Eastern coast's deepest inner harbour port. This port handles petroleum products, LPG, fertilisers, and iron ore, among other commodities.

Mormugao Port

In the state of Goa, Mormugao port is located in the estuaries of the River Juari. Mormugao port is a popular tourist attraction in Goa. This port is India's primary iron ore export port. This port also handles cotton, manganese, and coconut, in addition to iron ore.

Mumbai Port

Mumbai port, commonly known as Bombay port, is located in Maharashtra, India. It's a natural harbour. It is India's largest and one of the country's oldest ports. The Mumbai port is the country's busiest, handling almost one-fifth of the country's total export. Jawahar Dweep is a harbour island with four jetties (long narrow structures that protect the coastline from tides and currents) for handling crude and petroleum products. It has three dock facilities – Prince's dock, Victoria dock and Indira dock.

Jawaharlal Nehru Port

Nhava Sheva Port is another name for Jawaharlal Nehru Port. It is situated in Maharashtra's Raigad district (Navi Mumbai). It is India's largest container port, processing over 56 percent of the country's containers. It is one of the busiest ports in the world. Textiles, boneless meats, carpets, pharmaceuticals, machineries, chemicals, and vegetable oils are among the items shipped through this port. This port is home to the Western dedicated freight route being built by Indian Railways.

Kandla Port

Kandla Port, now known as Deendayal Port, is located in Gujarat's Kutch area. It is 90 kilometers from the Gulf of Kutch. Kandla port is India's largest port by volume of goods handled. For the next five years, the Indian government would provide a subsidy of Rs.1624 crore to Indian shipping industry.

3.5 DEFINITION

Legal definitions

The term "port" refers to the area where ships are loaded and/or unloaded of cargo, as well as the typical locations where ships wait for their turn or are forced or obligated to wait. This concept still applies if the word port is not used but the port is (or will be) identifiable by its name. A safe berth is one that the ship can arrive, stay at, and depart from during the appropriate

period of time without being exposed to danger, assuming no unusual events occur.

3.6 FEATURES

Main function and feature of ports:

- Sea and land access
- Ship berthing infrastructure
- Road and rail link
- Industrial area
- Vehicle control while entering and leaving port
- Environmental control
- Cargo damage control
- Safety and security in the port vicinity
- Immigration, customs, health and medical
- Commercial papers control
- Pilotage, tugging, and mooring arrangement
- Use of berths
- Loading, unloading, and storage
- Cargo distribution

3.7 THE IMPORTANCE OF PORTS

Ports are the primary transportation link between most trade nations and their trading partners, serving as a hub for highways and railway systems. A port serves as a trading gateway, but it also attracts commercial infrastructure such as banks, agencies, and industrial activity. Because ports are where the majority of maritime catastrophes occur, they should be regarded one of the most significant parts of marine transportation. The varied duties of a port are well recognized in Japan, where there are

officially categorized 1,100 ports and harbours (21 of which are regarded as major ports for international business). Dr. Ernst Frankel thinks that productive transportation accounts for only 40–45 percent of all transportation expenditures in international trade. Ports account for the majority of the additional cost and time (but is not necessarily caused by ports).

3.8 FUNDAMENTAL OBSERVATIONS CONCERNING PORTS

A ship is a separate entity from a port, which is only a collection of activities. When a ship owner makes a mistake in terms of ship type or size, he can usually recoup his losses by selling the ship. A port manager's mistakes are frequently more difficult and expensive to rectify. In a distribution centre, added value can take several forms, including cargo consolidation and deconsolidation, as well as providing up-to-date inventory and cargo flow information. Large ships must trade between large ports with plenty of deep water, with smaller ships (feeder vessels) distributing goods to smaller ports. The commerce pattern is now known as hub and spoke, and these huge ports are referred to as centre ports.

The Main Functions and Features of a Port

Civil engineering features

- Sea and land access.
- Infrastructures for ships berthing.
- Road and rail network.
- Industrial area management.

Administrative functions

- Control of vehicles, all modes, entering and leaving the port.
- Environmental control.
- Control of dangerous cargo.

- Safety and security within the port area.
- Immigration, health, customs and commercial documentary control.

Operational functions

- Pilotage, tugging and mooring activities.
- Use of berths, sheds, etc.
- Loading, discharging, storage and distribution of cargo.

3.9 MAIN FACILITIES AND SERVICES PROVIDED BY A PORT?

SHIPS

- **Arrival and departures**
- **Navigations aids and VTS**
- **Approach demand**
- **Pilotage, tugs and mooring gangs**
- **Locks (if tidal)**
- **Berths**

ADMINISTRATIVE FORMALITIES

- **Police, immigrations, customs, health**
- **Supplies, water, bunkers**
- **Telephone, repairs, medical, waste disposal**
- **Port state control**

CARGO TRANSFER

- **Opening/closing of hatches**
- **Breaking out/ stowing**

CARGO

- **Basic cargo handling on ship and on quay**
- **Transport to/from storage**
- **Storage /warehousing**
- **Tallying, marking, weighing, surveying**
- **Surveillance, protection, sanitary measures**
- **Dangerous cargo segregation**
- **Customs and documentary control**
- **Receiving and delivery**

ADDITIONAL "ADDED VALUE SERVICES"

- **Repacking, labelling, sorting, assembling**
- **Cleaning and preparing cargo**
- **Setting up a logistic network**
- **Setting up a marketing package**

3.10 PORTS SITE CONSIDERATION

Location

A port serves as a vital link between the maritime and land realms. Although a port's position remains constant, it can be enhanced by dredging and land reclamation, both of which entail significant capital inputs.

Operations

In terms of the types of traffic it can manage and the amounts involved, port operational characteristics differ. A port's operational efficiency can be increased through capital investments and management.

Administrative unit

The right to lead port development initiatives is normally reserved for port administrations. Terminal administration and operations are frequently leased to private corporations.

Value chain

The value of a port is added to transportation and supply chains. Heavy industrial activities like steel mills and petrochemical plants have historically preferred to locate within or near ports, a trend that continues today and is reinforced by a diverse range of freight distribution businesses.

3.11 CHALLENGES FACED BY PORTS

Infrastructure, international trade, production capacity, finances, regulatory compliance, safety and security, sustainability, digitalization, and a lack of community support are among issues that port operators face around the world. As globalisation and the maritime transport industry grow, these challenges will become more apparent and have a greater influence. These maritime difficulties, on the other hand, can be transformed into opportunities through Smart Port transformation as long as ports remain open to change as the maritime and shipping industries go digital. A Smart Port combines modern digital technology such as big data,

artificial intelligence, and a 5G network with environmental, community, ecological, and stakeholder considerations.

Because ports are a critical node in the supply chain, they must keep up with digital developments to remain competitive. Smart Ports are considered as the way of the future for sustainable marine sector development.

Various Challenges faced by ports are as follows:

1. Port Infrastructure

Port infrastructure is a challenge. The shipping sector, like many European and international ports, is old. As the marine and shipping industries continue to grow, the infrastructure can no longer handle present vessel traffic and port operations.

Infrastructure must be adjusted through growth and construction as ships become larger and global marine traffic develops. This places a pressure on the port's surrounding areas. Many ports face depth and size constraints, prompting development projects to deepen and broaden port waters, putting a pressure on the maritime environment and the general public.

2. Global Trade

Global trade is increasing in lockstep with global population. As a result of global trade, ports are usually unable to accommodate the number of vessels required to keep up with expanding maritime industry activity and traffic.

As global trade expands, ports face a plethora of new challenges. Due of a lack of transparency between vessels and ports, they are usually unprepared when a vessel arrives at the dock. Ships rarely arrive at the time stated by the captain, and many ports lack access

to real-time ETA prediction tools, making it difficult to prepare ahead.

3. Production Capacity

Due to infrastructure constraints and rising global trade, production capacity is a challenge. Ports may be able to increase their production capacity as global trade expands, but this will be difficult due to obsolete infrastructure, a lack of resources, and outdated technologies.

4. Finances

Ports suffer financially as a result of their numerous challenges. They are unable to utilise all of their production and activity capabilities due to a lack of demand.

Because ports cannot effectively organise resources without technology, they may end up spending more money on staff who are forced to work longer hours simply waiting for a ship to arrive.

In terms of port infrastructure, a port infrastructure that is unable to accommodate larger boats and higher cargo volumes will be costly in terms of lost business. Inefficiency increases operating costs while productivity decreases.

5. Regulation Compliance

Another issue is ensuring regulatory compliance. In Europe, for example, ports must comply with several regulations and norms. If the laws are not followed, they may face severe penalties.

Environmental and water quality regulations are numerous. Ports that monitor environmental conditions must meet these requirements. This is an inefficient method because most samples

are taken by hand and environmental measurements are not provided in real time.

6. Safety and Security

Ports face security and safety problems. Port workers' jobs can be dangerous. They entail operating massive machinery, working in close proximity to sulfuric plants that could potentially leak hazardous gases, and being around big machinery.

7. Sustainability

The importance of environmental issues and sustainability is growing. The Paris Agreement and the 2030 Agenda for Sustainable Development are forcing ports to reduce carbon use and care more for the environment.

While developing corporate strategy, ports must today consider not just commercial goals, but also environmental and social responsibilities.

8. Digitalization

Digitalization, new software, and powerful 5G networks are exacerbating the problem for ports that have yet to adopt new technologies. Digital technology is the way of the future for the whole nautical industry. These technologies boost port productivity, independence, and energy efficiency.

Those in charge of ports who do not adapt to this new technology will become outdated.

9. Community Support

A port may struggle to obtain community support because of its operations, which can be harsh for adjacent areas and communities. Because of their pollution, environmental harm, stress on the

hinterlands, and use of coastal land, gaining community acceptance can be difficult.

3.12 RECENT TRENDS

1. Increasing Private participation

Because of its tremendous growth potential, favourable investment climate, and state government incentives, the Indian ports sector has attracted both domestic and foreign commercial enterprises. The private sector has played a large role in port logistics services, in addition to port and terminal growth. The Indian government's 63.75 percent shareholding in the Shipping Corporation of India is being sold to private investors (SCI).

2. Setting up of Port based SEZs

SEZs are being established near various ports, providing a strategic advantage to firms within these zones. To take use of imported coal, coal-fired power plants are being built. Mundra, Krishnapatnam, Rewas, and a few more places are developing steel mills and refineries for edible oils SEZs.

3. Focus on draught depth

New ports are being developed on shores with natural deep draughts, while existing ports are investing in draught depth improvements. A deeper draught is required to accommodate large vessels. The majority of traffic is shifting away from smaller vessels because to the cost and time savings associated with large vessels, particularly in coal transportation.

4. Ports to operate on green energy

The Indian government intends to be the first in the world to use renewable energy to power all 12 of its major domestic government

ports. At the ports, the government plans to build 200 megawatts (MW) of wind and solar power generation capacity. The energy capacity could be raised to 500 MW in the following years.

JNPT (Jawaharlal Nehru Port Trust) launched a comprehensive solid waste management project in February 2021 as part of its green port activities.

5. IT Solutions

SAROD-Ports (Society for Affordable Redress of Disputes - Ports) was created as a dispute resolution platform by the Ministry of Shipping in September 2020. This platform will assist create confidence in the private sector as ports move to landlord models. In October 2020, the Ministry of Shipping will debut an in-house software solution for vessel traffic services (VTS) and vessel traffic monitoring systems. (VTMS).

6. Specialist terminal – based ports

Concentrate on terminals that deal with a certain type of cargo; this is important for handling specialised cargo such as LNG, which requires specialised equipment and consequently high capital costs. The most economical use of resources is to create specialised terminals for such cargo.

The ICTT in Cochin and the LNG terminal in Dahej Port, for example, are specialist terminals.

7. Rising traffic at non – major ports

Non-major port traffic accounted for 45 percent of total cargo due to a significant shift in traffic from major ports to non-major ports.

8. Sanitation

Haldia port in West Bengal was awarded the cleanest port among all major ports in the Ministry of Shipping's first ever ranking.

In the 'Swachhta Pakhwada,' the Quality Council of India (QCI) ranked the major 12 Indian ports.

9. Landlord port model

To attract private investment, the government has modified the organisational model of seaports, moving away from the "service port" concept, in which the port authority provides all services. A 'landlord port' concept, in which the port authority acts as both a regulator and a landlord while private companies run the port. The 'landlord port' model is used by major ports like as JNPT, Chennai, Visakhapatnam, and Tuticorin.

10. National Logistics Portal

In October 2020, the Ministry of Shipping announced plans for a National Logistics Portal (Marine) to aid exporters, importers, and service providers with end-to-end logistics solutions. The Indian Ports Association has published a request for proposals for the design, development, integration, implementation, management, and maintenance of the National Logistics Portal (Marine) Version 1.0.

3.13 FUTURE PORTS

The Marine India Vision-2030, a 10-year plan aimed at modernising the Indian marine sector, aims for an investment of Rs 3 lakh billion in port facilities, which will employ 20 lakh people. At the three-day Maritime India Summit 2021, Prime Minister Narendra Modi unveiled the Maritime India Vision (MIV) 2030, which was attended by 24 countries.

- The Maritime India Vision 2030 will require an investment of over Rs 3 lakh crore, resulting in the creation of over 20 lakh jobs and unleashing annual revenue potential of over Rs 20,000 crore for important ports.

- It is expected that investments of Rs 1-1.25 lakh crore will upgrade the infrastructure of major ports, resulting in the creation of 7-10 lakh jobs.
- By operationalizing Vizhinjam port and building transshipment zones in Kanyakumari and Campbell Bay, the government wants to increase the volume of Indian commodities transhipped at Indian ports from 25% in 2020 to over 75% in 2030.
- By 2021, it will have implemented Enterprise Business System (EBS) to simplify and digitise procedures across Major Ports, as well as a National Marine Logistics Gateway to execute 100 percent paperless processes, including online payment, and an universal ship e-registration portal.
- It claimed that transitioning from road/rail to coastal shipping may save between Rs 9,000 and 10,000 crore.
- It plans to construct green, sustainable ports, with a goal of boosting renewable energy use in ports from less than 10% presently to over 60% by 2030, as well as encouraging waste to wealth through sustainable dredging and domestic ship recycling, and meeting the Zero Accident Ports target by 2022.
- The policy emphasises the goal of making India a premier shipbuilding country by 2030, with a 15-fold increase in gross tonnage of ships constructed in India.
- It proposes the establishment of a maritime development fund to provide low-cost, long-term investment to maritime sector partners, as well as dedicated cruise terminals in 12 ports.
- In Phase 1, it plans to focus on developing 23 national waterways with the most potential, as well as increasing cargo flow from 73 million tonnes per annum (MTPA) to over 200 MTPA.
- It will also focus on the development of an eastern waterways transportation grid to boost regional connectivity and reduce transportation costs between Bangladesh, Nepal, Bhutan, and Myanmar.

3.14 THE IMPACT OF PORTS ON ECONOMIC DEVELOPMENT

A country wins more than essential resources and exotic luxury by opening its borders to foreign trade. Trade helps a country to concentrate production and specialise in what it does well, while importing less well-performing goods at a lower cost. It allows companies to learn from the best in the world in terms of management and technology, and it provides massive, global markets to encourage investment and innovation. For the ship owner, congested ports mean long waits for a berth. Congestion costs might be passed on to shippers in the form of a fee.

3.15 THE EFFECT OF GLOBALISATION

The world is bound together via finance, trade, investment, and production. Globalisation's most visible result is increased worldwide trade. One aspect that drives and is driven by globalisation is affordable and efficient transportation. Global marketplaces result in international competitiveness. International competition drives down product costs. The transportation industry is likewise affected by the demand to cut costs. The appropriate use of information technology and computer systems can increase port efficiency. The need for larger and more efficient ports has grown as ship sizes have grown. A port's hinterland has increased and now overlaps with other ports. Hamburg competes for container cargoes in North-West Europe with Antwerp, Amsterdam, and Rotterdam, for example. Because of its deep-water access, efficient terminals, and road, rail, and inland-waterway connections, Rotterdam has established itself as Europe's primary port. High-value, perishable items are transported by air, while low-value, time-sensitive goods are conveyed by sea. To suit the demands of the shipper, sea transport might compete or collaborate with air transport.

CHAPTER 4
ANALYSIS AND INTEPRETATION

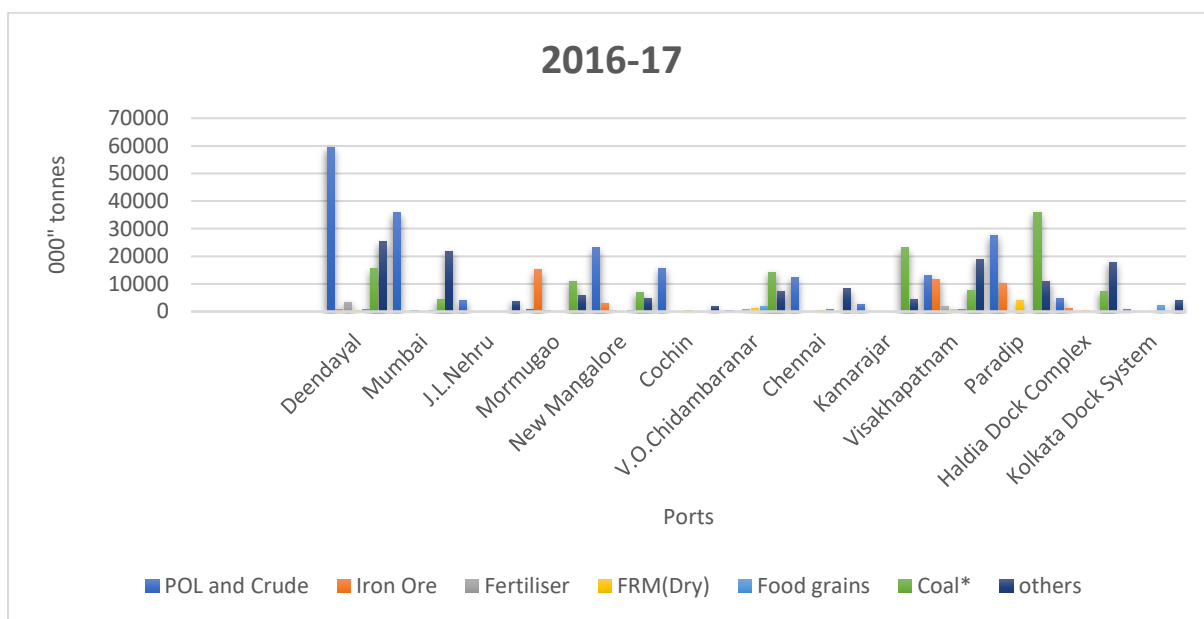


DIAGRAM 4.1: Showing the Traffic handled in major ports of selected commodities (000" tonnes)

Interpretation:

From this table we may infer from this data that the cargo handled of POL and Crude in Deendayal port was high in 2016-17, iron ore in Mormugao port, fertiliser in Deendayal port, FRM (Dry) in Paradip port, food grains in Kolkata Dock system, and coal in Paradip port.

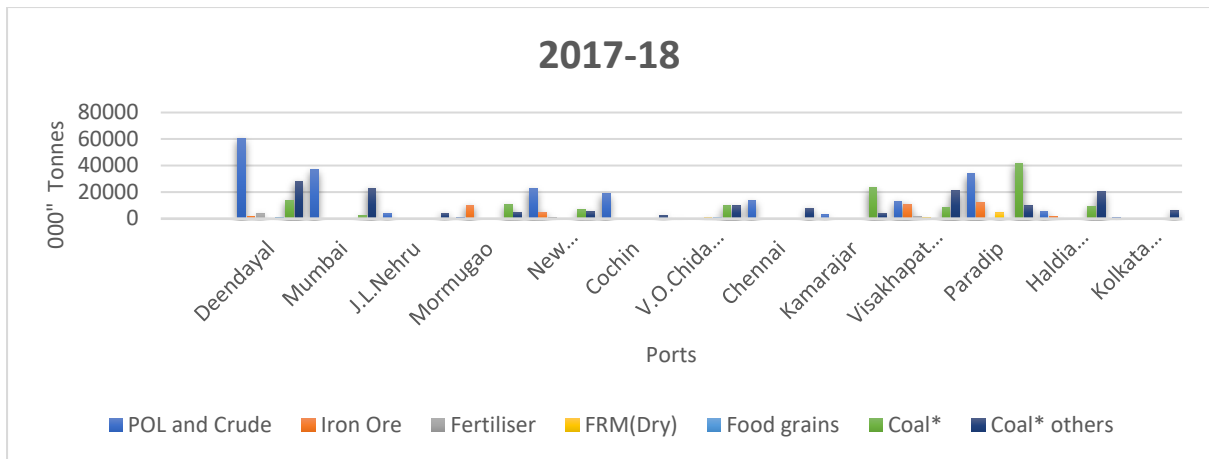


DIAGRAM 4.2: Showing the Traffic handled in major ports of selected commodities (000" tonnes)

Interpretation:

We may infer from this table that POL and crude cargo handled in Deendayal port is high, iron ore in Mormugao port, fertiliser in Deendayal port, FRM (Dry) at Paradip port, food grains at V.o Chidambaranar port, and coal in Paradip port during 2017-18. As of 2016-17, Deendayal port continues to carry the most POL, Crude, and Fertilizer cargo.

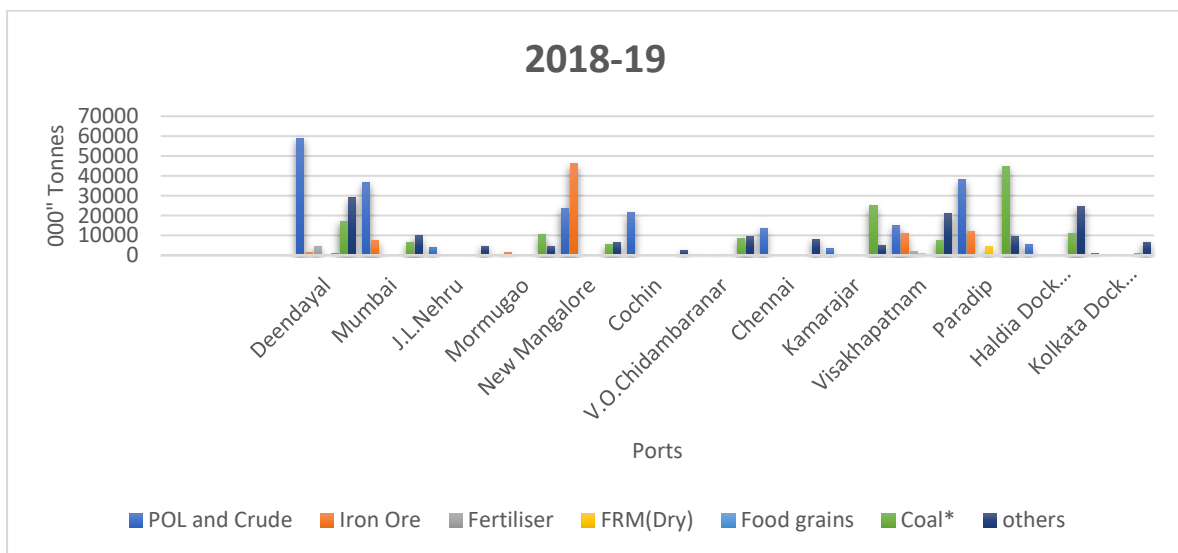


DIAGRAM 4.3: Showing the Traffic handled in major ports of selected commodities (000" tonnes)

Interpretation:

We may infer from this table that POL and crude cargo handled in Deendayal port is high in 2018-19, iron ore at New Mangalore port, fertiliser in Deendayal port, FRM (Dry) at Paradip port, food grains at Deendayal port, and coal in Paradip port.

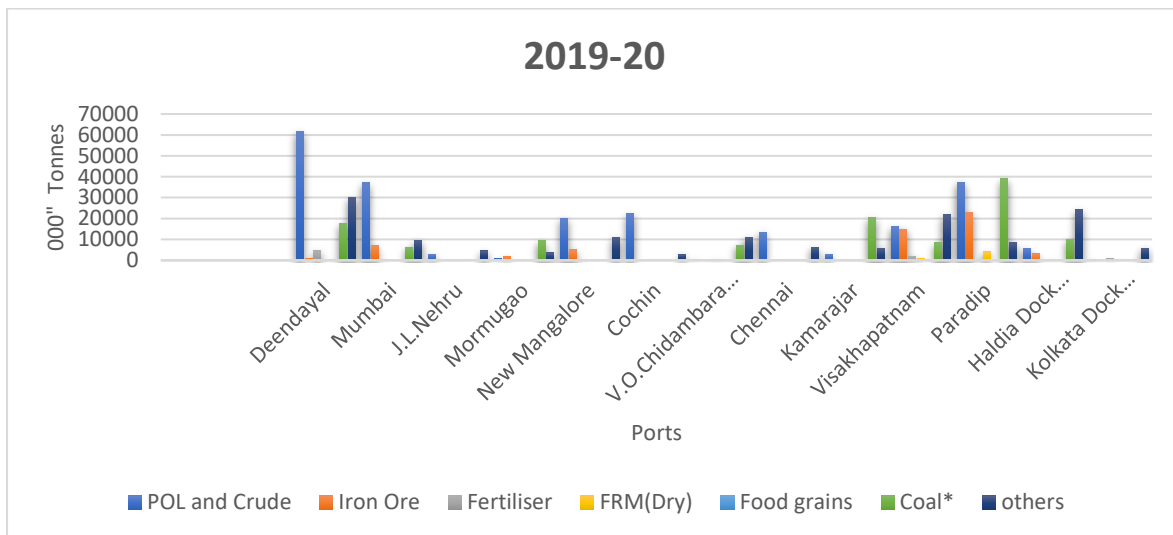


DIAGRAM 4.4: Showing the Traffic handled in major ports of selected commodities (000" tonnes)

Interpretation:

We may infer from this data that the volume of POL and crude cargo handled in Deendayal port is high in 2019-20, iron ore in Paradip port, fertiliser in Deendayal port, FRM (Dry) at Paradip port, food grains at Deendayal port, and coal in Paradip port.

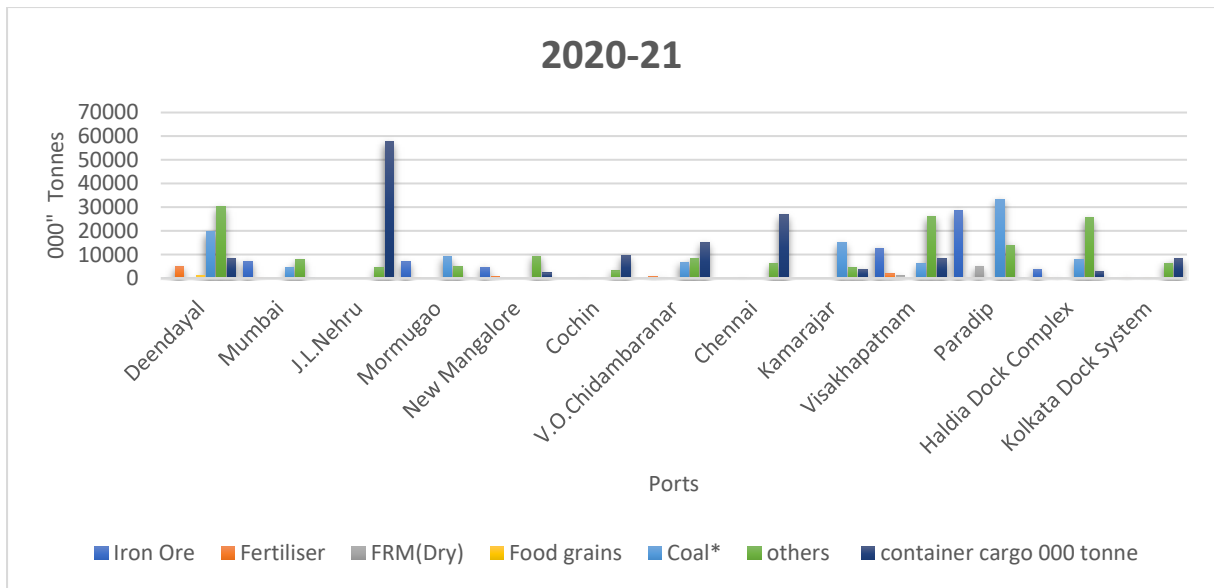


DIAGRAM 4.5: Showing the Traffic handled in major ports of selected commodities (000" tonnes)

Interpretation:

We can infer from this data that POL and crude cargo handled in Deendayal port is high in 2020-21, iron ore at Paradip port, fertiliser at Deendayal port, FRM (Dry) at Paradip port, food grains at Deendayal port, and coal in Paradip port.

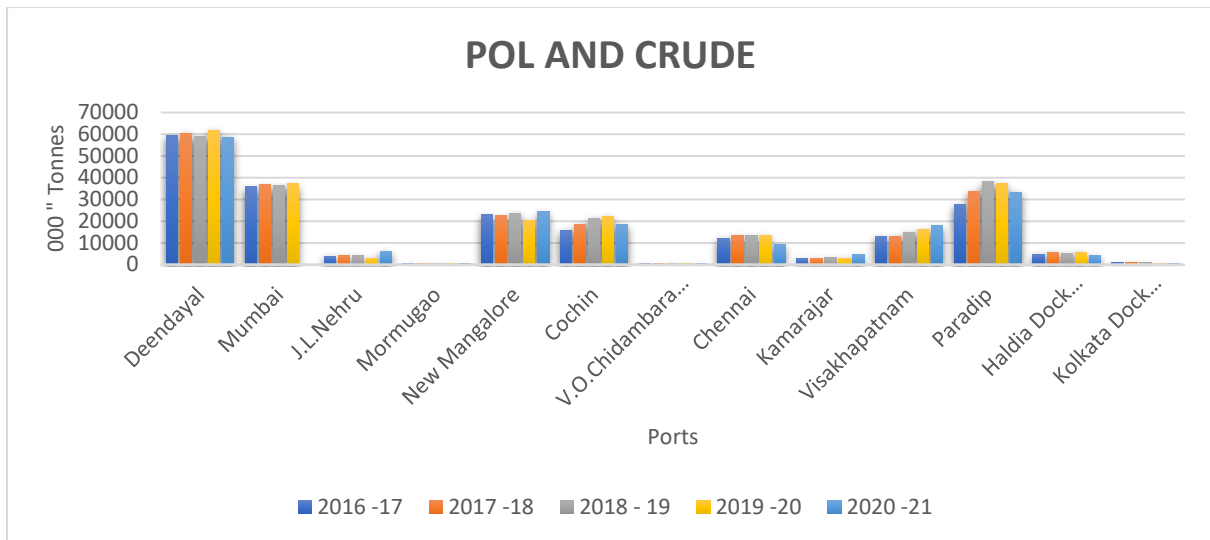


DIAGRAM 4.6: Showing the Traffic handled in major ports of POL and Crude for 5 years

Interpretation:

According to the following table, Deendayal port handled the most POL and Crude traffic over a 5-year period, following by Mumbai port, Paradip Port, and New Mangalore Port. The Mormugao and Kolkata Dock systems handled the least amount of traffic.

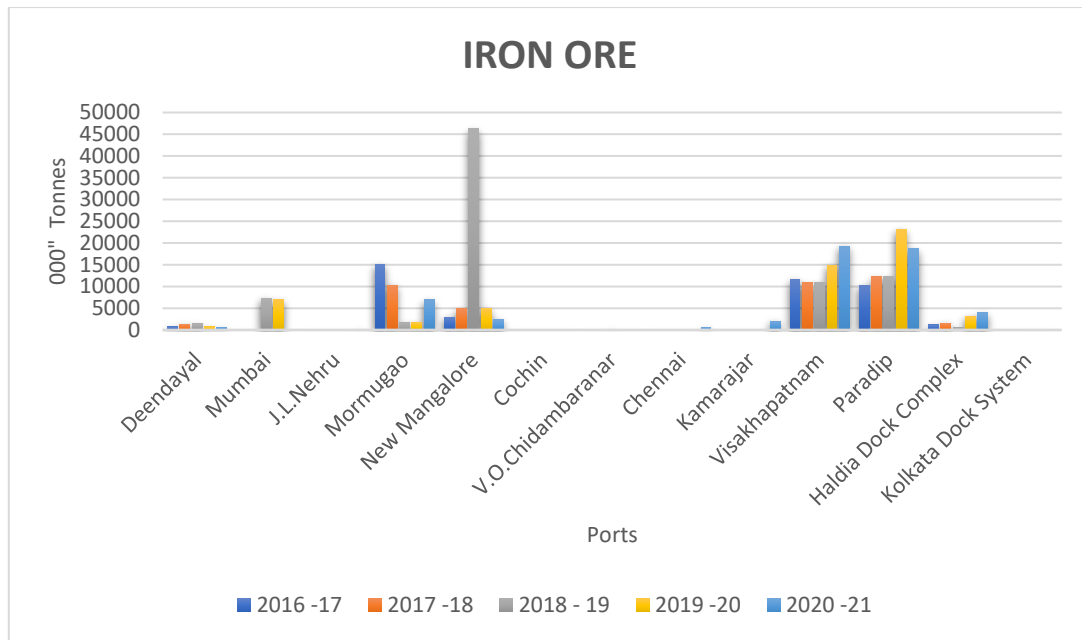


DIAGRAM 4.7: Showing the Traffic handled in major ports of Iron Ore for 5 years (000'' tonnes)

Interpretation:

According to the table above, during the last five years, Paradip port has handled the most iron ore traffic, followed by Visakhapatnam port and Mormugao port. The least amount of work was done at V.o Chidambaranar and Cochin.

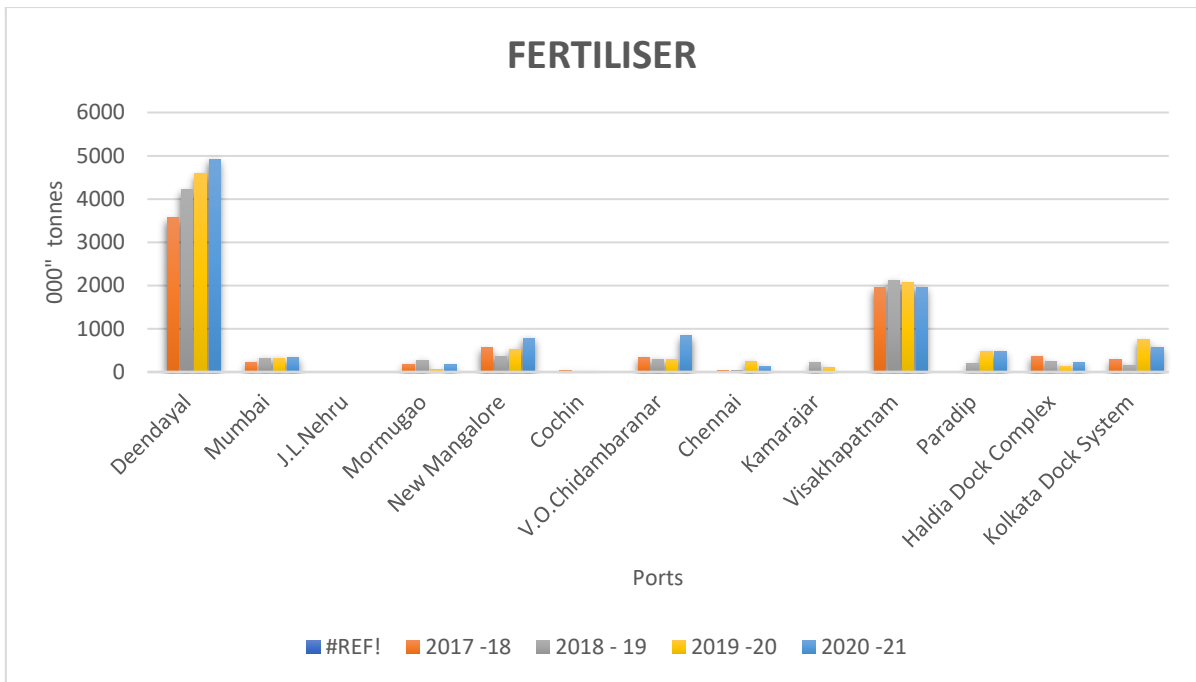


DIAGRAM 4.8: Showing the Traffic handled in major ports of Fertiliser for 5 years (000" tonnes)

Interpretation:

According to the following table, Deendayal port handled the most fertiliser trade over a 5-year period, following by Visakhapatnam port & New Mangalore port. The JNPT and Kamaraj ports had the least traffic.

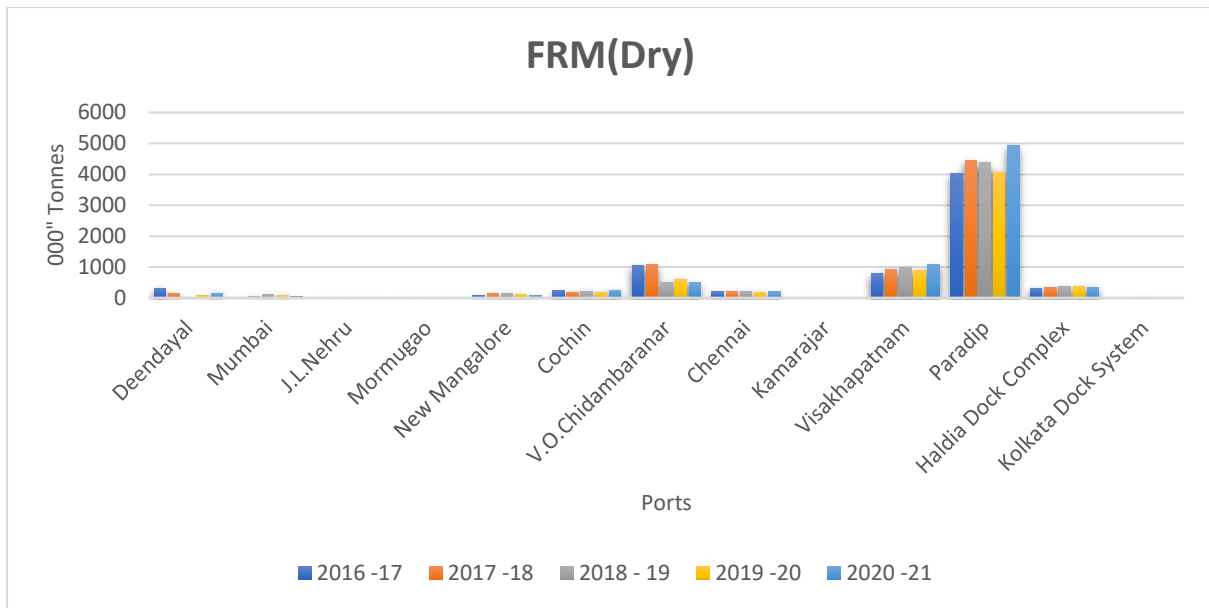


DIAGRAM 4.9: Showing the Traffic handled in major ports of FRM (Dry) for 5 years (000" tonnes)

Interpretation:

According to the table above, over a 5-year period, Paradip port handled the most FRM (Dry) traffic, following by Visakhapatnam port, V.o Chidambaranar. The least trafficked ports were Kamaraj, JNPT, and Mormugao.

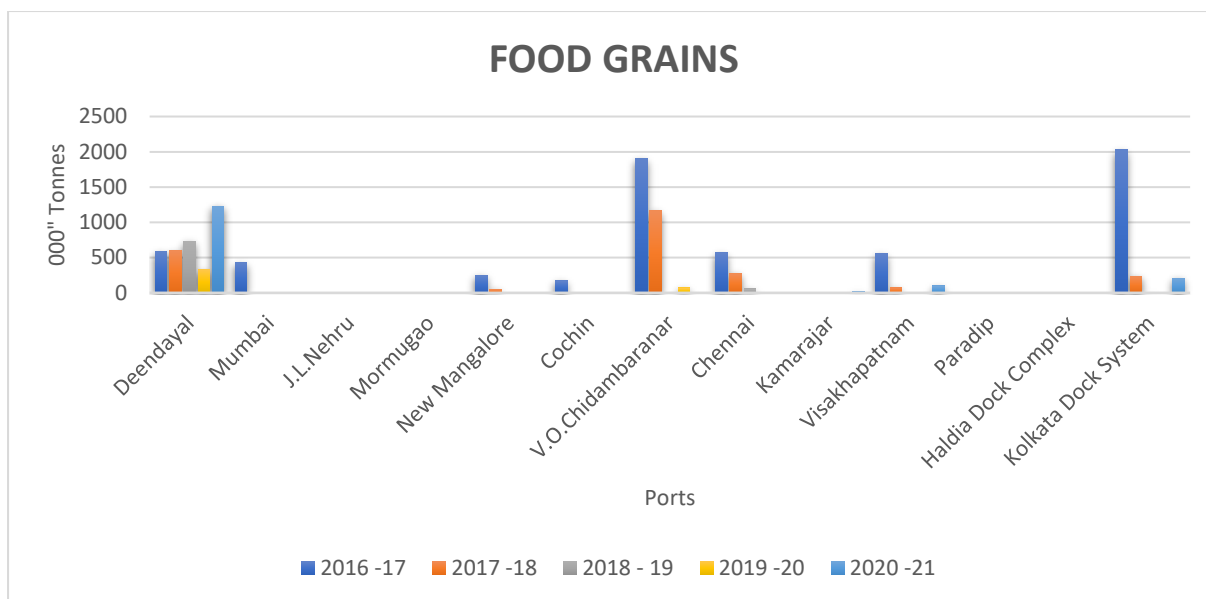


DIAGRAM 4.10: Showing the Traffic handled in major ports of Food grains for 5 years (000" tonnes)

Interpretation:

We can see from the table above that over a five-year period, V.o Chidambaranar port handled the most food grain trade, following by Deendayal port, Kolkata Dock System, and Chennai port, while JNPT, Mormugao port, and Paradip port handled the least.

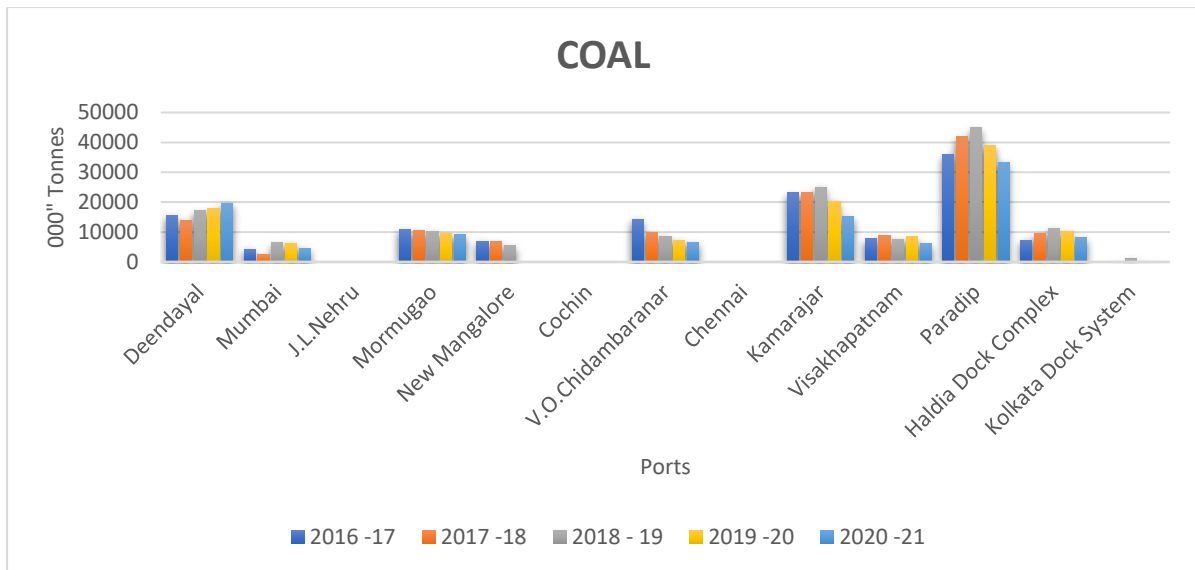


DIAGRAM 4.11: Showing the Traffic handled in major ports of Coal for 5 years (000" tonnes)

Interpretation:

According to the table above, Deendayal port handled the most coal traffic over a five-year period, following by Paradip port, Kamarajar port, and V.O Chidambaranar port. The ports of Chennai and JNPT handle the least.

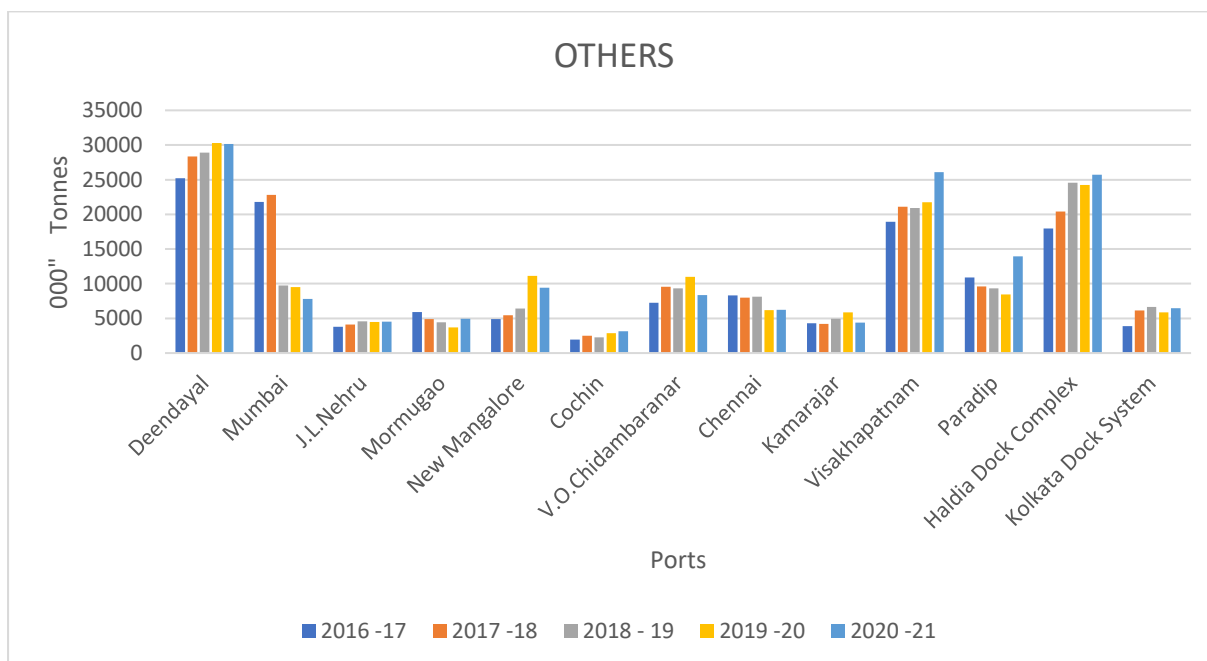


DIAGRAM 4.12: Showing the Traffic handled in major ports of other commodities for 5 years (Million tonnes)

Interpretation:

According to the table above, Deendayal port handled the most other commodity traffic over a 5-year period, following by Mumbai port, Vizag port, and Haldia Dock system. The ports of Cochin and JNPT handle the least.

TABLE 4.13: Total cargo handles (million tonnes) for 5 years

| Year | Cargo handled (million tons) |
|---------|------------------------------|
| 2016-17 | 648.47 |
| 2017-18 | 679.47 |
| 2018-19 | 699.17 |
| 2019-20 | 704.93 |
| 2020-21 | 672.68 |

Source: Basic port statistics (Annual reports)

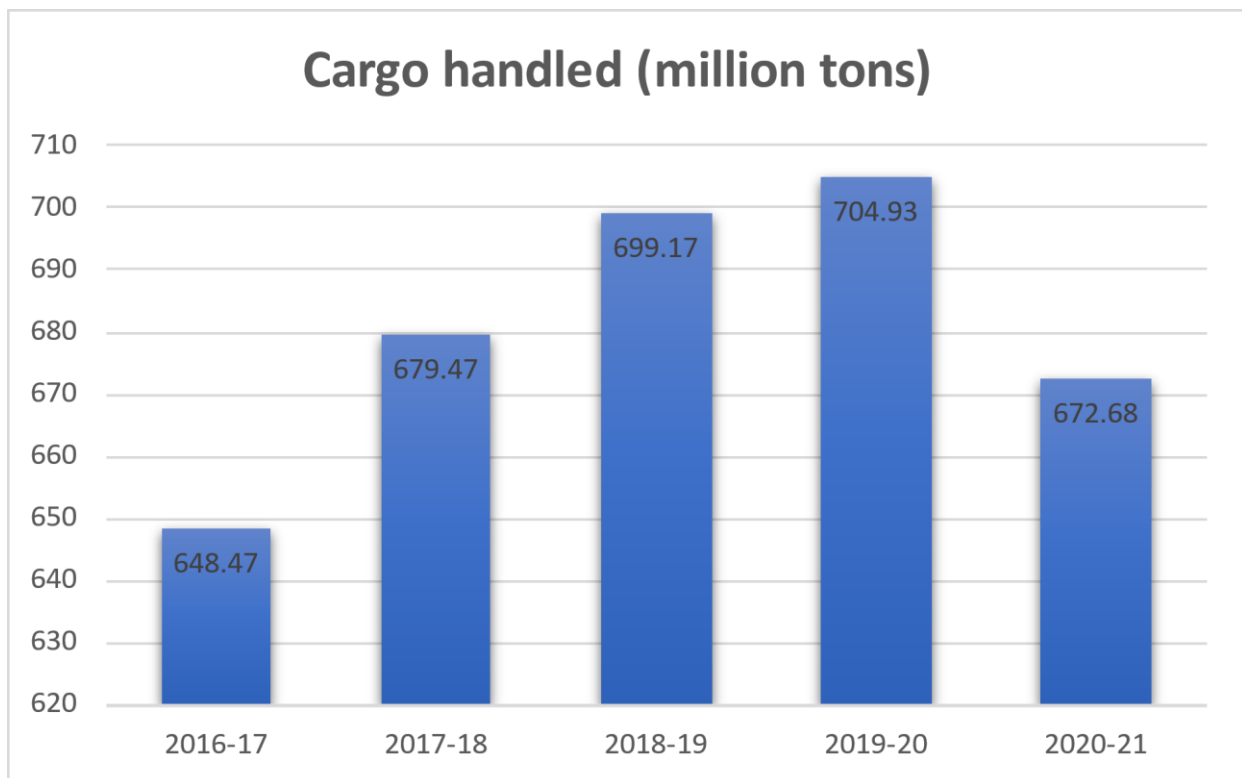


DIAGRAM 4.13: Total cargo handles (million tonnes) for 5 years

Interpretation:

From the above table and diagram, we can infer that the cargo handled in major ports is showing an increasing pace till 2019-20 but in 2020-21 due to COVID -19 Pandemic the cargo handled had decreased.

TABLE 4.14: Showing the Compound Annual Growth rate of Major Ports in respect of Cargo Handled (Million tons)

| MAJOR PORTS (CAGR) | | |
|--------------------|---------------|----------|
| Year | Cargo Handled | CAGR (%) |
| 2015 - 16 | 605.89 | 4.13 |
| 2016 - 17 | 648.47 | 7.11 |
| 2017 - 18 | 679.47 | 4.78 |
| 2018 - 19 | 699.17 | 2.95 |
| 2019 - 20 | 704.93 | 0.72 |
| 2020-21 | 672.68 | -4.55 |

Source: Basic port statistics (Annual reports)

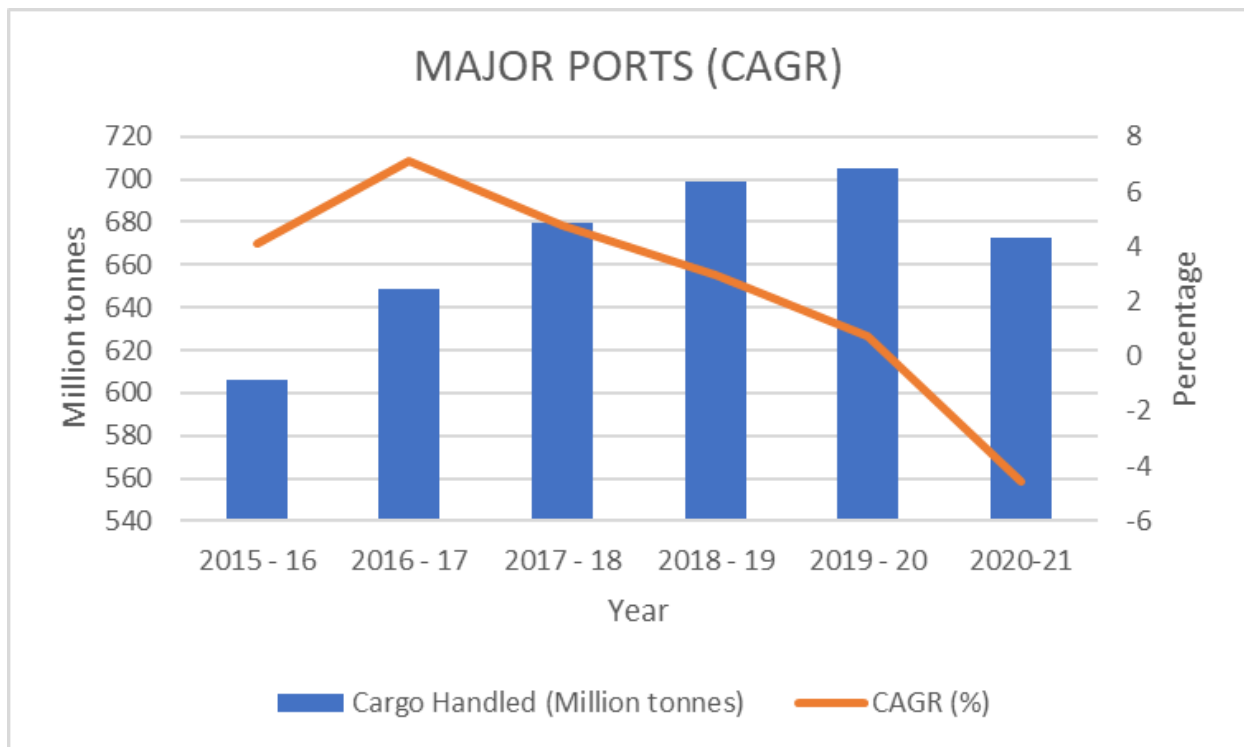


FIGURE 4.14: Showing the Compound Annual Growth rate of Major Ports in respect of Cargo Handled

INTERPRETATION:

We can infer from this table that the growth rate was first positive throughout a 5-year period, then increased from 4.13 percent to 7.11 percent between 2015-16 and 2016-17. Then it increased to 0.72 percent in 2019-20, before declining to -4.55 percent in 2020-21. As a result, we can conclude that cargo managed in major ports increased initially before declining.

CHAPTER 5 CONCLUSION

The Study on Cargo handled on Major ports of India pre and post covid-19 is driven by three main objectives that cover the importance of major ports, the impact of major ports cargo handled in economy and trade and to suggest finding from the study. Thus, we the researcher has concluded the study and projected below the finding and summary of the same.

5.1 SUMMARY OF FINDINGS

- Major ports of India are having a significant impact pre and post COVID-19 and it is evident from the above analysis.
- The Compound Annual Growth Rate (CAGR) of cargo handled by major ports is initially declining but later it had a rapid increase and again it started to decline.
- Total freight handled in India decreased by 5.3 percent in 2020-21, compared to 3.0 percent in 2019-20. Non-major port freight handled climbed at a negative rate of 5.6 percent in 2019-20 and 6.1 percent in 2020-21. The volume of cargo handled at major ports decreased from 0.8 percent in 2021-20 to 4.6 percent in 2020-21.
- In terms of cargo handled by major ports it can be concluded that in a span of 5 years, the study infers that major port is having a tremendous increase in the initial years of study but it declined in 2020-21 due to the pandemic,
- From the analysis we could conclude that during a span of 4 years that is 2016-20, POL and Crude is the commodity which is having the highest FDI among all major ports. On the other side food grains is marking the lowest position.
- During the study the researcher could identify that there has been a considerable growth in POL and Crude, Fertiliser, FRM(Dry), food grains, coal and decline in commodities like Iron Ore.

- The researcher had an analysis on the efficiency parameter of cargo handled by major and minor ports and concluded that the major port is having a great efficiency in terms of cargo handling.
- Export-import commerce in various bulk and non-bulk goods makes up India's marine trade. The processing of cargo traffic at Indian ports has steadily increased during the last decade. Over the previous few years, India's export growth has exhibited strength and vibrancy.

5.2 SUGGESTIONS

- As seen from the above study, we can understand that cargo handled in major ports show a considerable increase and then starts declining due to COVID-19. Increasing port capacity will make efficient utilization of cargo coming the ports and make a continuous flow of cargo.
- Infrastructure is critical in the cargo handling process. Only if there are appropriate infrastructure facilities will cargo arriving at ports compete effectively.
- Researcher had found that technological advancement will make the process easier and efficient. Port should adopt latest advancements to be themselves updated and ranking first among other ports.
- Researcher had a suggestion that the ports should utilize their existing capacity. There should be prompt use of existing resources of the port that is to attain at least 75% of capacity utilization.
- Researcher identified that only if cargo handling capacity is optimized there will be more customers reaching the ports making it the most reliable and demanding port.
- The country will require sufficient and effective port and maritime facilities to maintain export momentum and increase competitiveness.

5.3 CONCLUSION

The world we live in is rapidly changing, and change is always accompanied with uncertainty. In India, total freight handled grew at a negative rate of 5.3 percent in 2020-21, down from 3.0% in 2019-20. The freight handled at non-major ports grew at a negative rate of 5.6 percent in 2019-20 to 6.1 percent in 2020-21. Cargo handled at major ports grew at a negative rate from 0.8 percent in 2021-20 to 4.6 percent in 2020-21. Ports, as critical nodes in the global production–transport–distribution chain, could not have remained unaffected, and gone are the days when our students could anticipate future port demands based on limited data on consumption, income, and commerce. The port ecosystem is impacted by a variety of economic, social, institutional, and environmental trends and shocks, as well as a dynamic and often unpredictable demand for port services. While it is too early to say whether the current epidemiological crisis, and, more importantly, the assault of the new normal, will cause port governance patterns to break down, we hope that this editorial will highlight the importance of academia in assisting the business community in regularly monitoring trends and problems, as well as identifying gaps and points of (re-)orientation. As a result of the crisis, trade has slowed in all areas and nation groupings, both existing and emerging. The impact of the COVID-19 epidemic has been different depending on the cargo type. Finally, by considering the above said suggestions, the cargo handled at major ports during the time period of 2016-21 had a considerable increase till 2019 and started declining due to the pandemic. The pandemic of COVID-19 had an unexpected impact on global economic movements.