

**"A STUDY ON PORT INFRASTRUCTURE AT INDIAN MAJOR
PORTS WITH SPECIAL REFERENCE TO KOLKATA AND
CHENNAI PORTS"**

Project Report Submitted to the School of Maritime Management, Indian Maritime
University in partial fulfilment for the award of the degree of

MASTER OF BUSINESS ADMINISTRATION (MBA)

in

PORTS AND SHIPPING MANAGEMENT

Submitted by

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MAY 2025

DECLARATION

I, MUHAMMED SANIF P P bearing Register Number: 2303304021, student of MBA – Ports and Shipping Management, at School of Maritime Management, Indian Maritime University, Chennai Campus, hereby declare that the project report titled "**A STUDY ON PORT INFRASTRUCTURE AT INDIAN MAJOR PORTS WITH SPECIAL REFERENCE TO KOLKATA AND CHENNAI PORTS**" is my original work. This report is being submitted in partial fulfilment of the requirement for the award of the degree of Master of Business Administration (MBA) In Ports and Shipping Management (PSM). The project report is output of my learnings and observations of my research under the guidance of Dr Lekha Ravi, Assistant professor School of Maritime Management, Indian Maritime University, Chennai Campus.

I declare that the information submitted is true and original to the best of my knowledge.

Place: Chennai

Date: 27/05/2025

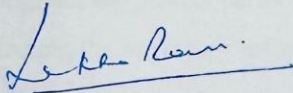


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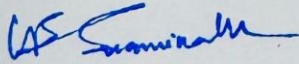
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Project Guide

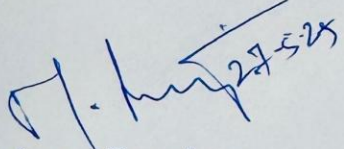
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EXECUTIVE SUMMMARY

This research project titled “*A Study on Port Infrastructure at Indian Major Ports with Special Reference to Kolkata and Chennai Ports*” aims to evaluate and compare the existing infrastructure, operational efficiency, and development strategies of two strategically important major ports in India Kolkata Port and Chennai Port.

India’s maritime sector plays a pivotal role in supporting the country’s international trade, and major ports are critical to this network. However, infrastructural disparities, operational challenges, and modernization gaps persist among them. This study focuses on identifying the key infrastructural constraints at Kolkata and Chennai Ports and analyzing their performance with respect to cargo handling capacity, hinterland connectivity, modernization initiatives, and overall service quality.

The research adopts a mixed-method approach, combining secondary data analysis from port trust reports, government publications, and industry databases. Performance indicators such as berth productivity, turnaround time, cargo traffic trends, and port-led development initiatives were compared to assess competitiveness.

Key findings indicate that while Chennai Port has made significant strides in mechanization and container handling capabilities, it continues to face urban congestion and limited expansion space. Conversely, Kolkata Port, particularly due to its riverine nature, grapples with draft limitations and high siltation but benefits from strong inland waterway connectivity and emerging PPP-based modernization projects.

The study concludes by recommending tailored infrastructure upgrades, better integration with multimodal transport, and policy support to enhance operational efficiency at both ports. The insights provided are valuable for policymakers, port authorities, and logistics stakeholders aiming to strengthen India’s port competitiveness on the global stage.

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CHAPTER 1
INTRODUCTION

1.1 ABOUT THE INDUSTRY

India's maritime sector is a vital driver of the nation's economic growth, serving as the gateway for almost 95% of its foreign trade by volume and approximately 65% by value. With a coastline exceeding 7,500 kilometers, India is endowed with an extensive network of ports that play a critical role in sustaining domestic and international commerce. The country has 12 major sea ports, complemented by nearly 200 non-major ports, which together processed close to 795 million tons of cargo during the fiscal year 2022–23.

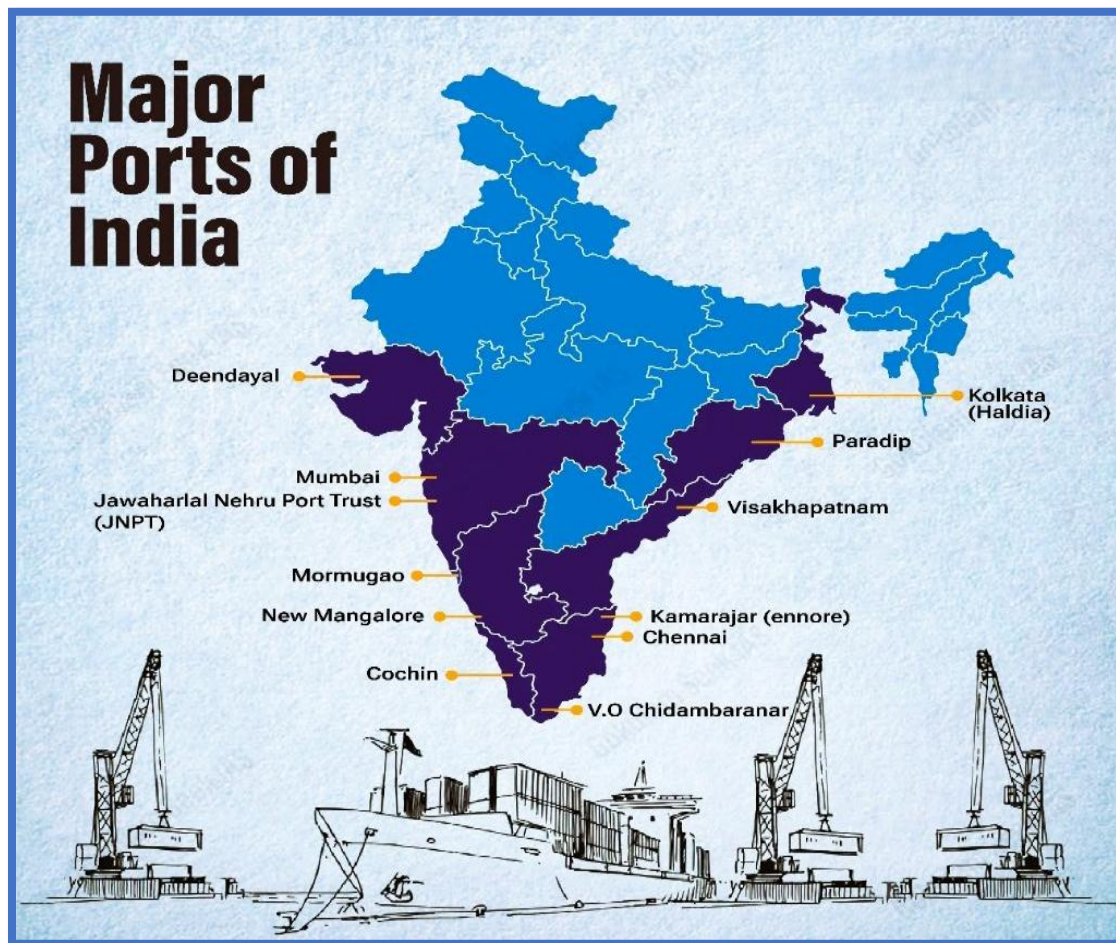


Figure 1. Major Ports of India, source: - www.gokulamseekias.com

The major ports not only handle a diverse mix of cargo ranging from containers, dry and liquid bulk, to project cargo but also serve as strategic hubs connecting India's vast hinterland to global markets. For example, Jawaharlal Nehru Port (JNPA) in Navi Mumbai is widely recognized as the

largest container port in India. JNPT accounts for more than 50% of India’s containerized cargo and recorded a throughput of approximately 6.05 million TEUs (Twenty-foot Equivalent Units) in FY 2022–23. This high-performance places JNPT among the world’s top 100 container ports and underscores its strategic importance in international trade networks.

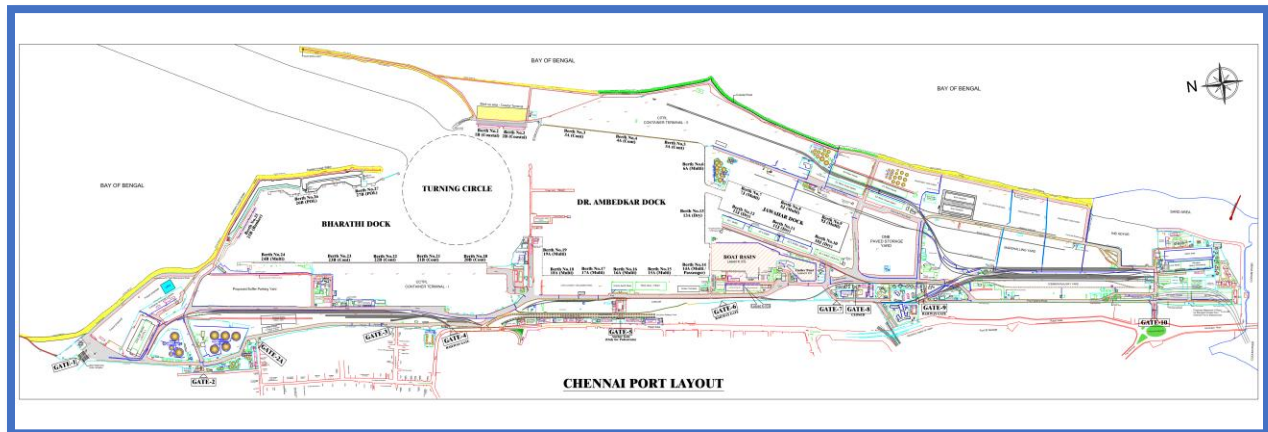


Figure 2. Chennai Port Layout, source: - www.chennaiport.gov.in

Chennai Port, situated on the eastern coast of India along the Bay of Bengal, is one of the country’s largest and most strategically significant maritime hubs. Established in 1881, it has evolved into a modern, all-weather, deep-water port that handles a diverse range of cargo, including containers, automobiles, petroleum products, coal, fertilizers, and general cargo. In FY 2023–24, the port handled approximately 46.76 million tons of cargo, with an annual container handling capacity of around 2.5 million TEUs. The port is equipped with state-of-the-art container terminals operated by DP World and PSA International, ensuring efficient cargo movement. Its multimodal connectivity, including well-developed road, rail, and coastal shipping links, enhances trade flow across southern India and beyond. Chennai Port serves as a crucial gateway for automobile exports, particularly for major manufacturers like Hyundai, Nissan, and Ford.

To maintain its competitive edge, Chennai Port has undertaken several modernization and expansion projects, including deepening its draft to accommodate larger vessels. It is also focusing on green port initiatives, such as shore power supply and sustainable cargo handling. With

continuous infrastructure improvements and digitalization efforts, Chennai Port is strengthening its position as a key player in India's maritime trade and logistics sector.¹

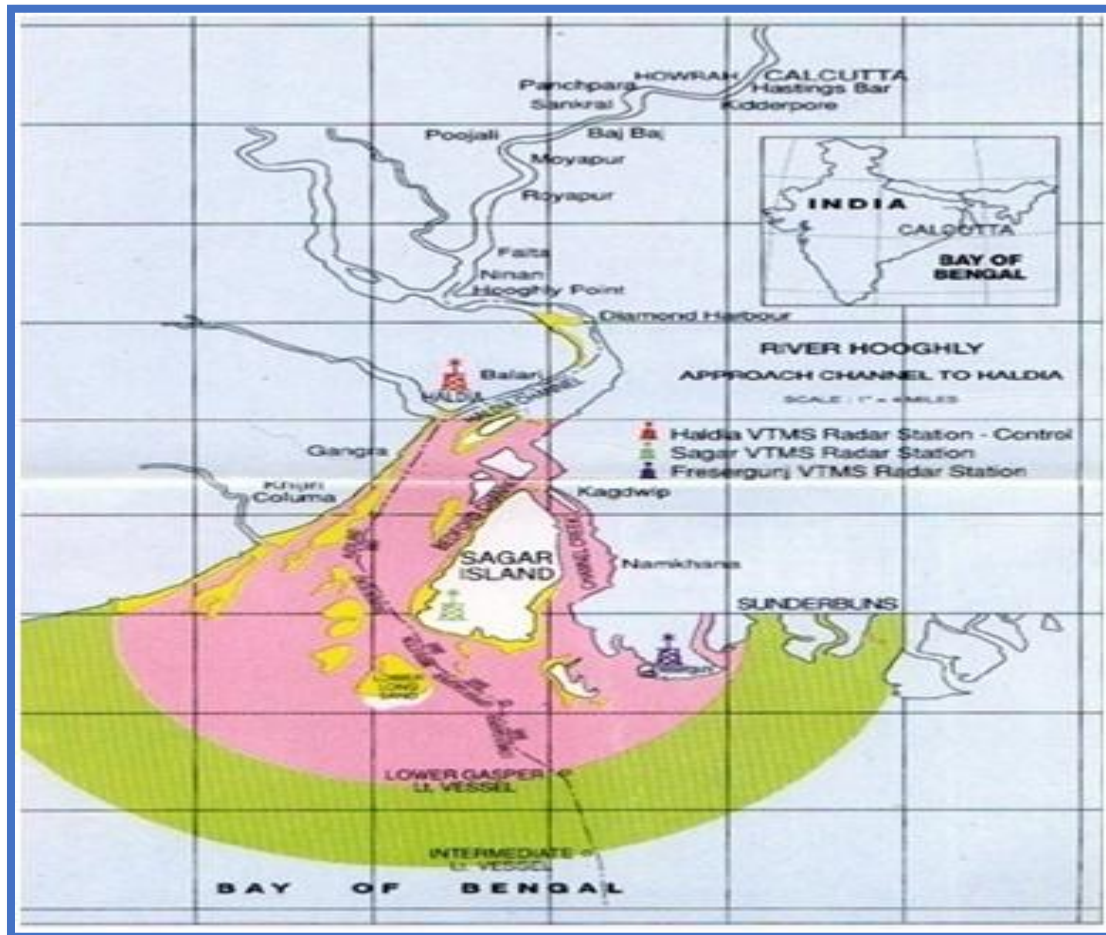


Figure 3. Shyama Prasad Mukherjee Port Map, source: - www.smp.smpportkolkata.in

Kolkata Port, one of the country's oldest ports, occupies a unique position on the Hooghly River. Its extensive hinterland stretches across eastern and northeastern India, supporting the export of commodities such as jute, tea, and agricultural products. However, the natural riverine setting also brings challenges Kolkata Port frequently contends with heavy silting, navigational "bends," "bars," and "bores," which require regular dredging and specialized pilotage. These recurring issues elevate operational costs and impact overall efficiency.

• ¹ www.chennaiport.gov.in

Other significant ports contribute to a robust maritime ecosystem. Mumbai Port, located on the west coast, handled approximately 67.26 million tons of cargo in FY 2023–24, while Kandla Port in Gujarat is a major hub for dry cargo, processing over 137 million tons. Visakhapatnam Port in Andhra Pradesh noted for its deep-water facilities, processed around 81.09 million tons of cargo² in FY 2022–23 and recorded container traffic nearing 512,000 TEUs. Paradip Port in Odisha, Tuticorin Port in Tamil Nadu, New Mangalore Port in Karnataka, Ennore Port (Kamarajar Port Limited) near Chennai, Mormugao Port in Goa, and Mundra Port in Gujarat also play crucial roles, collectively handling diverse cargo and driving regional economic activity.

To support the sector’s growth and improve efficiency, the Indian government has launched ambitious initiatives like the Sagarmala project. This program envisions extensive modernization of port infrastructure, investment in terminal expansion, and enhanced connectivity through improved road, rail, and inland water transport networks. With investments estimated in the multi-lakh crore rupees range, these modernization efforts aim to reduce vessel turnaround times and logistics costs, positioning Indian ports to meet future trade demands. Additionally, strategic plans such as dedicated freight corridors are expected to further integrate ports with industrial clusters and bolster India’s global competitiveness.³

1.2 STATEMENT OF PROBLEM

India's major ports are crucial for the country's trade and economic development. However, there are significant disparities in port infrastructure and operational efficiency among these ports. Specifically, the Kolkata and Chennai ports, despite their strategic locations and historical significance, exhibit notable differences in infrastructure, technological advancements, and overall performance. These disparities hinder the ports' ability to operate at their full potential, impacting cargo handling capacity, turnaround times, and, ultimately, India's global trade competitiveness.

This research aims to conduct a comparative analysis of the port infrastructure at Kolkata and Chennai ports to identify the key areas, causes, differences, and their impact on port efficiency and performance. By addressing these issues, the study seeks to provide actionable insights for

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- ² www.smp.smpportkolkata.in
 - ³ https://globalmaritimehub.com/wp-content/uploads/attach_734.pdf

infrastructure improvement, policy formulation, and investment prioritization to enhance the overall efficiency of Chennai and Kolkata ports.

1.3 OBJECTIVE OF THE STUDY

This study is designed to explore the differences in port infrastructure between Kolkata and Chennai two of India's most critical maritime gateways. Kolkata Port, with its centuries-old legacy, faces unique challenges such as sediment accumulation and intricate navigation due to its riverine setting. Meanwhile, Chennai Port has continuously upgraded its facilities through targeted modernization, leading to state-of-the-art container terminals and efficient multimodal connectivity.

1. To study the infrastructure at two Indian legacy Ports- Kolkata Port and Chennai Port.
2. To identify infrastructure constraints of Kolkata and Chennai Port
3. To analyze the investment and development initiatives undertaken by port authorities to address infrastructure constraints

1.4 RESEARCH METHODOLOGY

The chosen methodology for this project review is a qualitative research design. Data for this review will be gathered from secondary sources such as scholarly journals, conference proceedings, reports, books, Ministry of Ports, Shipping and Waterways Website and other pertinent publications. To ensure a comprehensive approach, a well-defined search strategy will be formulated, incorporating online databases, search engines, and relevant keywords to uncover literature relevant to the research focus

1.5 RESEARCH SCOPE

This study is limited to a analysis of the port infrastructure at two of India's major ports "Kolkata Port and Chennai Port". It focuses on understanding how historical evolution, physical infrastructure, and modernization efforts influence operational efficiency and overall performance.

1.6 LIMITATIONS

- 1) The constraints of limited time available for data collection, analysis, and interpretation may have restricted the depth and breadth of the research, preventing a comprehensive investigation of the topic
- 2) The research project may have been hindered by limitations in resources, including budgetary constraints, restricted access to data or information, and limited availability of research tools or equipment. These constraints could have influenced the overall scope and quality of the research.
- 3) Secondary data may contain inherent biases such as selection bias, publication bias, or reporting bias. These biases can impact the validity and reliability of the research findings and may introduce limitations in the interpretation of the data.
- 4) An empirical study would be an appropriate avenue for further research, it was not feasible due to the project's constraints in terms of resources and time.

CHAPTER 2
LITERATURE REVIEW

2.1 REVIEW OF LITERATURE

(Stough, 2005) highlights that regulatory complexity, conflicting stakeholder interests, and fragmented intergovernmental responsibilities delay necessary reforms. Ports that have successfully navigated these institutional constraints, such as the Alameda Corridor Transportation Authority, have demonstrated better crisis management and reduced project delays. This underscores the importance of institutional adaptability over mere physical or technological enhancements.

The efficiency of port infrastructure is another critical factor influencing trade competitiveness. (Herrera & Pang, 2006) utilize non-parametric methods like Data Envelopment Analysis (DEA) to evaluate container port efficiency. Their findings suggest that inefficient ports use 20% to 40% more inputs than their efficient counterparts, leading to unnecessarily high maritime transport costs. While larger ports tend to be more efficient, the causality between port size and efficiency remains ambiguous. Similarly, (Munim & Schramm, 2018) examine the relationship between port infrastructure, logistics performance, and economic growth, demonstrating that improvements in port efficiency significantly enhance seaborne trade. This is particularly relevant in developing economies, where logistics performance plays a crucial mediating role.

The role of port infrastructure in supply chain integration is particularly evident in the case of Colombo Port, as explored by (Park & Dossani, 2020). Their study underscores the importance of transshipment and multi-country consolidation services in reducing lead times and diversifying product lines in the South Asian apparel industry. While Colombo Port sets a benchmark, gaps in regional logistics and infrastructure alignment remain a challenge. Similarly, research on Indian ports by (Karthik & Dubey, n.d.) highlights the need for modernization to enhance competitiveness in global trade. Despite initiatives like the Sagarmala Project, inefficiencies such as inadequate connectivity and prolonged turnaround times continue to hinder India's export growth.

Further studies investigate the relationship between port capacity, efficiency, and competitiveness. (Gaur et al., 2011) develop an Efficiency Index to benchmark Indian ports, revealing that despite substantial investments, systemic inefficiencies persist, leading to a 30–40% gap between effective and absolute capacity. Similarly, (Palanisingham et al., 2017) discuss how India's port infrastructure, while geographically advantageous, struggles with congestion and high logistics costs. While the

Sagarmala Project has significant potential, its success depends on improved implementation and coordination.

Investment in port infrastructure is often viewed as a catalyst for trade and economic welfare. (Brancaccio et al., 2024) apply a novel empirical framework combining queueing theory and demand estimation to assess the impact of port infrastructure investments. Their study finds that even small demand shocks can cause disproportionately high delays at congested ports, with shippers willing to pay significantly to reduce port time. However, returns on investment vary across ports, emphasizing the need for strategic, regionally coordinated infrastructure development.

One significant area of research focuses on how port infrastructure improvements influence shippers' decisions and trade patterns. The deepening of the fairway at Szczecin Port reduced transport costs by up to 25%, allowing larger vessels to call at the port, thus enhancing its trade reach (Wagner et al., 2022). However, the study also highlighted the necessity for additional investments in quay reinforcements and port handling equipment to fully utilize the benefits of deepening. Similarly, an analysis of port investment in Spain comparing the ports of Bilbao and Valencia revealed that heavy infrastructure investment does not always translate into increased efficiency or market share (Garcia-Alonso & Martin-Bofarull, 2007). While Valencia maintained high efficiency and competitive positioning, Bilbao struggled with scale inefficiencies, demonstrating that investment alone is insufficient and must be complemented by strategic operational improvements.

The regulatory aspect of port infrastructure also plays a vital role in ensuring fair competition and efficiency in port services. A proposed access model based on the Coase Theorem and Demsetz approach suggests that structured incentives and negotiated access terms can help mitigate monopolistic control over essential port facilities, ultimately leading to reduced maritime transport costs (Flor & Defilippi, 2003). This model highlights the need for balancing regulation and market forces to optimize port efficiency.

Another perspective examines the causal relationship between port investments and regional economic growth. A study using Granger causality analysis on Chinese ports found that while port investments and economic growth influence each other in the short term, long-term growth is primarily driven by sustained infrastructure investment rather than economic expansion prompting

further investments (Song & Mi, 2016). These findings underscore the importance of a proactive investment strategy to stimulate regional economic performance and competitiveness.

In the context of strategic decision-making for port investments, an integrated approach combining SWOT analysis and the Analytic Hierarchy Process (AHP) has been suggested to ensure optimal resource allocation (Gürol* & Acar, 2019). The study emphasizes that factors such as port tariffs, environmental policies, and operational efficiency play a crucial role in determining the success of port investments. Similarly, the role of public-private partnerships (PPPs) in port development has been widely examined. Research indicates that PPPs help mobilize private capital, improve efficiency, and ensure sustainable port operations (Vining & Boardman, 2008). However, challenges such as conflicting objectives between public and private partners and high transaction costs must be carefully managed to maximize the benefits of such collaborations.

In the Indian context, the implementation of PPPs has played a significant role in enhancing port throughput. Studies have found that major ports have benefitted from increased private sector participation, leading to improved cargo handling capabilities and reduced dependency on foreign transshipment hubs (B.Swaminathan, 2018). The transition from traditional port models to modernized frameworks, supported by legislative reforms, has strengthened the competitiveness of Indian ports. Another study examining the economic and social benefits of PPPs highlights their role in job creation, risk-sharing, and service quality improvements, reinforcing the necessity of well-structured contractual agreements to optimize their effectiveness (Hamed Al Habsi & Ullah, 2022).

CHAPTER 3

**OVERVIEW OF PORT INFRASTRUCTURE AT
KOLKATA & CHENNAI**

3.1 INTRODUCTION

The infrastructure of maritime ports plays a pivotal role in facilitating international trade, ensuring operational efficiency, and supporting regional economic development.

In my analysis of Indian port infrastructure, I chose Kolkata and Chennai ports because they offer contrasting yet equally valuable insights into the complexities of managing major maritime hubs in India. This decision was not made lightly, as each port embodies different geographical, historical, and operational challenges that together illustrate the broad spectrum of issues faced by India's ports today.

Kolkata Port, located along the Hooghly River in West Bengal, has a storied past that stretches back to colonial times. This port has long been a vital gateway for trade in eastern India, playing a key role in the country's maritime history. However, its riverine location brings a set of natural challenges. Over the years, the port has had to contend with issues like siltation and fluctuating water depths. These problems, noted in several reports by the Ministry of Shipping and supported by studies from the Indian National Centre for Ocean Information Services (INCOIS), have made regular dredging and careful engineering a necessity just to maintain safe navigation. For me, Kolkata is a fascinating example of how a legacy port grapple with modern demands while still holding on to its historical significance.

In contrast, Chennai Port is situated along the Bay of Bengal on the Coromandel Coast—a setting that naturally supports deeper waters and eases many of the challenges faced by river ports. This coastal location means that Chennai does not require as frequent dredging as Kolkata, and it can handle larger vessels and a higher volume of cargo more efficiently. Over the past few decades, the port has undergone significant modernization, supported by initiatives like the Sagarmala Project. This ambitious government program has spurred investments in advanced cargo-handling systems, upgraded berth facilities, and improved multimodal connectivity. Industry case studies and government publications often highlight Chennai's transformation as a model for how strategic investment and technology can push a port into the modern era.

The two ports also differ in their broader roles within India's economic framework. Kolkata, with its rich historical backdrop, remains an essential hub for the transport of bulk cargo and the

movement of goods in eastern India. Its traditional role, while burdened with aging infrastructure, continues to underpin regional trade. On the other hand, Chennai's modernized facilities not only boost its operational efficiency but also position it as a key player in international maritime trade. Its ability to handle a diverse range of cargo types efficiently sets a benchmark for other ports looking to upgrade their operations. Economic surveys and maritime logistics studies consistently point out that while Kolkata illustrates the enduring challenges of legacy systems, Chennai exemplifies how modernization can drive growth and efficiency.

There is also a broader lesson in analyzing these two ports together. Kolkata's struggle with environmental constraints and the need to update its traditional systems offers an important case study on the challenges of upgrading legacy infrastructure. Chennai, with its proactive investments and adaptive management practices, demonstrates the benefits of forward-thinking approaches in overcoming natural and technical hurdles. Comparing these approaches helps in formulating policy recommendations that balance the preservation of historical assets with the need for modern efficiency.

To conclude, my decision to focus on Kolkata and Chennai ports for this study was guided by their clear geographical, historical, and operational differences. Kolkata Port, steeped in history and affected by natural challenges, and Chennai Port, a shining example of strategic modernization, together encapsulate the diverse challenges and solutions present in Indian port management. This comparison not only deepens our understanding of the existing issues but also lays the groundwork for actionable insights and recommendations that could benefit the maritime sector as a whole.

3.2 INFRASTRUCTURE ANALYSIS OF KOLKATA PORT

3.2.1 OVERVIEW AND HISTORICAL EVOLUTION

Kolkata Port has a storied history that dates back to its establishment in 1870. Initially managed under the Calcutta Port Commissioners during the British colonial era, the port has evolved into a dual-component system comprising the Kolkata Dock System (KDS) and the Haldia Dock Complex (HDC). The KDS includes historically significant docks such as Kidderpore and Netaji Subhas Dock (NSD), which played an essential role in the early phases of India's maritime trade. Over time, the limitations imposed by its riverine setting especially the shallow draft and

⁴persistent siltation necessitated the development of the Haldia Dock Complex to accommodate larger vessels and increase overall throughput.

The unique challenges presented by operating in a riverine environment have long been recognized in scholarly literature. For instance, research published in the Proceedings of the Institution of Civil Engineers describes how factors such as shallow water depths (often limited to 8–9 meters in parts of the KDS) and silt deposition require continuous dredging. These factors have a significant impact on vessel accommodation, turnaround times, and overall operational efficiency. As a result, there is a growing consensus on the need for modernization, including the potential development of a deep-sea terminal to overcome these limitations⁵

3.2.2 PHYSICAL INFRASTRUCTURE AND OPERATIONAL FACILITIES

Kolkata Port's infrastructure is organized into two main operational areas:

Kolkata Dock System (KDS)

The KDS comprises traditional impounded dock basins, including Kidderpore Dock and Netaji Subhas Dock. These docks were designed to handle a mix of containerized cargo and general cargo. Due to their historical design, these facilities have limitations:

- **Impounded Basins:** The design provides protection from tidal variations; however, it also results in a confined operational space.
- **Shallow Draft:** Parts of the KDS have water depths limited to 8–9 meters, which restricts the size of vessels that can dock.
- **Siltation:** The riverine environment results in continuous silt deposition, necessitating frequent dredging and increasing maintenance costs.⁶

⁵ <https://doi.org/10.1680/jenhh.19.00028>

⁶ www.smp.smpportkolkata.in

Haldia Dock Complex (HDC)

HDC was developed to complement the KDS by offering deeper berths and modernized cargo handling facilities. This complex is better suited for handling bulk cargo and larger vessels, and it benefits from:

- **Modern Equipment:** HDC incorporates updated machinery and technology to improve cargo handling efficiency.
- **Expanded Storage:** Enhanced storage facilities enable the port to manage higher volumes of bulk cargo.
- **Improved Draft:** With deeper berths than the KDS, HDC can accommodate vessels with greater draft, thereby attracting larger international ships.

Kolkata Port handles a diverse range of cargo, including bulk, break-bulk, and containerized cargo. Its overall throughput is estimated at 65–70 million tonnes per annum. The port's strategic location allows it to serve not only eastern India but also neighboring regions, including Nepal, Bhutan, and parts of Bangladesh. Multimodal connectivity is achieved through a robust network of road, rail, and inland waterways especially via National Waterway 1, which plays a critical role in reducing logistics costs and facilitating cargo transfers.

Recent modernization initiatives are focused on digital transformation. The port administration is increasingly integrating technologies such as vessel traffic management systems (VTMS) and automated cargo tracking platforms, which are expected to streamline operations and significantly reduce turnaround times.⁷

⁷ https://sagarmala.gov.in/sites/default/files/6.Final_Master_Plan_KoPT.pdf

3.3 HINTERLAND OF KOLKATA PORT

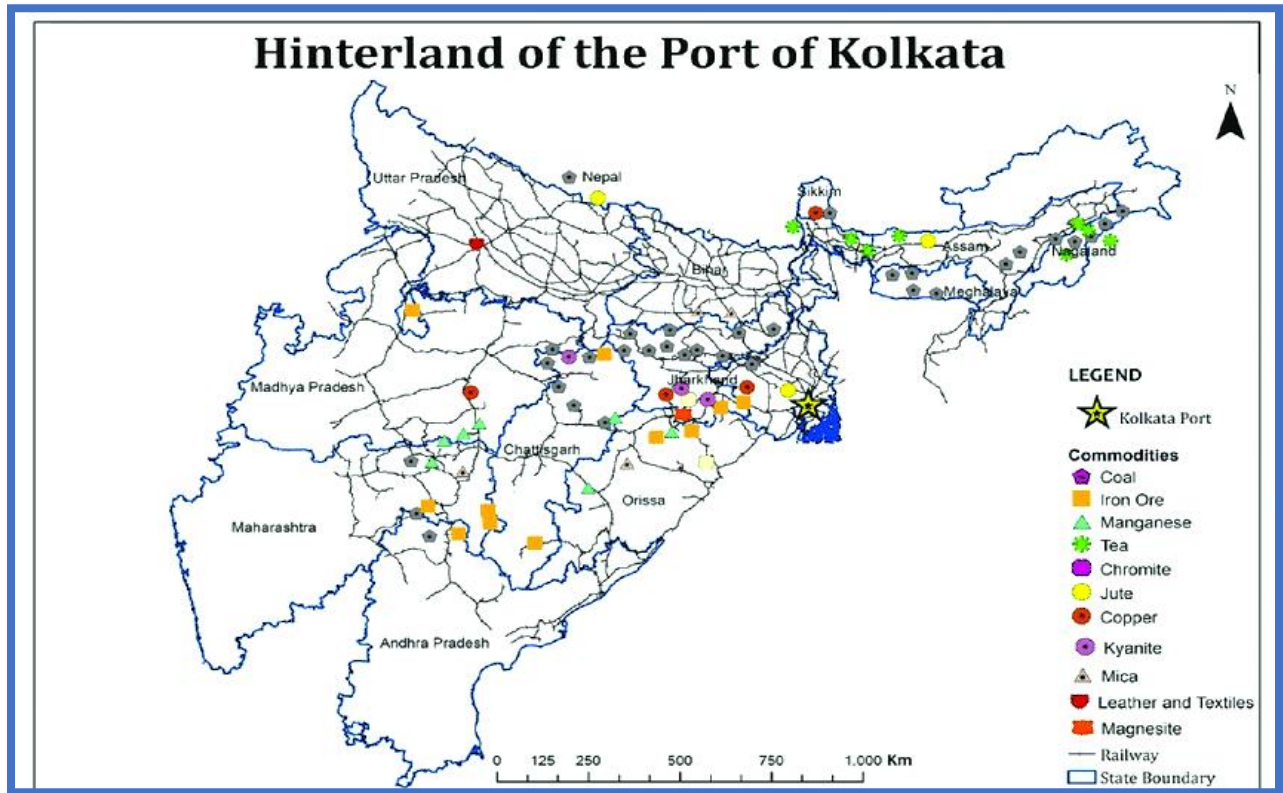


Figure 4. Hinterland of Kolkata Port, source: - www.google.com

Kolkata Port serves as a crucial gateway for eastern, northeastern, and central India, along with neighboring countries like Nepal, Bhutan, and Bangladesh. It handles cargo for states like West Bengal, Bihar, Jharkhand, Odisha, and even parts of Chhattisgarh and Uttar Pradesh. The port is also a vital link for northeastern states, relying on inland waterways and transit routes through Bangladesh.

The key industries in Kolkata's hinterland include iron ore, steel, tea, jute, and agricultural products for export, while crude oil, fertilizers, coal, and machinery are commonly imported. West Bengal and Assam are significant producers of tea and jute, whereas Jharkhand and Odisha contribute to the port's steel and mineral trade. The port also plays a role in the cross-border trade of consumer goods with Nepal and Bhutan.

Connectivity to the hinterland is supported by an extensive rail and road network, including Eastern and South Eastern Railways and major highways like NH-16 and NH-19. Inland

waterways, particularly National Waterways 1 and 2, facilitate cargo movement to Varanasi and Assam. The Indo-Bangladesh Protocol Route further enhances trade efficiency for the northeastern states, making Kolkata Port a preferred choice for regional trade.

However, the port faces significant challenges, including siltation in the Hooghly River, which requires continuous dredging to maintain navigability. Additionally, congestion due to high cargo volumes leads to delays. The reliance on Bangladesh for transit to the northeast also poses logistical hurdles. To address these issues, modernization projects, deepening of the draft, and improved rail connectivity through the Eastern Dedicated Freight Corridor (EDFC) are underway.

3.4 INFRASTRUCTURE ANALYSIS OF CHENNAI PORT

3.4.1 HISTORICAL CONTEXT AND EVOLUTION

Chennai Port has a rich history that spans several centuries, with its origins dating back to the 17th century. Over time, it has evolved from a traditional bulk cargo facility to a sophisticated, modern port. Extensive reforms implemented in the late 20th and early 21st centuries have significantly enhanced its operational performance. Research by C.K. Gomathi reveals that these reforms have led to reduced ship turnaround times, increased cargo handling efficiency, and overall improvements in productivity. The transition from legacy systems to modern operations underscores the port's commitment to continuous improvement and adaptation in the face of growing global trade demands.

In addition to technological upgrades, the port has also invested in better hinterland connectivity and expanded container handling infrastructure. Strategic collaborations with private stakeholders have further contributed to capacity building and service diversification. Environmental sustainability has also become a focus area, with green initiatives being integrated into port operations. These collective efforts have positioned Chennai Port as a key driver of maritime trade on the eastern coast of India.⁸

⁸ https://kasbit.edu.pk/KBJVol_5/3%20Dr%20Gomthi%20-%20Port%20Environment%20Development%20A%20Study%20Of%20Chennai%20Port.pdf

3.4.2 PHYSICAL INFRASTRUCTURE AND TERMINAL FACILITIES



Figure 5. Location of Chennai Docks, source: - <https://www.chennaiport.gov.in>

Dr. Ambedkar Dock

Primarily dedicated to bulk and break-bulk cargo, Dr. Ambedkar Dock is integral to the port's handling of raw materials and bulk commodities. Its facilities, although older, have been incrementally upgraded to meet current operational demands.

Jawahar Dock

Jawahar Dock supports both general cargo and containerized shipments. With a mix of modern and legacy infrastructure, this dock is vital for the port's overall versatility. Recent upgrades have improved its handling capacities and operational throughput.

Bharathi Dock

Bharathi Dock hosts specialized terminals that manage container and liquid cargo operations. With dedicated container terminals managed by international operators such as DP World and PSA International, Chennai Port now handles over 1.5 million TEUs per annum. The adoption of advanced cargo handling equipment such as rubber-tyred gantry cranes (RTGs) and automated conveyor systems has played a significant role in reducing vessel turnaround times and enhancing operational efficiency.

Connectivity is a key strength of Chennai Port. The port is integrated into extensive road and rail networks that connect it to major industrial centers in Tamil Nadu. Ongoing projects, such as the

Chennai Port–Maduravoyal Expressway, are expected to further reduce congestion and improve multimodal connectivity.

Digital transformation is another cornerstone of Chennai Port’s modernization strategy. The implementation of IT-driven systems for real-time cargo tracking, vessel scheduling, and operational monitoring has streamlined processes and increased overall efficiency.⁹

3.5 CARGO -WISE SHARE OF CHENNAI PORT

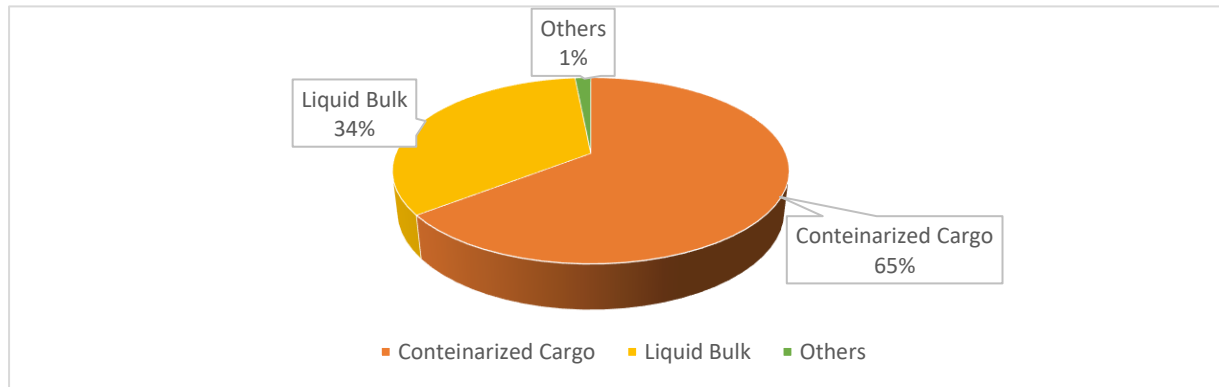


Figure 6. Cargo-wise share, source: - author

Containerized Cargo is the dominant category, making up 65% of the total traffic. This highlights Chennai Port’s strategic positioning as a key hub for container trade on India’s east coast, supported by its two container terminals and robust hinterland connectivity. Liquid Bulk Cargo accounts for 34%, reflecting the port’s strong role in the import and export of crude oil, petroleum products, edible oils, and chemicals, facilitated through its two dedicated oil jetties. Other Cargo represents only 1%, indicating a relatively minor contribution from dry bulk or break-bulk cargoes in the port's overall traffic mix.

⁹ <https://www.chennaiport.gov.in/>

3.6 HINTERLAND MAP OF CHENNAI PORT

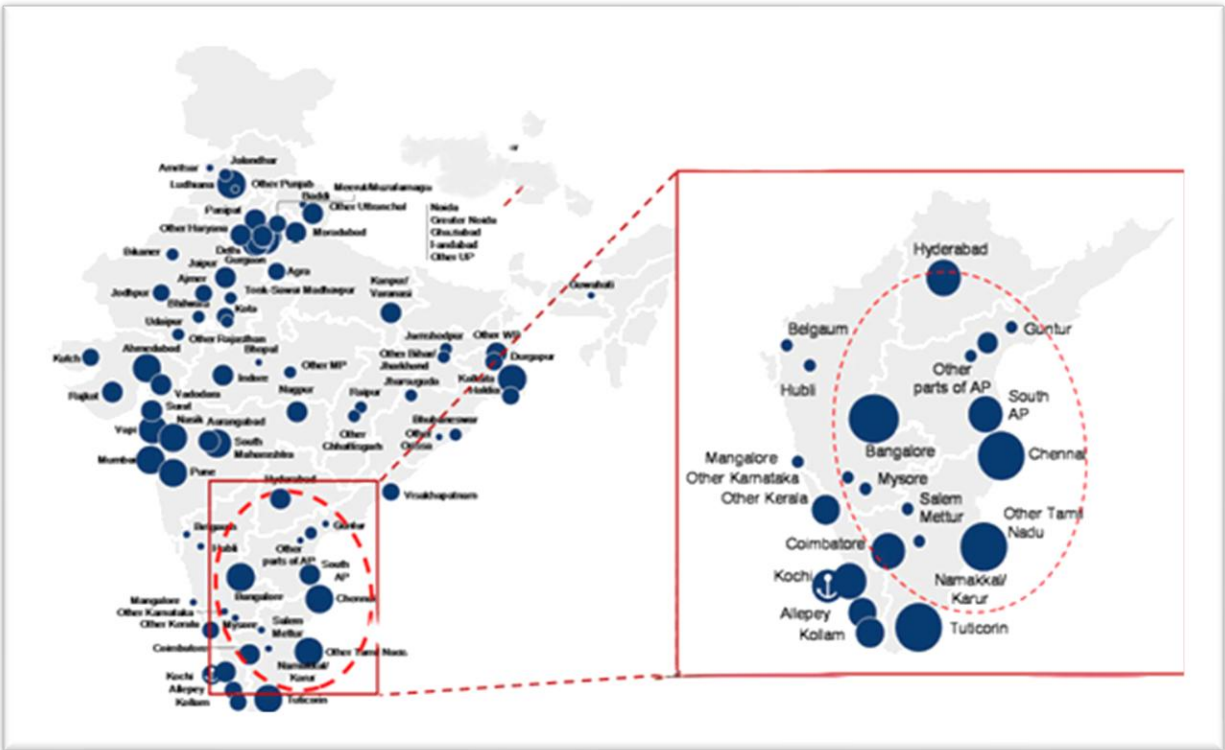


Figure 7. Hinterland Map of Chennai Port, source: - www.google.com

Chennai Port has a vast and economically vibrant hinterland that spans across Tamil Nadu, Andhra Pradesh, Karnataka, and Kerala. Major cities like Chennai, Bangalore, Hyderabad, Coimbatore, Salem, and Guntur form the core of its hinterland network. These regions contribute significantly to the port's cargo traffic, including automobiles, textiles, machinery, agricultural goods, and containerized cargo. Excellent road and rail connectivity facilitates smooth cargo movement between the port and its hinterland. Tamil Nadu, being the home state, contributes the highest share, especially from industrial hubs like Namakkal, Karur, and Tuticorin. Andhra Pradesh and Karnataka also serve as key hinterland regions due to their proximity and trade potential. The port's strategic location and infrastructure make it a preferred gateway for South India's imports and exports. This diverse hinterland strengthens Chennai Port's position as one of the busiest maritime hubs on the eastern coast of India.

3.7 COMPARATIVE INFRASTRUCTURE OVERVIEW

Parameter	Chennai Port	Kolkata Port
Total Area	274 hectares	4,500 acres (1,821 hectares)
Berths	24	35 (17 in KDS + 18 in HDC)
Container Terminals	2	3
Oil Jetties	2	3 (Haldia only)
Maximum Draft	Up to 16.5 meters	8.5 meters (KDS), 9 meters (HDC)

Table 1. Infrastructure Overview, source: - author

3.8 COMMODITY WISE TRAFFIC CHENNAI PORT - LAST 5 YEARS

COMMODITY	2019-20	2020-21	2021-22	2022-23	2023-24
LIQUID BULK					
POL – CRUDE	10281	8180	9192	11365	11934
PRODUCT	3139	2049	2658	2783	2538
EDIBLE OIL	1212	475	960	1181	1221
CHEMICALS	110	120	130	119	129
OTHER LIQUID	74	204	65	108	149
TOTAL LIQUID BULK	14816	11268	13005	15556	16171
CONTAINER					
CCTL	9332	10404	14095	12730	14426
CITPL	17357	16361	16828	15641	16424
INNER HARBOUR	21	3	2	6	8
TOTAL CONTAINER	26710	26768	30925	28377	30678
DRY BULK					
PELLETS	0	0	33	113	827
BARYTES	602	380	850	793	809
FERT. FINISHED	187	135	0	0	0
FERT. RAW	187	202	268	280	289
MAIZE	0	62	64	0	0

DOLOMITE	334	142	56	132	103
INDUSTRIAL/SALT	33	53	15	20	14
GYPSUM	0	145	188	347	21
LIMESTONE	346	1770	200	414	814
COBBLE STONE	0	130	202	132	0
CEM. CLINKERS	0	0	0	0	0
SILICA SAND	111	90	86	152	98
SCRAP	9	36	106	1088	1178
LATERITE	0	0	422	0	0
OTHER DRY BULK CARGO	0	0	0	0	0
TOTAL DRY BULK	2104	3193	2401	3189	2931
BREAK BULK					
GRANITE	250	0	0	0	0
IRON & STEEL	2411	1900	1400	984	948
CEMENT	0	0	15	0	0
PROJECT CARGO	204	198	141	285	271
RO-RO	243	175	227	304	273
OTHER/MISC	21	81	450	248	326
TOTAL BREAK BULK	3129	2324	2233	1821	1818
GRAND TOTAL	46759	43553	48564	48949	51598

Table 2. Commodity wise Traffic Chennai port, source: - Chennai port annual report

The above table presents the cargo traffic handled at Chennai Port across five financial years from 2019-20 to 2023-24, categorized under Liquid Bulk, Container, Dry Bulk, and Break Bulk cargo types. It can be observed that Container cargo consistently contributed the largest share to the port's throughput, showing resilience even during the pandemic-affected year 2020-21. The container volumes saw strong growth in 2021-22 and continued to remain high, reaching 30.68 million tons in 2023-24. Liquid Bulk cargo, mainly consisting of POL (Crude and Products), Edible Oil, and Chemicals, showed a temporary decline in 2020-21 but recovered steadily in the following years,

crossing 16 million tons in 2023-24. This indicates a growing demand for energy and related commodities handled through the port.

Dry Bulk cargo displayed fluctuations over the five years, with notable movements in commodities such as Barytes, Limestone, and Scrap. Although volumes remained relatively modest compared to Containers and Liquid Bulk, Dry Bulk continued to play an important supporting role. Break Bulk cargo, including Granite, Iron & Steel, and Project Cargo, showed a declining trend over the years. This suggests a shift towards containerization and bulk consolidation in trade practices at Chennai Port.

Overall, the total cargo handled by Chennai Port has shown a positive trend, increasing from 46.76 million tonnes in 2019-20 to 51.60 million tonnes in 2023-24. The data reflects Chennai Port's strengthening position in container and liquid cargo handling while highlighting evolving trends in dry and break-bulk cargo movements.¹⁰

3.9 COMMODITY WISE TRAFFIC KOLKATA PORT - LAST 5 YEARS

COMMODITY	2019-20	2020-21	2021-22	2022-23	2023-24
THERMAL COAL	2359	522	95	0	0
IRON ORE	3179	3947	949	925	1805
IRON STEEL	879	1489	1074	444	513
COKING COAL	7992	7720	7852	13256	9564
METALLURGICAL COKE	479	333	221	538	628
RICE	5	250	543	72	0
MAIZE	117	0	97	111	3
SAND	265	225	107	55	19
COAL TAR PITCH	12	21	6	8	4
CEMENT CLINKER	838	305	5	1	0

¹⁰ Annual Report of Chennai port

RORO CAR	1	1	0	0	0
VEGETABLE OIL	2831	2619	2954	2871	2928
OTHER LIQUID CARGO	2607	3518	2556	3010	2645
OTHER CARGO	10327	9358	10398	9987	10087
GENERAL CARGO	110	140	322	188	223
CONTAINER	12800	11144	11794	10587	11948
FERTILISER FINISHED	884	784	457	486	840
ROCK PHOSPHATE	286	269	349	358	334
SULPHUR	92	78	57	50	59
SALT	24	0	0	0	0
CALCITE CHIPS	33	25	55	35	33
NONCOOKING COAL	9015	10936	7823	9550	12646
STEAM COAL					
BREEZE COKE	0	49	11	97	161
LIME STONE	3288	2433	2711	4101	2646
MANGANESE ORESLAG	943	1733	2640	2163	2893
OTHER ORE	333	257	165	477	648
PYROXENITE					
SODA ASH	58	32	10	15	38
GYPSUM	371	105	196	1215	601
DOLOMITE	16	278	201	209	147
FLY ASH	3184	2888	3456	3304	3282
PIG IRON	0	35	25	0	0
NON-COOKING COAL	3	0	41	44	46

RAPESEED	0	0	8	3	0
WHEAT	0	0	314	237	0
SUGAR	0	22	84	0	116
WAGON	1	0	0	0	0
PROJECT CARGO MATERIALS	38	78	70	77	59
PROJECT CARGO	9	3	6	12	8
MACHINERY SPARE PARTS	11	4	6	7	44
MACHINERY	0	2	1	1	0
IWV TRAFFIC	8	14	13	11	10
MW/IVW TRAFFIC	10	5	5	5	5
GRAND TOTAL	63,983	61,368	58,175	65,660	66,445

Table 3. Commodity wise Traffic Kolkata port, source: - Kolkata port annual report

The table above summarizes the commodity-wise traffic handled at Kolkata Port over the past five financial years (2019–20 to 2023–24). It presents a comprehensive view of the port's diversified cargo profile, which includes dry bulk, liquid bulk, containerized cargo, and break-bulk commodities. Notably, coking coal and non-coking coal (steam coal) were dominant contributors throughout the period, with non-coking coal rising steadily from 9.01 million tonnes in 2019–20 to 12.65 million tonnes in 2023–24, underscoring the port's crucial role in supporting industrial fuel needs.

Dry bulk cargo such as iron ore, manganese ore/slag, and limestone also recorded consistent throughput, indicating the port's relevance in mineral exports and imports. Conversely, commodities like thermal coal and cement clinker showed a sharp decline, possibly due to environmental regulations and changes in sourcing or demand patterns. Container traffic remained relatively stable, ranging from 10.58 to 12.8 million tonnes, which highlights Kolkata Port's sustained role in regional container trade despite operational and navigational limitations compared to deep-draft ports.

Liquid cargo, including vegetable oil and other liquid cargo, maintained a steady performance, reflecting ongoing regional demand for edible oils and chemicals. Minor but steady cargo flows were observed in categories like fly ash, fertilizers, general cargo, and project cargo materials, which together support niche industrial and infrastructure sectors.

The port's overall annual traffic ranged between 58.17 to 66.45 million tonnes, showing Kolkata Port's resilience and strategic importance despite challenges such as draft limitations and growing competition. Its inland connectivity, especially via National Waterways and rail, continues to support its relevance for cargo movement in eastern and northeastern India.¹¹

3.10 OPERATING INCOME PERFORMANCE

3.10.1 THREE-YEAR ANALYSIS OF CHENNAI PORT

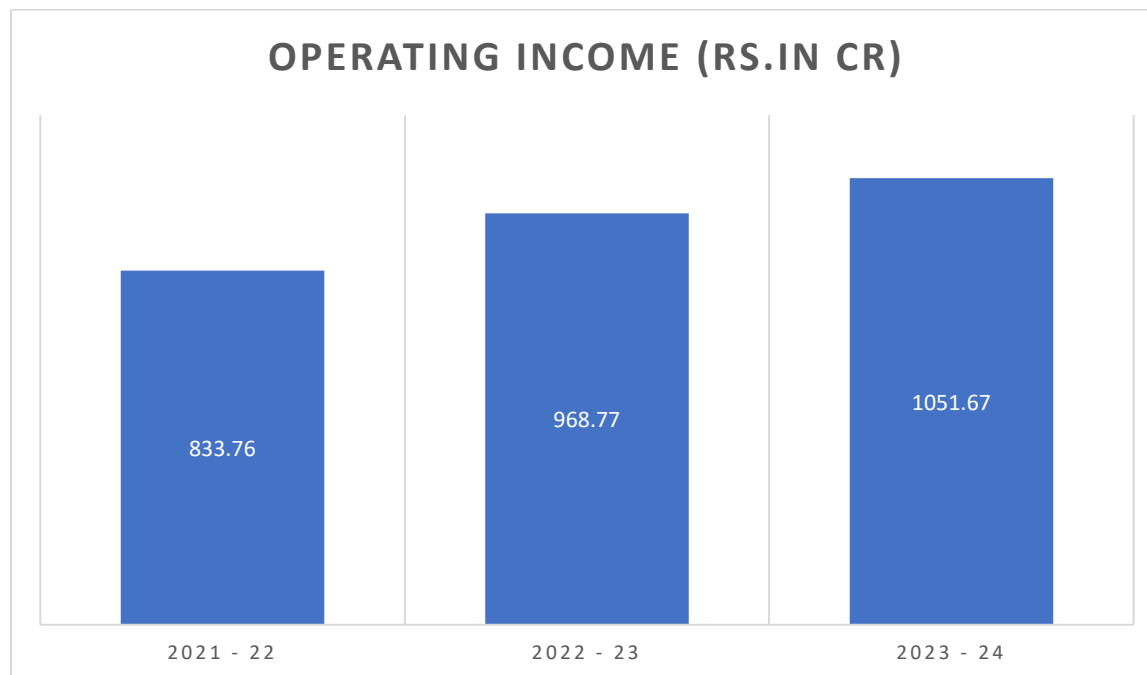


Figure 8. Chennai port Operating income, source: - author

The operating income of Chennai Port has shown a consistent upward trend over the past three financial years, reflecting improved operational performance and revenue generation capabilities. In 2021–22, the port recorded an operating income of ₹833.76 crore. This figure increased to ₹968.77 crore in 2022–23, representing a year-on-year growth of approximately 16.2%. The

¹¹ Annual Report of Kolkata port

positive trajectory continued in 2023–24, with operating income reaching ₹1051.67 crore, indicating a further growth of around 8.6% over the previous year.

Overall, Chennai Port achieved a cumulative growth of about 26.1% in operating income over the three-year period. This steady increase can be attributed to factors such as enhanced cargo handling efficiency, improved port infrastructure, better service delivery, and possibly an increase in trade volumes through the port.¹²

3.10.2 THREE-YEAR ANALYSIS OF KOLKATA PORT

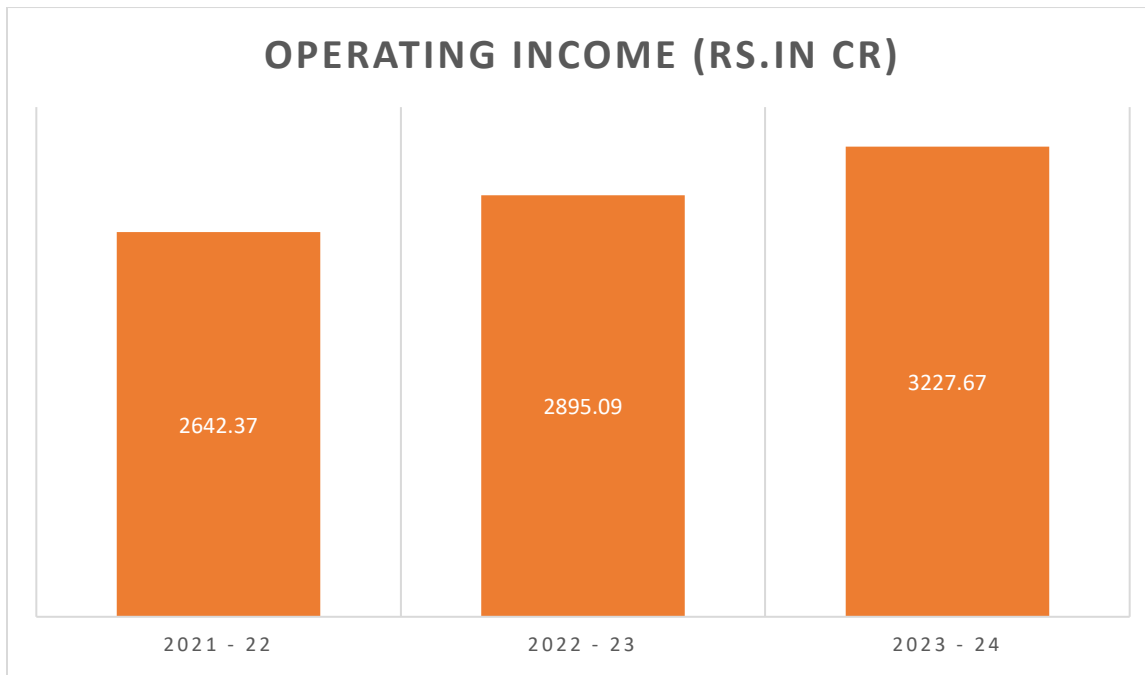


Figure 9. Kolkata port Operating income, source: - author

The operating income of Kolkata Port has shown a steady upward trend over the past three financial years, indicating robust financial performance and consistent revenue growth from port operations. In 2021–22, the port recorded an operating income of ₹2,642.37 crore. This increased to ₹2,895.09 crore in 2022–23, marking a year-on-year growth of approximately 9.6%. The growth continued in 2023–24, with the operating income reaching ₹3,227.67 crore, showing a further increase of about 11.5% over the previous year.

¹² Annual Report of Chennai Port

Over the three-year period, the port achieved a total growth of nearly 22.1% in operating income. This growth reflects improved cargo volumes, better operational efficiency, and effective revenue management at the port. It also indicates the port's strengthening role in supporting regional trade and logistics.

3.11 FIVE-YEAR REVIEW OF TURNAROUND TIME

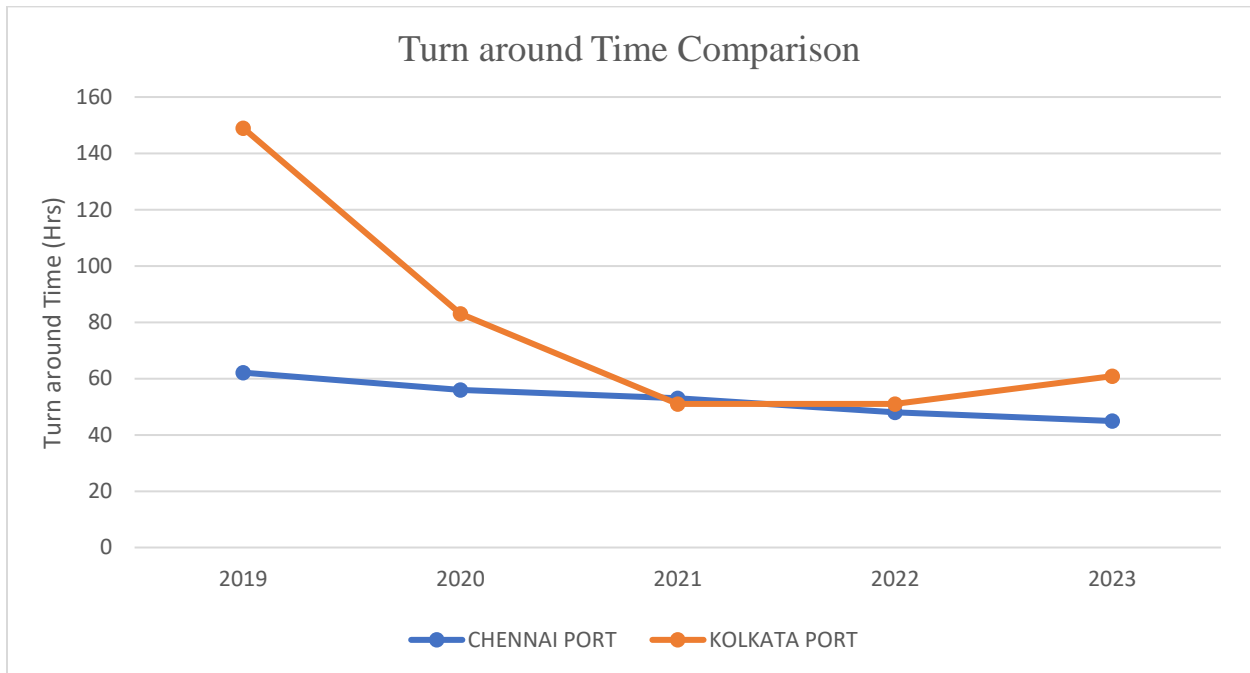


Figure 10. Turnaround time Comparison, source: - author

Chennai Port steadily reduced turnaround time from 62.11 hours in 2019 to 44.92 hours in 2023, a 27.68% improvement, reflecting consistent operational enhancements. Kolkata Port saw a sharp drop from 149 hours in 2019 to 51 hours in 2021, but rose slightly to 60.85 hours by 2023, still achieving a 59.16% overall gain, indicating early progress with later volatility.

Kolkata briefly led in 2021 (51 vs. 53 hours), but Chennai's steady approach resulted in a better 2023 outcome (44.92 vs. 60.85 hours). Both improved efficiency, but Chennai's incremental strategy proved more effective long-term, highlighting the value of sustained improvements in port operations. This trend can be attributed to Chennai's adoption of mechanized cargo handling systems, improved hinterland connectivity, and steady policy implementation under the Sagarmala Programme.

Kolkata Port, constrained by riverine geography and draft limitations, made initial strides through digital integration and berth upgrades, but struggled to maintain momentum in the face of rising cargo volumes. The fluctuating performance at Kolkata suggests the need for sustained capacity building and long-term infrastructural reforms. Overall, Chennai's model reflects how steady policy execution and infrastructure modernization can lead to tangible and lasting efficiency gains in major ports.

CHAPTER 4
INFRASTRUCTURE CONSTRAINTS AND DEVELOPMENT
INITIATIVES AT KOLKATA PORT AND CHENNAI PORT

4.1 INTRODUCTION

This chapter presents a detailed examination of the infrastructure constraints faced by Kolkata Port and Chennai Port, two of India's prominent major ports, and the various development initiatives undertaken to address these challenges. As critical gateways for maritime trade, both ports play a significant role in supporting regional and national economic growth. However, their operational efficiency and capacity are often hindered by infrastructure-related bottlenecks such as inadequate draft, aging equipment, limited hinterland connectivity, and congestion.

The chapter aims to identify and compare the key infrastructure challenges specific to each port while also highlighting the strategic measures, modernization efforts, and policy initiatives implemented by the respective port authorities and stakeholders. Understanding these constraints and developments is essential for assessing the current performance levels of the ports and their readiness to handle future growth in cargo volume and vessel traffic. The analysis draws from both primary and secondary data to provide a comprehensive view of the existing infrastructural landscape and the ongoing transformation at Kolkata and Chennai Ports.

4.2 INFRASTRUCTURE CONSTRAINTS

4.2.1 KOLKATA PORT

Constraint Category	Description
Navigational Limitations	The port's location on the Hooghly River leads to high siltation, requiring constant dredging to maintain navigable channels.
Draft Restrictions	The shallow draft restricts the port's ability to accommodate large vessels, impacting its competitiveness.
Aging Infrastructure	Many facilities are outdated, leading to inefficiencies in cargo handling and longer turnaround times.

Limited Land Availability	Being a city port, expansion is constrained by surrounding urban development, limiting space for storage and logistics.
Connectivity Issues	Inadequate road and rail links to the hinterland affect the smooth movement of goods, causing delays.

Table 4. Infrastructure constraints of Kolkata Port, source: - ministry of ports, shipping, and waterways

The Syama Prasad Mookerjee Port, India’s sole major riverine port, operates through the Kolkata Dock System and Haldia Dock Complex, located 203 kilometers from the sea along the Hooghly River. Its riverine geography necessitates annual dredging costs of Rs. 450 crore in 2023-24 to maintain drafts of 7–9 meters at the Kolkata Dock System and 8.5–11 meters at the Haldia Dock Complex, restricting access to Panamax-class vessels, unlike Mundra Port’s 16-meter draft. Hinterland connectivity is hampered by narrow roads, limited rail infrastructure, and daytime truck bans in Kolkata, inflating logistics costs by 15%. The port’s aging berths at the Kolkata Dock System and at the Haldia Dock Complex rely heavily on manual processes, contributing to an 80% berth occupancy rate at the Haldia Dock Complex in 2022–23 and prolonged turnaround times of 83 hours at the Kolkata Dock System and 65 hours at the Haldia Dock Complex in 2021–22, far exceeding global benchmarks of 24–36 hours. Regulatory hurdles, including Coastal Regulation Zone clearances and customs delays, extend operational timelines by 2–3 days, while environmental concerns, such as cargo spills, raise compliance costs. Labor disputes, exemplified by a 2023 Haldia Dock Complex strike costing Rs. 50 crore, and skill shortages hinder automation efforts. Land acquisition for Haldia Dock Complex expansion faces community resistance, escalating project costs by 15%, and bureaucratic delays in tendering, notably for the Balagarh barge terminal planned for May 2025, further impede progress.¹³

¹³ <https://shipmin.gov.in/>

4.2.2 CHENNAI PORT

Constraint Category	Description
Congestion	High traffic volume leads to congestion within the port and on connecting roads, causing delays in cargo movement.
Limited Draft	The shallow draft limits the port’s ability to handle larger vessels, affecting its capacity and efficiency.
Inadequate Infrastructure	Some facilities are outdated, and there is a need for modernization to handle increasing cargo volumes.
Connectivity Challenges	Delays in infrastructure projects like the Chennai Port-Maduravoyal Expressway impact port connectivity.

Table 5. Infrastructure constraints of Chennai Port, source: - ministry of ports, shipping, and waterways

The Chennai Port Trust, a coastal hub on the Coromandel Coast and India’s second-largest container port, handled 48.949 million tonnes of cargo in 2022–23. Despite its strategic location, congestion from 65% capacity utilization in 2019 results in a 53-hour turnaround time in 2021–22, though improved from prior years. Berth depths of 12–15 meters limit accommodation of ultra-large vessels. Urban congestion and shared rail tracks increase logistics costs by 10%, exacerbated by the lack of dedicated freight corridors. The port’s aging berths, many equipped with outdated machinery, report 70% occupancy in 2022–23, contributing to inefficiencies. Environmental challenges, including oil spills and emissions, coupled with insufficient shore power infrastructure, raise compliance costs, while Cyclone Michaung in 2023 inflicted Rs. 100 crore in damages. Land constraints in Chennai’s urban setting, compounded by opposition from fishing communities, restrict expansion efforts. Regulatory bottlenecks, such as CRZ clearances and post-Tariff Authority for Major Ports (2021) tariff disputes, delay public-private partnership projects, and a 2022 labor strike costing Rs. 30 crore underscores skill gaps impeding mechanization.

4.2.3 COMPARATIVE ANALYSIS OF INFRASTRUCTURE CONSTRAINTS

Constraint Category	Kolkata Port Constraints	Chennai Port Constraints
Geographical	Riverine siltation, drafts 7–11m; Rs. 450 crore dredging (2023–24)	Coastal, drafts 12–15m; cyclone damages (Rs. 100 crore, 2023)
Operational Efficiency	Turnaround: 65–83 hours (2021–22), 80% HDC berth occupancy	Turnaround: 53 hours (2021–22), 70% berth occupancy
Connectivity	Poor rail/road, daytime truck bans; 15% cost increase	Urban congestion; shared rail tracks; 10% cost increase
Infrastructure	aging berths; manual processes	aging berths; outdated equipment
Regulatory	CRZ, customs delays; Balagarh tendering delays	CRZ, customs, post-TAMP tariff disputes
Environmental	Cargo spills; dredging environmental impact	Oil spills; emissions; limited shore power

Table 6. Comparative Infrastructure constraints, source: - ministry of ports, shipping, and waterways

The constraints faced by the Syama Prasad Mookerjee Port and Chennai Port Trust reflect their distinct geographical and operational contexts, yet share common regulatory and labor challenges. The Syama Prasad Mookerjee Port’s riverine setting imposes severe siltation and draft limitations, necessitating substantial dredging investments, whereas Chennai Port Trust’s coastal location enables deeper drafts but exposes it to cyclone-related disruptions, as evidenced by the 2023 Michaung damages. Turnaround times at Chennai Port Trust, at 53 hours in 2021–22, outperform the Syama Prasad Mookerjee Port’s 65–83 hours, owing to navigational advantages, yet both ports suffer from high berth occupancy and congestion. Hinterland connectivity issues plague both, with Kolkata’s daytime truck bans and Chennai’s urban congestion inflating logistics costs by 15% and 10%, respectively. Aging infrastructure and manual processes are prevalent, with the Syama Prasad Mookerjee Port’s berths and Chennai Port Trust’s requiring modernization. Regulatory delays, including Coastal Regulation Zone and customs processes, affect both, with the Syama Prasad Mookerjee Port facing additional tendering hurdles for projects like Balagarh, while Chennai Port Trust contends with tariff disputes post-Tariff Authority for Major Ports.

Environmental compliance is a shared concern, with the Syama Prasad Mookerjee Port's cargo spills and Chennai Port Trust's oil spills drawing scrutiny. Labor strikes and skill gaps, costing millions annually, underscore the need for workforce development. Land acquisition challenges, driven by community opposition, delay expansion at both ports, particularly Chennai Port Trust's urban projects and the Syama Prasad Mookerjee Port's Haldia Dock Complex initiatives.¹⁴

4.3 INVESTMENT AND DEVELOPMENT INITIATIVES

The Sagarmala Programme, PM GatiShakti National Master Plan, Bharatmala Pariyojana, National Logistics Policy, and National Infrastructure Pipeline, complemented by Ministry of Ports, Shipping and Waterways funding and public-private partnerships, drive infrastructure modernization at the Syama Prasad Mookerjee Port and Chennai Port Trust. These initiatives address constraints through berth upgrades, connectivity enhancements, digitalization, and sustainability, with 839 Sagarmala projects worth Rs. 5.79 lakh crore and 101 PM GatiShakti port projects worth Rs. 62,627 crores identified by March 2025. The following sections synthesize these efforts, focusing on their implementation at the Syama Prasad Mookerjee Port and Chennai Port Trust

4.3.1 SAGARMALA



Figure 11. Sagarmala, source: -www.sagarmala.gov.in

The Sagarmala Programme, launched in March 2015, is the flagship initiative of the Ministry of Ports, Shipping, and Waterways, aimed at revolutionizing India's maritime sector. With a 7,500 km coastline, 14,500 km of potentially navigable waterways, and a strategic position on key global trade routes, India holds immense potential for port-led economic growth. Sagarmala aims to streamline logistics, reduce costs, and enhance international trade competitiveness by shifting from

¹⁴ <https://shipmin.gov.in/>

traditional, infrastructure-heavy transport to efficient coastal and waterway networks. The program focuses on port modernization, industrial growth, job creation, and sustainable coastal development, ensuring minimal infrastructure investment while maximizing economic impact. The Sagarmala Programme is a key pillar of the Maritime Amrit Kaal Vision 2047 (MAKV), driving India's ambition to become a global leader in maritime affairs. Building on Maritime India Vision 2030, MAKV sets ambitious targets, including 4 million GRT of shipbuilding capacity and 10 billion metric tons of port handling annually, aiming to position India among the top five shipbuilding nations by 2047. Formulated through 150+ stakeholder consultations and an analysis of 50 global benchmarks, MAKV outlines over 300 strategic initiatives to develop world-class ports, expand coastal and inland waterways, and promote a sustainable Blue Economy. As a core enabler, Sagarmala plays a transformative role in enhancing logistics, infrastructure, and shipping, accelerating India's maritime growth by 2047.

As part of the Sagarmala Programme, around 839 projects, estimated to cost around 5.79 lakh crores, have been identified for implementation. Central ministries, IWAI, Indian Railways, NHAI, State Governments, Major Ports, and other relevant organizations implement these projects. As of 19th March 2025, 272 projects have been completed, which account for an investment of approximately 1.41 lakh crores.

4.3.1.1 OVERVIEW OF SAGARMALA PROJECTS

Pillar	Completed		Under Implementation		Under Development		Total	
	No. of Projects	Project Cost (Rs.Cr.)	No. of Projects	Project Cost (Rs.Cr.)	No. of Projects	Project Cost (Rs.Cr.)	No. of Projects	Project Cost (Rs.Cr.)
Port Modernization	98	32,066	62	75,650	74	1,82,652	234	2,91,622
Port Connectivity	91	57,997	57	68,010	131	80,366	279	2,06,363
Port Led Industrialization	9	45,865	3	9,247	2	775	14	55,887
Coastal Community Development	21	1,559	32	6,166	28	3,847	81	11,573
Coastal Shipping and IWT	43	2,956	63	4,665	125	6,980	231	14,601
Total	262	1,40,443	217	1,63,738	360	2,74,620	839	5,79,562

Table 7. Stats of Sagarmala Projects, source: -www.sagarmala.gov.in

Under the Sagarmala Programme, 839 projects worth approximately ₹5.8 lakh crore are planned for implementation by 2035, aimed at enhancing port-led development in India. So far, 262

projects costing ₹1.4 lakh crore have been completed, 217 projects worth ₹1.63 lakh crore are under implementation, and 360 projects involving ₹2.74 lakh crore are under development.

Port Modernization accounts for the highest investment at ₹2.91 lakh crore across 234 projects, followed by Port Connectivity with 279 projects worth ₹2.06 lakh crore. Although Port-led Industrialization has only 14 projects, it commands a substantial investment of ₹55,887 crore. Coastal Community Development and Coastal Shipping & IWT focus on localized and waterway transport development with investments of ₹11,573 crore and ₹14,601 crore respectively.

The data indicates that while significant progress has been made, most of the capital is yet to be deployed, signaling continued momentum and growth under the Sagarmala vision.¹⁵



Figure 12. Overview of Sagarmala Project, source: -www.sagarmala.gov.in

¹⁵ www.sagarmala.gov.in

4.3.2 PM GatiShakti



Figure 13. PM Gatishakti, source: -www.pmgatishakti.gov.in

The PM Gati Shakti – National Master Plan for Multi-modal Connectivity, launched by the Government of India in October 2021, is a transformative infrastructure initiative aimed at streamlining logistics and enhancing connectivity across the country. It brings together 16 key ministries including Railways, Road Transport, Shipping, and Civil Aviation on a single GIS-based digital platform to ensure integrated planning and coordinated execution of infrastructure projects. The initiative is focused on building a robust multimodal transport network by linking various modes of transportation road, rail, air, and waterways to reduce logistical costs, which currently stand at around 13-14% of GDP, and bring them down to a globally competitive level of 8%. A special emphasis has been placed on the development of port connectivity, with 101 projects worth ₹60,872 crore identified under the Ports and Shipping sector alone. These projects aim to improve last-mile connectivity to ports, boost cargo handling capacity, and facilitate faster and more efficient trade flows. As of 2024, 13 port-related projects have already been completed, and the shipping cargo handling capacity is expected to increase by 37% to reach 1,759 MMTPA by 2025. Additionally, 91 Gati Shakti Cargo Terminals have been commissioned to support freight movement across the country. India improved its ranking in the World Bank’s Logistics Performance Index from 54 in 2014 to 38 in 2023. By fostering synergy across departments and leveraging digital tools for real-time monitoring and execution, PM Gati Shakti is set to revolutionize infrastructure development in India, particularly in the ports and logistics sectors, and contribute significantly to the vision of a self-reliant and developed India by 2047.¹⁶

¹⁶www.pmgatishakti.gov.in

4.3.3 BHARATMALA



Figure 14. Bharatmala, source: -www.morth.nic.in

Bharatmala Pariyojana, launched by the Government of India in 2017, is an ambitious highway development Programme aimed at transforming India's road infrastructure by developing 50,000 km of national highways and expressways. The primary objective of this initiative is to improve freight and passenger movement by connecting economic corridors, border regions, ports, and backward areas through high-quality, access-controlled roads. One of the key components of Bharatmala is enhancing port connectivity, which plays a crucial role in strengthening India's logistics and shipping ecosystem. Under this initiative, dedicated port connectivity roads and feeder routes are being constructed to ensure faster evacuation of cargo from ports, thereby reducing congestion and improving turnaround times. The seamless integration of road networks with ports, industrial clusters, and logistics parks helps in significantly lowering logistics costs, which currently stand at 13–14% of India's GDP. By providing last-mile connectivity to major and minor ports, the initiative complements the Sagarmala Programme and supports coastal shipping and multimodal freight movement. Additionally, Bharatmala helps in decongesting urban areas around major ports through bypass roads and ring roads, thus facilitating smooth movement of goods in and out of ports. As of 2024, over 20,000 km of roads have been awarded under Phase I, including more than 2,000 km of port and coastal connectivity roads, many of which are strategically aligned with India's maritime gateways. This integrated infrastructure development not only enhances the efficiency of the port sector but also boosts trade competitiveness and supports the vision of a robust and self-reliant logistics network in India.¹⁷

¹⁷ www.morth.nic.in

4.3.4 NATIONAL LOGISTICS POLICY (NLP)

The National Logistics Policy (NLP), launched by the Government of India in September 2022, aims to build a modern, technology-driven, and integrated logistics ecosystem to drive economic growth and improve India's competitiveness in global trade. The policy's primary goal is to reduce the high logistics cost currently around 13–14% of GDP to a globally benchmarked level of 8%, while ensuring faster, smoother, and more reliable movement of goods. Key pillars of the NLP include digitization, infrastructure optimization, standardization, and inter-ministerial coordination, with the support of initiatives like Unified Logistics Interface Platform (ULIP), Logistics Data Bank, and Digital Freight Corridors. For the ports and shipping sector, the NLP plays a transformational role by promoting multi-modal connectivity, strengthening last-mile road and rail links to ports, and encouraging the use of coastal shipping and inland waterways to decongest highways and reduce emissions. It aligns closely with the Sagarmala Programme, which focuses on port-led development, by ensuring that goods can move seamlessly from production centers to ports and onward to international markets. The policy also supports the development of logistics parks, container terminals, and port-side warehousing, which enhances port efficiency and cargo handling capabilities. Moreover, NLP aims to improve the performance of India in the World Bank's Logistics Performance Index (LPI) where India jumped to 38th rank in 2023, up from 54 in 2014 by addressing critical bottlenecks in supply chains. In summary, the National Logistics Policy provides a unified framework to upgrade India's logistics ecosystem, directly benefiting the ports and shipping sector by enhancing connectivity, improving infrastructure efficiency, and lowering costs, thereby boosting trade and making India a global logistics hub.¹⁸

4.3.5 NATIONAL INFRASTRUCTURE PIPELINE (NIP)

The National Infrastructure Pipeline (NIP) plays a crucial role in strengthening the ports and shipping sector by earmarking significant investments for the development and modernization of maritime infrastructure. Out of the total ₹111 lakh crore planned under NIP, around ₹1.4 lakh crore is allocated specifically for port-related projects. These investments are aimed at expanding port capacity, upgrading cargo handling systems, constructing new deep-draft terminals, and enhancing last-mile connectivity through road and rail links. The NIP works in close synergy with initiatives

¹⁸ www.commerce.gov.in

like Sagarmala, PM Gati Shakti, and the National Logistics Policy, ensuring a holistic approach to port-led development. It promotes the development of smart ports, logistics parks, and port-based industrial clusters, thereby improving port efficiency and supporting higher cargo volumes. The NIP also encourages Public-Private Partnerships (PPP) in port infrastructure, attracting private investment and improving service quality. By facilitating seamless movement of goods and reducing turnaround time, the NIP significantly contributes to making Indian ports more globally competitive and better integrated with international shipping networks. In essence, the NIP is a backbone for maritime sector transformation, supporting India’s ambition to become a global logistics and trade hub.

4.4 INFRASTRUCTURE PROJECTS

4.4.1 KOLKATA PORT

Project Name	Cost (Rs. Crore)	Capacity Addition	Initiative	Completion Status
Rail Mounted Quay Crane (HDC)	52.82	0.25 MTPA	Sagarmala	2023–24
Fire Fighting System (HDC)	107.49	Safety Enhancement	Sagarmala	2023–24
Coastal RoRo Berth (KDS)	80	Coastal Cargo	Sagarmala	2022
Balagarh Barge Terminal	370	2.7 MTPA	Sagarmala/PMGS	Tendering May 2025
Netaji Subhas Dock (Berths 7 & 8)	809.18	0.48 MTPA	Sagarmala	2024–26
Tajpur Deep-Sea Port	25,000	TBD	Sagarmala	Under Construction
HDC Berth 5	600	6.8 MTPA	Sagarmala	2026

Table 8. Kolkata port infrastructure projects, source: -www.sagarmala.gov.in

Under the Sagarmala initiative, several key infrastructure projects are being undertaken at the Haldia Dock Complex (HDC) and Kolkata Dock System (KDS) to enhance port capacity and efficiency. Notable among these are the installation of a Rail Mounted Quay Crane and a Fire Fighting System at HDC, both scheduled for completion by 2023–24. The Coastal RoRo Berth at KDS, aimed at boosting coastal cargo movement, was completed in 2022. The Balagarh Barge

Terminal, a joint initiative under Sagarmala and PM Gati Shakti, with a capacity addition of 2.7 MTPA, is currently in the tendering stage (May 2025). Meanwhile, significant upgrades at Netaji Subhas Dock (Berths 7 & 8) and the construction of HDC Berth 5 are planned for completion by 2026, contributing 0.48 MTPA and 6.8 MTPA respectively. The ambitious Tajpur Deep-Sea Port, with a massive investment of ₹25,000 crore, is under construction and expected to play a pivotal role in future capacity expansion. These projects collectively reflect the strategic focus on enhancing port infrastructure and operational capacity in the region.¹⁹

PROJECT NO:1

Rejuvenation of Khidderpore Docks (KPD-I West):

Capacity: Phase-I: 3.00 million tonnes (incremental capacity of 2.31 MMTPA), Phase-II: 2.48 million tonnes (incremental capacity of 1.73 MMTPA) **Project Cost:** INR 181.81 Crores.

Concession agreement signed on September 26, 2022. Work order issued to Independent Engineer (Voyants) on April 6, 2023. Award of Concession issued on June 24, 2023. Work is under implementation, with procurement of Mobile Harbor Crane (MHC) initiated and construction of the boundary wall completed. Phase-I completion expected by March 2025.

PROJECT NO:2

Development of Drainage Network at Dock Zone, HDC (Phase-II, Eastern Side Dock Basin)

Project Cost: 267.9 Crores. **Status:** Work in progress, with physical progress at 42%.

PROJECT NO:3

Construction of Wind Screen at Dock Zone of HDC for Phase-I

Project Cost: 125.0 Crores. **Status:** Work in progress, with physical progress at 80%

PROJECT NO:4

Development of Hardstand Including Drainage Facilities Behind Berth No. 14 HDC

Project Cost: 132.7 Crores. **Status:** Work in progress, with physical progress at 24%.

¹⁹ www.sagarmala.gov.in

PROJECT NO:5

Mechanization of Berth No. 2 (Previous Berth No.3)

Capacity: 3.744 million tonnes. **Project Cost:** 298.26 Crores

Award of concession on July 14, 2023. Design and drawing under scrutiny by the Independent Engineer. Civil construction work in progress, with physical progress at 14%.

PROJECT NO:6

Setting Up of Liquid Cargo Handling Jetty Along with Associated Facilities at Shalukkhali, Haldia Dock-II, Haldia Dock Complex, Kolkata Port Trust on DBFOT Basis for 30 Years

Capacity: 2.43 million tonnes. **Project Cost:** 253.65 Crores. Award of Concession on August 17, 2022, to HOGTPL. Land handover by HDC to Concessioner on August 31, 2023. Offshore soil investigation completed. Physical work to be commenced by the Concessioner from May 2024.

PROJECT NO:7

Mechanization of Berth No. 5 at HDC

Capacity: 5 million tones. **Project Cost:** 365.88 Crores. Request for Proposal (RFP) issued on July 21, 2023. RFP opening date extended up to June 3, 2024.

PROJECT NO:8

Re-Construction of berth No. 8 and Mechanization of berth Nos. 7 & 8 at NSD of KDS, SMPK on DBFOT basis under PPP

Capacity: 6.1 MMTPA. **Project Cost:** 698.84 Crores. RFQ floated. Target Issue of

LoI: 31.12.2024

Key Sagarmala-Funded Projects

Netaji Subhas Dock (2023): Construction of a new canteen building (₹1 crore).

Road Infrastructure (2022–23): Upgradation of roads in Dhobitala and Kantapukur areas (₹39.57 crore).

Rail Mounted Quay Crane – Haldia Dock Complex (2023–24): Installed at a cost of ₹52.82 crore, increasing capacity by 0.25 million tonnes per annum (MTPA).

Fire Safety – Haldia Oil Jetties (2023–24): Implementation of a fire-fighting system worth ₹107.49 crore.²⁰

Major Ongoing and Upcoming PPP Projects

Balagarh Barge Terminal: ₹370 crore project with a planned capacity of 2.7 MTPA; tendering scheduled for May 2025. Supported by Sagarmala and National Waterway-1.

Netaji Subhas Dock (Berths 7–8): Reconstruction project worth ₹809.18 crore, expected to handle 0.48 MTPA during 2024–2026.

Tajpur Deep-Sea Port: A landmark ₹25,000 crore project expected to generate around 25,000 jobs.

Haldia Dock Complex – Berth Developments

Berth 2: ₹298.3 crore project awarded to Adani Group.

Berth 5: ₹600 crore project with Ripley & Bothra Group.

Combined, these projects are expected to add 6.8 MTPA capacity and are targeted for commissioning by 2026.

Future Projects

Shalukkhali Liquid Cargo Terminal

Floating Crane at Diamond Harbor – Estimated cost: ₹75 crore

Feasibility Study for a Hooghly River Tunnel

These combined initiatives aim to elevate SPMP's cargo handling capacity to 130 million tonnes per annum (MTPA) by 2030, supported by a total investment plan of around ₹4,000 crore.

²⁰ Annual Report of Kolkata Port

Development of Satellite Port at Sagar Island

To overcome draft limitations and navigational challenges of the Hooghly River, SMP Kolkata proposes the development of a satellite port at Sagar Island.

Phase 1: Construction of a 600-meter quay length, expandable to 2,000 meters. State-of-the-art material handling systems and deep draft berths to accommodate larger vessels. The project is in the proposal stage, with feasibility studies and environmental clearances underway²¹

4.4.2 CHENNAI PORT

Project Name	Cost (Rs. Crore)	Capacity Addition	Initiative	Completion Status
EXIM Godowns	73.91	18,000 sqm	Sagarmala	2022–23
Coastal Cargo Berth	80	Coastal Cargo	Sagarmala	2021
Chennai Port-Maduravoyal Expressway	5,510	Connectivity	Bharatmala/PMGS	2024–27
Mappedu MMLP	1,424	Logistics Hub	NLP/PMGS	Phase 1 Ongoing
South Chennai Terminal (CITPL)	492	1.0 MTEU	Sagarmala	Operational
SBM Terminal	600	10.0 MTPA	Sagarmala	By 2025

Table 9. Chennai port infrastructure projects, source: -www.sagarmala.gov.in

Chennai Port is undergoing multiple infrastructure developments under national initiatives like Sagarmala, PM Gati Shakti, Bharatmala, and NLP (National Logistics Policy). The EXIM Godowns project, completed in 2022–23, added 18,000 sqm of storage capacity, while the Coastal Cargo Berth, completed in 2021, enhances coastal shipping operations. A major connectivity project, the Chennai Port–Maduravoyal Expressway, backed by Bharatmala and PM Gati Shakti, is slated for completion between 2024–27. The Mappedu Multi-Modal Logistics Park (MMLP), supported by NLP and PM Gati Shakti, is currently in Phase 1 development and is expected to

²¹ www.pppinindia.gov.in

serve as a key logistics hub. The South Chennai Terminal (CITPL), with a capacity of 1.0 MTEU, is already operational, and the SBM Terminal, expected by 2025, will contribute an additional 10.0 MTPA capacity. These initiatives aim to improve cargo handling, reduce congestion, and strengthen multimodal connectivity for Chennai Port.²²

PROJECT NO:1

Development of Multimodal Logistics Park at Mappedu, Chennai

Project Cost: 1423.5 Crores (including 782.58 Crores to be invested by the Concessionaire) Approved by MoRT&H for implementation through Public-Private Partnership (PPP) mode, forming a Special Purpose Vehicle (SPV) with stakeholders including NHLML, ChPA, TIDCO, and RVNL. MoU signed on October 12, 2021, between NHLML, ChPA, and TIDCO, with a supplementary MoU on May 24, 2022, including RVNL. Foundation stone laid by the Hon'ble Prime Minister on May 26, 2022. Implementing agency is NHLML through SPV "CHENNAI MMLP PRIVATE LIMITED". Letter of Award (LoA) issued to M/s Reliance Industries Limited, Navi Mumbai, on November 11, 2022. Concession Agreement executed on December 26, 2022, with appointed date notified as February 15, 2024. Sub-Lease deed executed on March 13, 2024, between ChPA and SPV.

Development will be implemented in three phases: Phase-1: To be completed by February 2026, investment cost of 349.78 Crores, area ~64 acres. Phase-2 (2034): Within 10 years from appointed date, investment cost of 122.52 Crores, area ~64 acres. Phase-3 (2039): Within 15 years from appointed date, investment cost of 310.28 Crores, area ~64 acres.

Project period: 45 years, including construction.

PROJECT NO:2

Berth No.26B (BD-I) and Berth No.27B (BD-III) for Handling POL

Capacity: 32.40 MTPA. **Project Cost:** 195 Crores. Berths currently utilized by M/s CPCL and M/s ICCL for handling crude and POL. Initially identified for Asset Monetization, but CPCL indicated need for rehabilitation due to age (constructed in 1972 and 1987). Rehabilitation works

²² www.sagarmala.gov.in

proposed, but during a review meeting on January 18, 2024, Chairperson, ChPA, informed that the process would take time, and CPCL has no expansion plans beyond current capacity (10.05 MTPA refinery, 12 MTPA cargo handling). No other interest shown for leasing, leading to a proposal to drop the leasing on Captive/PPP basis, communicated to the Ministry on March 11, 2024. Approval from the Ministry is still awaited.

PROJECT NO:3

Chennai Port-Maduravoyal Elevated Corridor

The Chennai Port-Maduravoyal Elevated Corridor is a flagship infrastructure project under India's Bharatmala Pariyojana and PM Gati Shakti initiatives, aimed at enhancing connectivity to one of India's busiest ports. Spanning 19.881 km, this four-lane, double-decker elevated expressway connects Chennai Port's Gate No. 10 to Maduravoyal, aligning along the Cooum River and National Highway 4 (NH-4). With a revised cost of Rs. 5,855 crore, the project addresses longstanding issues of traffic congestion, inefficient cargo movement, and port accessibility, promising significant economic and logistical benefits for Chennai and Tamil Nadu.

PROJECT NO:4

Strengthening of existing revetment at eastern seashore of Chennai Port

Project Cost: Rs. 65.56 Cr. Funding Sanctioned GBS under Sagarmala: Rs.63 Cr., Received GBS:63 Cr, Balance: Internal Resources. Work completed. amount spent Rs.65.56Cr.

PROJECT NO:5

Development of Cruise Passenger Facilitation Centre at Chennai Port

Project Cost: Rs.17.24 Cr. Sanctioned GBS: Rs.17.24 Cr. under Ministry of Tourism. Received GBS: 17.24 Cr. Work completed. amount spent Rs.17.24Cr

PROJECT NO:6

Railway line at west of western yard 1-earlier common rail yard and providing paving block platform in between new track and western yard I- Chennai

Project Cost: Rs.19. 68Cr.Funding Internal resources. Work completed Amount spent Rs.16.64 Cr

PROJECT NO:7

Construction of Coastal Cargo Berth at ChPA

Project Cost:Rs.80 Cr. Funding Sanctioned GBS under Sagarmala: Rs. 30 Cr.

Received GBS: 30 Cr. Balance: Internal resources Work completed. amount spent Rs.79.56Cr

PROJECT NO:8

Construction of Bunker Berth at Bharathi Dock

Project Cost: Rs.44 Cr. Funding Sanctioned GBS under Sagarmala: Rs. 22 Cr. Received

GBS: 19.80 Cr. Balance: Internal resource

Berth portion was completed on 10.05.2021 and was commissioned on 01.07.2021. Since Vessel Vamsee (Barge vessel of IOC) was operating in the location till 01.07.2021, and revised alignment the balance work of Approach Trestle could not be commenced in time. Approach Trestle Civil works completed on 20.01.2023 Physical Progress : 100% Financial Progress: 97.24%

PROJECT NO:9

Development of paved storage yard at Chennai Port for handling export cargo

Project Cost: Rs.54 Cr. Funding. Sanctioned GBS under Sagarmala: Rs. 27 Cr. Received GBS:

24.30 Cr. Balance: Internal resources

The major component of work i.e. "Construction of Paved Storage Yards" completed in May, 2019. The ancillary works included in the overall estimate for this project viz., Electrical works, procurement of rails & Storm water drain etc., were completed in Sep'2020. Balance ancillary work "Providing Pavement and laying Railway Track at ONB Yard & JD(E) Backup area at Chennai Port "Contract awarded on 07.10.2022. Scheduled date of completion 19.05.2023. Overall Physical Progress: 93.25% Financial Progress: 88.13%

PROJECT NO:10

Development of Goods Shed facility at Jolarpet

Project Cost: Rs.6.71 Cr. Funding: Internal resources

Contract awarded on 31.01.2022 at a value of Rs.4.58 Cr. work in progress. Scheduled date of completion: August 2022. Expected date of completion: March 2023 Delay due to site not fully handed over by Southern Railway. Revised Physical Progress: 93.62 Revised Financial Progress: 76.70%.

PROJECT NO:11

Modernization of Chennai Fishing Harbor Project

Project Cost: Rs. 97.95 Cr.(Revised). Funding: MoPSW: 50%, MoFAHD: 50%.

MoFAHD released Rs.24.50 Cr. towards 1st Installment of Grant on 29.03.2022

Modernization and Upgradation of Chennai fishing Harbor consists of 18 works. IPRCL, the Consultant for the work has grouped all the works in 3 phases based on the nature of the work. Further, Phase I is sub divided into two stages viz stage- I and stage- II. Phase I stage I work comprises 8 works and work is awarded on 18.10.2022. Enabling Construction activities were carried out by the Contractor till 19.01.2023. further work could not process for want of Environmental Clearance. Chennai District Collector, conducted District Coastal Zone Management Authority (DCZMA) meeting on 11.01.2023 and issued Minutes of Meeting with the advice to approach Tamil Nadu State Coastal Zone Management Authority (SCZMA). Accordingly Environmental Consultant has submitted necessary documents to SCZMA. Environmental & CRZ Clearance is expected during the Month of May 2023. Tender for Phase I (stage II), Phase II are expected to be invited by March 2023 and Phase III by April 2023. All the works will be completed by March 2024.

PROJECT NO:12

Development of dedicated Container Corridor to NHAI road for quick evacuation Chennai (Renamed as Development of Internal Road Network at Chennai Port for Effective Receipt and Evacuation of Cargo)

Project Cost: Rs. 100 Cr. (Tentative). Funding: To be decided after study

Preparation of RFP for selection of Technical Consultant for preparation of Detailed Project Reporting progress. Expected Timeline Issue of RFP for Tech Consultant: March'2023 Award of consultancy: April'2023 Final DPR: Oct'2023 Based on the outcome of final DPR, project proposal will be initiated. Timelines for Award and Completion and funding pattern will be decided at that stage.²³

Ongoing and Upcoming PPP Projects

Coastal Terminal

A public-private partnership (PPP) project to develop a coastal terminal for cargo handling.

Sagarmala Programme Cost: Rs. 80 crores. Delayed, expected completion by 2025.

Target capacity:1.0 million tonnes per annum. Delay due to Coastal Regulation Zone (CRZ) clearance issues, requiring environmental compliance. Will include modern cargo-handling infrastructure and digital tracking systems.

Coastal Road (850 meters)

Extension of coastal road infrastructure to improve port connectivity. Sagarmala Programme (PPP model). **Cost:** Rs. 63 crores. Ongoing, completion timeline not specified. Spans 850 meters, connecting key port facilities and cargo terminals. Designed to handle heavy vehicular traffic, including container trucks. Includes drainage systems to prevent flooding during monsoons.

Single Buoy Mooring (SBM) Terminal

A terminal for handling crude oil imports via a single buoy mooring system. Funding: Not specified (likely PPP or National Infrastructure Pipeline). **Cost:** Rs. 600 crores. Planned completion by 2025. Target capacity: 10.0 million tons per annum of crude oil. Located offshore to minimize environmental impact on coastal areas. Includes pipelines for transferring oil to onshore storage facilities. Designed to serve refineries in Tamil Nadu and neighboring states.

²³ Annual Report of Chennai Port

Ship Repair Facility

A dedicated facility for ship maintenance and repair services. Funding: Not specified (likely PPP or National Infrastructure Pipeline). **Cost:** Rs. 500 crores. Planned, no specific completion date. Will include dry docks, workshops, and equipment for repairing vessels. Targets both domestic and international ships calling at Chennai Port. Aims to position Chennai as a ship repair hub in South Asia.²⁴

4.5 PUBLIC – PRIVATE PARTNERSHIP (PPP)

Public-Private Partnerships (PPPs) have played a crucial role in augmenting port infrastructure and operational efficiency across India. The Ministry of Ports, Shipping and Waterways has identified 123 PPP projects under the Sagarmala initiative, with an estimated investment of ₹2.63 lakh crore. Among these, 29 projects worth ₹44,961 crore have been completed, while 31 projects worth ₹50,942 crore are under implementation. PPP terminals now handle 56.5% of cargo traffic at major ports, a significant rise from 40% a decade ago. The government aims to raise this to 85% by 2030, aligning with the National Logistics Policy to reduce logistics cost to 8% of GDP from the current ~13%.

Chennai Port has been a frontrunner in PPP adoption, with major terminals like Chennai Container Terminal (CCTL) operated by DP World, and Chennai International Terminals Pvt Ltd (CITPL) run by PSA International. Over 75% of container handling at the port is through PPP-operated terminals. PPP-driven modernization has resulted in a 20–25% reduction in vessel turnaround time, now averaging around 44.92 hours. Mechanization and hinterland connectivity (e.g., elevated corridor projects) have improved port performance and capacity utilization by over 30% since 2018.

Being India's only riverine major port, Kolkata faces navigational and draft challenges. Despite this, it has successfully leveraged PPPs. The Berth No. 2 mechanization project at Haldia Dock Complex (HDC), awarded to an Adani-led consortium, has an investment outlay exceeding ₹300 crore. The port plans to attract ₹2,500 crore via PPPs for upcoming jetty development, dry dock

²⁴ www.pppinindia.gov.in

modernization, and a ₹75 crore floating crane project. PPPs have contributed to Kolkata Port’s steady cargo growth of ~3.5% CAGR over the past 5 years, despite tidal and draft limitations.

These developments reflect a broader shift towards privatization and efficiency enhancement in Indian ports. According to the Ministry’s 2024 data, PPP projects have contributed to an average 18–22% improvement in berth productivity and a 15% increase in container dwell time efficiency at major ports. Additionally, private investment has catalyzed skill development and job creation, with over 1.2 lakh direct and indirect employment opportunities generated through PPP port ventures. This growing reliance on PPPs is instrumental in transforming Indian ports into globally competitive, tech-driven trade hubs.

4.5.1 EFFICIENCY OF PPP VS GOVERNMENT-RUN TERMINALS

Metric	PPP Terminals	Govt-Operated Terminals
Turnaround Time (Avg.)	48–52 hours	60–65 hours
Berth Occupancy Rate	~60%	75–85% (indicating congestion)
Equipment Utilization Rate	>80%	~60–65%
TEU/Crane/Hour (Container)	28–32	18–22

Table 10. Efficiency of PPP vs Government-Run Terminals, source: - author

PPP-operated port terminals outperform government-operated ones in key metrics. Turnaround time is 48–52 hours at PPP terminals, compared to 60–65 hours at government terminals, reducing vessel waiting time by 15–25%. Berth occupancy at PPP terminals is lower (around 60%), indicating better scheduling and less congestion, while government terminals have higher occupancy (75–85%), suggesting delays. Equipment utilization is over 80% at PPP terminals, leading to higher productivity, compared to 60–65% at government terminals. PPP terminals also show 45% higher crane productivity, with 28–32 TEU/crane/hour, versus 18–22 at government terminals.

4.5.2 INDIAN PORTS: PPP INVESTMENT FORECAST TO 2030

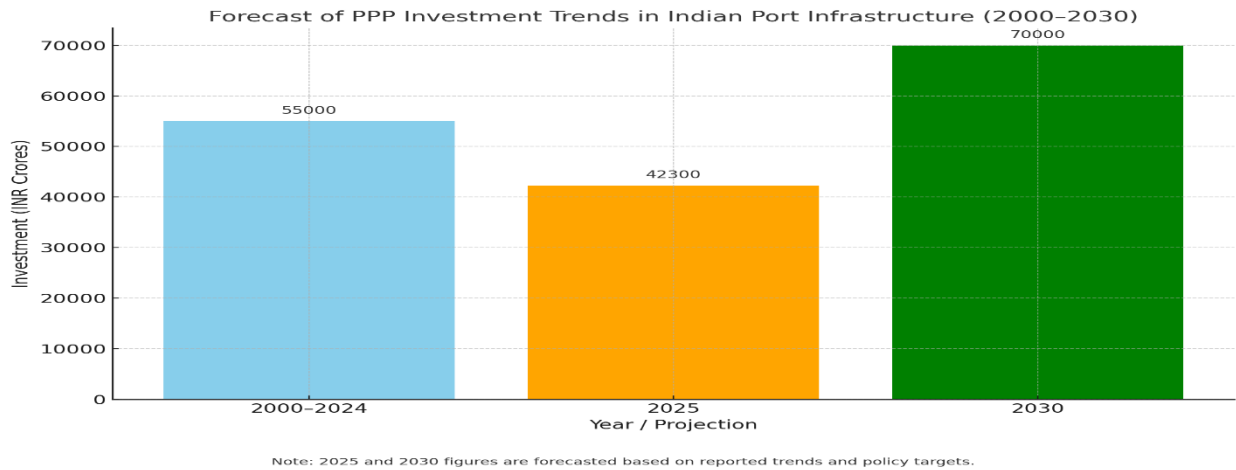


Figure 15. Indian Ports: PPP Investment Forecast To 2030, source: - author

The chart shows PPP investment trends in Indian port infrastructure from 2000 to 2030, with investments at ₹55,000 crore between 2000–2024, dipping to ₹42,300 crore in 2025, and then rising significantly to ₹70,000 crore by 2030. The 2025 and 2030 figures are forecasts based on reported trends and policy targets.

4.5.3 SECTOR WISE CONTRIBUTION OF PPP

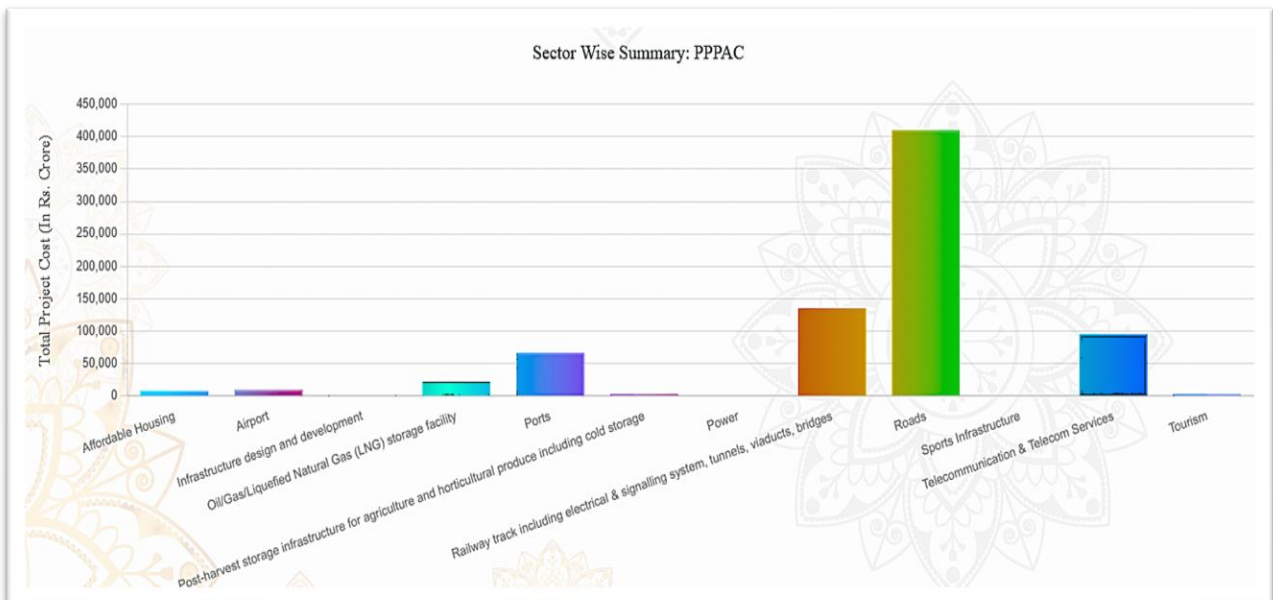


Figure 16. Sector Wise Contribution of PPP, source: -www.pppinindia.gov.in

The Sector Wise Summary: PPPAC chart highlights the strategic and forward-looking infrastructure investments made under India’s Public-Private Partnership model. The data reflects the government’s commitment to building a robust and future-ready infrastructure network across key sectors.

A standout feature is the massive investment in the Roads sector, exceeding ₹4 lakh crore. This demonstrates a strong focus on enhancing connectivity, reducing logistics costs, and supporting economic growth through world-class highways and expressways. Similarly, the railways sector, with over ₹1.3 lakh crore in project costs, showcases the push for modern, efficient, and sustainable rail transport, including electrification and advanced signaling systems.

The Ports sector also receives significant funding, reflecting India’s goal to become a global maritime hub and promote initiatives like Sagarmala. The Telecommunication sector’s robust investment further emphasizes the drive toward digital connectivity and innovation across urban and rural areas. Other sectors such as Oil & Gas, post-harvest storage, and affordable housing are also receiving attention, ensuring balanced development that supports both industry and citizens’ welfare. Even emerging sectors like tourism and sports infrastructure are being nurtured, paving the way for long-term socio-economic benefits.²⁵

4.6 PORT INFRASTRUCTURE MARKET

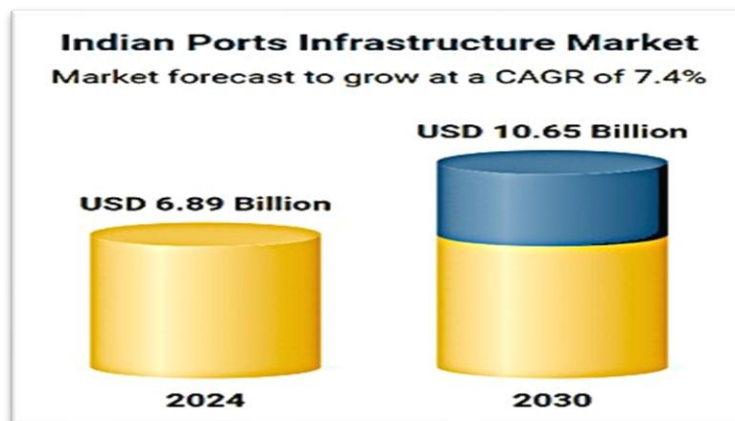


Figure 17. Port Infrastructure Market, source: -www.globenewswire.com

²⁵ www.pppinindia.gov.in , www.globenewswire.com

The Indian Ports Infrastructure Market is set to grow significantly, with a projected USD 10.65 billion opportunity by 2030, driven by substantial investments in port modernization and expansion under initiatives like the Sagarmala Programme and Maritime AmritKaal Vision 2047. These efforts include 839 projects worth ₹5.79 lakh crore, with 272 completed by March 2025, enhancing coastal shipping by 118% and doubling major port capacities over the past decade. Investments focus on deeper drafts, automation, and AI-driven technologies, particularly in states like Maharashtra, Karnataka, and Gujarat. However, challenges such as shallower drafts, limited automation, and slower turnaround times compared to global ports like Singapore persist, alongside labor shortages and high material costs. This growth supports India's integration into global supply chains, economic diversification, and reduced logistics costs.

CHAPTER 5
FINDINGS AND CONCLUSION

This chapter presents the key findings and conclusions derived from the study on port infrastructure at Indian major ports, with special reference to Kolkata and Chennai Ports. Based entirely on secondary data, the chapter summarizes the major observations related to infrastructure capabilities, challenges, and development efforts at both ports. It aims to provide a clear understanding of how these ports compare in terms of efficiency, modernization, and readiness to handle future maritime demands, thereby concluding the study with relevant insights for stakeholders and future research.

5.1 FINDINGS

5.1.1 INFRASTRUCTURE AND OPERATIONAL PERFORMANCE

- Chennai Port a modern coastal hub, Chennai handled 51.60 million tonnes in 2023–24, with a 2.5 million TEU container capacity. Its Dr. Ambedkar, Jawahar, and Bharathi Docks, equipped with advanced terminals (operated by DP World, PSA International), achieve a 44.92-hour turnaround time (27.68% improvement from 62.11 hours in 2019). Containers dominate (65%), supported by robust road-rail connectivity for South India’s exports. Operating income grew 26.1% (₹833.76 crore to ₹1,051.67 crore, 2021–24).
- Kolkata Port India’s only riverine port, Kolkata processed 66.45 million tonnes in 2023–24 via Kolkata Dock System (KDS) and Haldia Dock Complex (HDC). Shallow drafts (7–9m KDS and HDC) limit vessel size, but HDC handles bulk cargo like non-coking coal (12.65 million tonnes). Turnaround time improved 59.16% (149 to 60.85 hours, 2019–23). National Waterway 1 supports its hinterland (eastern India, Nepal, Bhutan). Income rose 22.1% (₹2,642.37 crore to ₹3,227.67 crore, 2021–24).
- Chennai’s coastal advantage and modern terminals outperform Kolkata’s riverine constraints, though Kolkata excels in bulk cargo. Chennai nears global benchmarks (24–36 hours), while Kolkata lags due to draft issues.

5.1.2 INFRASTRUCTURE CONSTRAINTS

- Kolkata Siltation requires ₹450 crore annual dredging, restricting drafts to Panamax vessels. Aging KDS berths, high berth occupancy (80% HDC), and manual processes prolong turnaround times (65–83 hours, 2021–22). Narrow roads, truck bans, and limited

rail inflate logistics costs by 15%. CRZ clearances, customs delays, labor strikes (₹50 crore, 2023 HDC), and land acquisition issues hinder progress.

- Chennai Urban congestion and 70% berth occupancy yield a 53-hour turnaround time (2021–22). Berth depths (12–15m) limit ultra-large vessels. Shared rail/road networks raise logistics costs by 10%. Oil spills, cyclone damage (₹100 crore, Michaung 2023), and fishing community opposition restrict expansion. CRZ delays and strikes (₹30 crore, 2022) impede PPPs.

5.2.3 DEVELOPMENT INITIATIVES AND INVESTMENTS

- National Initiatives like Sagarmala (839 projects, ₹5.79 lakh crore, 272 completed by March 2025), PM Gati Shakti (101 port projects, ₹60,872 crore), Bharatmala, and National Infrastructure Pipeline (₹1.4 lakh crore) drive modernization, targeting 8% GDP logistics costs
- Chennai EXIM Godowns, Coastal Cargo Berth, Chennai Port–Maduravoyal Expressway (₹5,855 crore, 2024–27), and Mappedu Logistics Park (₹1,423.5 crore) reduce congestion. South Chennai Terminal (1.0 MTEU) and SBM Terminal (10.0 MTPA, 2025) boost capacity. PPP terminals (75% container traffic) achieve 48–52 hour turnaround times.
- Kolkata Berth No. 2 (₹298.3 crore) and No. 5 (₹365.88 crore) mechanization, Balagarh Barge Terminal (₹370 crore), Tajpur Deep-Sea Port (₹25,000 crore), and Sagar Island port target 130 million tonnes by 2030. PPPs drive 3.5% cargo growth CAGR. CRZ and tendering delays persist.
- PPP terminals outperform government ones (60% vs. 75–85% berth occupancy, 45% higher crane productivity), handling 56.5% of cargo, targeting 85% by 2030.

5.2 CONCLUSION

The study on Kolkata and Chennai Ports underscores their critical roles in India’s maritime trade, shaped by distinct geographical and operational contexts. Chennai Port, with its coastal advantage, modern terminals, and robust connectivity, excels in container handling (65% of traffic) and operational efficiency, achieving a 44.92-hour turnaround time. Kolkata Port, despite its riverine constraints, dominates in bulk cargo (e.g., 12.65 million tonnes of non-coking coal in 2023–24)

and serves a vast hinterland, but its 60.85-hour turnaround time reflects inefficiencies due to shallow drafts and siltation.

Both ports face common challenges high berth occupancy, regulatory delays, and labor skill gaps but require tailored solutions. Chennai must address urban congestion and land scarcity to sustain its growth, while Kolkata needs transformative infrastructure to overcome navigational limitations. The Sagarmala Programme, PM Gati Shakti, and PPPs have driven significant progress, with Chennai leveraging connectivity projects and Kolkata focusing on capacity enhancements. However, implementation delays and environmental compliance issues highlight the need for streamlined regulatory processes and sustainable practices.

By addressing these challenges and capitalizing on ongoing investments, both ports can enhance their efficiency and global competitiveness, supporting India's vision of becoming a maritime leader by 2047. This study provides a foundation for stakeholders to prioritize infrastructure upgrades, foster collaboration, and implement reforms that drive sustainable economic growth.

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