

Paradip Port of India: A Connectivity and Trading Gateway of India's Blue Economy in the Indo-Pacific

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ABSTRACT

This paper first examines and explores the strategic significance of the Paradip port. Later, it brings in a detailed analysis of Paradip's role in enhancing India's maritime Blue Economy. In addition, the study analyzes Paradip Port's integration into the broader Indo-Pacific Framework, emphasizing its role in regional economic cooperation and sustainable maritime growth. To guide this analysis, the paper tests two key hypotheses: First, the expansion and full mechanization of Paradip Port will significantly improve cargo handling efficiency and throughput, thereby enhancing India's maritime trade competitiveness and contributing to sustainable port operations. Second, Paradip Port's strategic alignment with the Indo-Pacific Framework strengthens regional connectivity and promotes sustainable maritime development in eastern India.

1. Introduction.

In contemporary international relations, the Indo-Pacific has gained visibility due to economic growth and strategic significance. This prominence has been further instrumentalised by becoming a pivot to world trade, investment, regional competition and building geopolitical space. The vast oceanic space of the Indo-Pacific represents a cumulative 64% of global demography, which contributes 62% of world GDP. It is significant to understand that 50% of world trade and 40% of oil traverse through these waters. In this context, India's 90% of trade and 80% of critical freight, such as gas and petroleum, iron ore, fertilizers, coal, etc., is included (Press Information Bureau, 2023). This region is also home to key world shipping sea lanes of communication, with strategic significance of various straits such as Bab el-Mandeb, the Strait of Hormuz, and the Malacca Strait. Therefore, this maritime region underscores its importance in the global supply chain and connectivity.

The economic rise of China, India, Japan and ASEAN countries, with their economic activities, trade and exploration of

maritime resources, has paved the way for the Indo - Pacific growth engine. The region is also home to numerous organisations, institutions, initiatives and associations mechanisms such as ASEAN-led frameworks, China's Belt and Road Initiative (BRI), India's Act East Policy and the Quadrilateral Security Dialogue – Quad. These mechanisms promote rule-based maritime governance, blue economy, sustainable development in the region and freedom of navigation, ensuring sustainable long-term regional stability in the Indo-Pacific.

The maritime blue economy and the rich potential for exploitation have also amplified the region's significance, emphasizing the sustainable use of ocean resources for economic growth, improved livelihoods, and ecosystem health. As climate change, maritime disputes, and great power competition converge in the Indo-Pacific, the region's role in shaping the 21st-century world order continues to grow.

Amidst the evolving strategic great game, geopolitics in a real sense would be dominated by maritime infrastructure. The Chinese Belt and Road Initiative spearheaded the competition in this segment, making many deals around the Indo-Pacific. In the Indian context, India's maritime infrastructure has received a much-needed push under the Sagarmala project. The unique selling point of this project is that it is port-led development.

India's maritime infrastructure, particularly its ports, drives

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trade and economic growth. The cargo handled at Major Ports has increased from 581.34 million tonnes in 2014–15 to 819.23 million tonnes in FY 2023–24, a CAGR of 3.5%, which is comparable to global standards. During 2023–24, the cargo handled consisted of 33.80% liquid bulk, 44.04% dry bulk, and 22.16% container cargo (Press Information Bureau, 2025).

Mundra, Kandla (Deendayal), and Jawaharlal Nehru Port Authority (JNPT) are the major ports central to this growth. Mundra Port, operated by Adani Ports, is one of the largest commercial ports in India. It handles over 155 MT of cargo annually, which accounts for 11% of the country's maritime cargo (Press Trust of India, 2023). Similarly, Deendayal (erstwhile Kandla) Port handled 132.37 MT of cargo in FY 2023–24, underscoring its significance in bulk and liquid cargo operations (Ministry of Ports, Shipping and Waterways, 2024).

The Sagarmala and National Maritime Development Program of the government's initiatives have further enhanced and improved port capacity and connectivity. These programs emphasised infrastructure development, including mechanization, dredging, and improved road and rail links, to accommodate larger vessels and streamline logistics. The classic example is the establishment of new ports like the Vizhinjam International Seaport in Kerala. This port aims to bolster trans-shipment capabilities, with a projected capacity to handle 15% of India's container trans-shipment (The Hindu Bureau, 2025). Moreover, the Vizhinjam seaport has the potential to become a central hub for global maritime trade in the Indian Ocean region.

Among all other ports of India, Paradip port on the east coast of India has achieved a remarkable height. In recent record-breaking time, it clocked an unbelievable 145.38 MMT of cargo in FY 2023–2024. It also recorded progress of 10.2 million metric tonnes (7.4%) of maritime traffic on a year-on-year basis (Ministry of Ports, Shipping and Waterways, 2024).

Paradip Port, located on the east coast of India, is nestled in the state of Odisha. Through its sustainable focus and maritime activity, it has emerged as a pivotal maritime hub in India. Its strategic positioning significantly enhances regional trade and connectivity in the east and southeast of Asia. Moreover, the port is strategically positioned near the mineral-rich hinterlands of India. Thus, Paradip Port serves as a critical gateway for bulk commodities, particularly thermal coal. For instance, in FY24, it handled 43.97 MMT of thermal coal via coastal shipping, marking a 4.02% increase from the previous year (Rediff Money Desk, 2024).

In the future, Paradip Port is set to expand its capacity beyond 300 MMT with the upcoming Western Dock project, slated for completion within three years (Rediff Money Desk, 2024). Additionally, mechanization plans for the port by 2030, with investment in building infrastructure (Mishra, 2024), will advance the port and strengthen India's maritime infrastructure. Further, these improvements are crucial for regional economic integration and to sustain maritime development, as India's ports and their infrastructure facilitate over 95% of the country's external trade by volume and 70% by value (Press Information Bureau, 2024b).

Thus, this paper first examines and explores the strategic importance of Paradip port. Later, it discusses a detailed anal-

ysis of the port's role in enhancing India's maritime blue economy. In addition, the paper analyses Paradip port's integration into the broader Indo-Pacific framework. To guide this analysis, the paper tests two hypotheses: First, the expansion and full mechanization of Paradip port will significantly improve cargo handling efficiency and throughput, thereby enhancing India's maritime trade competitiveness and contributing to sustainable port operations. Second, Paradip Port's strategic alignment with the Indo-Pacific framework strengthens regional connectivity and promotes sustainable maritime development in eastern India.

2. Strategic Significance of Paradip Port.

Paradip port, on the eastern coast of India, holds strategic significance at both the sub-regional level of the Bay of Bengal and within the larger geopolitics of the Indo-Pacific framework. Paradip has emerged as a vital maritime gateway for the eastern corridor of connectivity and trade. The port has been a lifeline for facilitating trade in commodities such as coal, iron ore and petroleum products. Further, the port serves the needs of industry based in hinterlands like Odisha, Chhattisgarh and Jharkhand. Apart from its economic utility, the port has emerged as a significant zone of opportunity in India's maritime security architecture, overseeing the vital tapestry of connectivity, sea lanes and transnational shipping routes in the Bay of Bengal.

It is in this context that Paradip port has emerged as a logistical and strategic anchor in the sub-region, especially within the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). In addition, the port enhances connectivity and economic integration within the immediate neighbourhood and the extended neighbourhood of India, particularly with East and Southeast Asia. From the Indo-Pacific perspective, Paradip port underwrites India's Act East Policy and the Indo-Pacific Oceans Initiative, thereby strengthening New Delhi's naval interoperability, its blue economy and maritime domain awareness. Certainly, it captures the dual vision of economic growth as well as maritime security in the fast-evolving regional order in the Indo-Pacific region.

2.1. Economic Dimension.

Paradip port has emerged as a pivot to India's maritime economy on the east coast, facilitating significant export of iron ore, coal and various other commodities from the states of Chhattisgarh, Odisha and Jharkhand (see Table 1). At the same time, under the port modernisation project Sagarmala, Paradip is expected to receive a significant amount of investment, which will certainly transform the port infrastructure to a global standard. This will further improve and enhance maritime connectivity and linkages to industrial clusters across east and central India.

At present, Paradip Port handles various cargo, including crude oil, POL products, iron ore, thermal coal, chrome ore, coking coal, manganese ore, charge chrome, ferro chrome, ferro manganese, limestone, hard coke, ingots and moulds, billets, finished steel, scrap, fertilizer, fertilizer raw material, clinker, gypsum, project cargo and containers (Paradip Port Authority, 2024).

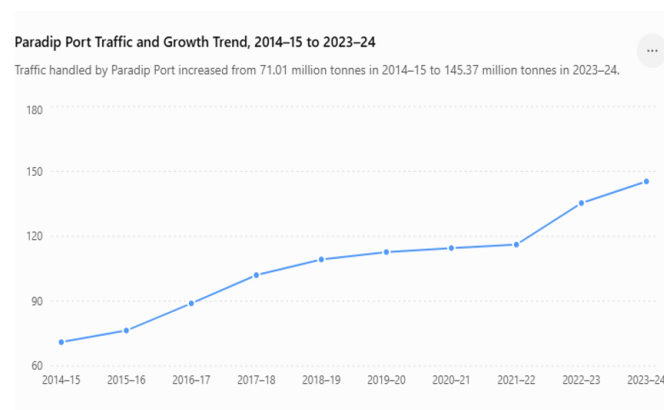
Table 1: Traffic handled at Paradip port in million tonnes from 2014-15 to 2023-24.

Sl No.	Year	Traffic handled in million tonnes
1.	2014 -15	71.01
2.	2015-16	76.39
3.	2016-17	88.96
4.	2017-18	102.01
5.	2018-19	109.28
6.	2019-20	112.69
7.	2020-21	114.54
8.	2021-22	116.13
9.	2022-23	135.36
10.	2023-24	145.37

Source: Ministry of Ports, Shipping and Waterways, Government of India – Annual Reports from 2014-15 to 2024-2025. <https://shipmin.gov.in/publication/annual-reports>.

The above table demonstrates that Paradip port has handled substantial cargo traffic, from 71.01 million tonnes in 2014-15 to 145.37 million tonnes in 2023-24, highlighting consistent growth of 8.44% per year (average YoY growth) and 8.29% per year CAGR. To further illustrate, the graph clearly validates an overall increase of approximately 104.72%—more than doubling over the period. This reflects a significant improvement in port efficiency, hinterland connectivity and expanding trade flow.

Figure 1: Paradip Port traffic and growth trend, 2014–15 to 2023–24.



Source: Ministry of Ports, Shipping and Waterways, Government of India.

Furthermore, from the regional perspective of the Bay of Bengal and the broader perspective of the Indo-Pacific, the rise of Paradip port and its efficiency have positioned it as a gateway for India's eastern seaboard. This further strengthens India's initiatives, such as the Act East policy and the Indo-Pacific Oceans Initiative, by connecting Paradip port to other maritime hubs of Southeast Asia, Australia and further to the regions of Melanesia, Micronesia, and Polynesia. Thus, it proves that the

enhanced performance of Paradip port, and its economic and geostrategic utility, make it central to India's maritime vision of becoming a significant player in the Indo-Pacific region.

2.2. Strategic Dimension.

Strategically, the geographical location of Paradip port on the eastern seaboard of India provides a vantage point over key sea lanes in the Bay of Bengal. This topographical proximity enables India to monitor and influence maritime traffic and secure the region, especially in the context of growing geostrategic competition. The strategic dimension of Paradip port has become even more important due to rising Chinese strategic advances in the Indian Ocean, particularly in the Bay of Bengal. For India's maritime security, a comprehensive understanding of the maritime domain will bolster its maritime presence in the Bay of Bengal. Thus, the Bay of Bengal is India's frontier in the east, and its Act East Policy aims to achieve strategic development, strengthening strategic capabilities in close coordination with India's Andaman and Nicobar Command Center. Hence, in India's grand maritime strategy, Paradip port is a strategic linchpin that serves the hinterland markets of Odisha, Chhattisgarh, Jharkhand, Bihar, and West Bengal (Paradip Port Authority, 2024).

In alignment with India's Act East Policy, Paradip Port plays a critical role in enabling maritime connectivity with South-east Asian nations, particularly Bangladesh, Thailand, Myanmar, Singapore, Indonesia, Sri Lanka and Vietnam. In addition, the port's integration with multimodal transport corridors, including rail, road, and inland waterways, significantly boosts its logistical reach and operational efficiency (Raut et al., 2024). These multimodal links further enable the continuous movement of cargo from the mineral-rich hinterlands of Odisha, Jharkhand, and Chhattisgarh to regional and international markets. This connectivity aligns with India's commitment and its role in the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). BIMSTEC also emphasizes cross-border connectivity, trade facilitation, and infrastructure development. In this context, Paradip emerges as a logistical and infrastructural cornerstone within this grouping.

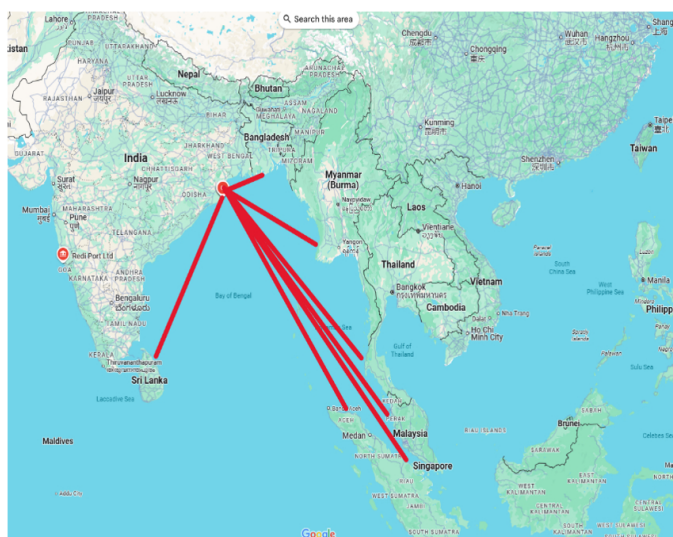
The following map succinctly illustrates the strategic importance of Paradip Port's connectivity in the Bay of Bengal, linking South Asia and Southeast Asia. This spatial evidence categorically highlights the port's role in advancing economic growth, regional cohesion, resilience, and its position as an economic engine and diplomatic asset in regional cooperation.

Additionally, in the context of India's Indo-Pacific framework, Paradip Port serves as a fulcrum of strategic maritime policy under SAGAR and the Indo-Pacific Oceans Initiative (IPOI).

2.2.1. SAGAR – Security and Growth for All in the Region.

Since Prime Minister Narendra Modi introduced the SAGAR vision in 2015, categorically highlighting a cooperative framework for the sustainable use of oceanic resources, India has emerged as a first responder in the region, demonstrating India's humanitarian diplomacy, anti-piracy operations, defence

Figure 2: Map of the Bay of Bengal and Paradip Port connectivity.



Source: Google Maps.

and maritime capacity-building partnerships, strengthening its role in securing sea lanes, and expanding its maritime connectivity and port diplomacy. Thus, in this context, Paradip port holds significant importance in promoting and endorsing India's SAGAR vision and locating maritime space and capacity for consolidating its economic ties with the littorals around it.

Within the SAGAR doctrine, the Sagarmala Programme complements port modernisation, including the development of deep-draft berths and mechanised cargo handling systems. Such an upgrade, particularly at Paradip port, would boost its operational efficiency and would position the port as a model for port-led development in the region.

2.2.2. India's Indo-Pacific Oceans Initiative (IPOI).

India's IPOI comprises seven thematic areas that cover a wide spectrum of issues spanning the 'security-development-capacity building' continuum in diverse areas including security, safety, resource development, science and technology, resilient infrastructure, and marine environment-ecology. Each of these pillars involves significant issues and therefore merits attention (Singh, 2022).

In this context, Paradip Port, as a major port on India's eastern coast, once again has the potential to support and endorse India's Indo-Pacific Oceans Initiative, encompassing its seven thematic pillars, and to serve as a strategic facilitator of India's regional maritime vision. Furthermore, from a coastal surveillance perspective, Paradip port holds the potential of becoming a logistical hub for the Indian Navy and the coast guard. This certainly aids India's response capacity for power projection, anti-piracy operations, anti-trafficking and other maritime operations in the Bay of Bengal.

3. Paradip's Role in India's Blue Economy.

3.1. Maritime Trade and Logistics.

In the fiscal year 2023–24, Paradip Port emerged as India's leading cargo-handling port, managing a record 145.38 million metric tonnes (MMT) of cargo. Notably, it handled 59.19 MMT of coastal shipping traffic, with thermal coal accounting for 43.97 MMT. The port's berth productivity reached 33,014 MT, up from 31,050 MT in the previous financial year, thus registering 6.33% growth. The berth productivity achieved by Paradip Port is the highest among all ports in the country. During the financial year, the port handled 2,710 ships, registering an increase of 13.82% over the previous financial year (Press Information Bureau, 2024a). These achievements underscore Paradip's critical role in enhancing India's maritime logistics and trade efficiency. Further, the commodity-wise traffic handled by Paradip port is a testament to its growing capability in India's maritime blue economy (see Figure 1).

3.2. Green Energy Initiatives.

Aligning with the National Green Hydrogen Mission, Paradip Port is being developed as a hydrogen hub, alongside Kandla and Tuticorin ports (ET Online, 2023). The port has signed Memoranda of Understanding (MoUs) worth Rs. 50,800 crore with four investors to establish green hydrogen and ammonia plants nearby (India Sea Trade News, 2024). Plans include constructing a dedicated berth for exporting green hydrogen and ammonia, with a 5 million tonnes per annum capacity, targeted for completion by 2026 (Mishra, 2024).

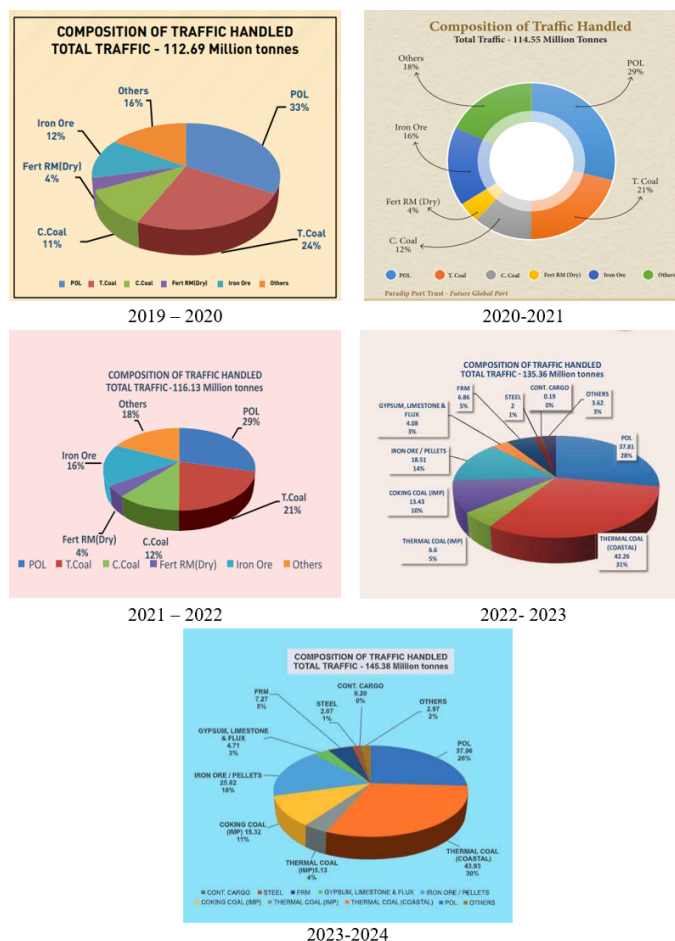
3.3. Sustainable Development and Smart Port Transformation.

Paradip Port is undertaking significant sustainability measures, such as transitioning to 100% mechanized cargo handling by 2030 (Mishra, 2024). The port is also implementing a greenification drive, targeting the planting of one million trees by 2025. Additionally, the installation of a 10 MW solar power plant is planned to enhance renewable energy usage (FE Online, 2024). These innovations and ingenuities by Paradip Port certainly contribute to limiting its carbon footprint and pave the way for promoting eco-environmental sustainability.

Thus, Paradip Port's development in cargo handling, its commitment to green energy, and sustainable practices certainly position it as a leader in India's Blue Economy. Therefore, its strategic developments consistently bolster economic growth and align with national objectives for environmental sustainability and energy transition.

From the above figures, it is clearly evident that Paradip port handled a variety of cargo such as petroleum, thermal coal, iron ore, coking coal, fertilizer and miscellaneous cargo. Among these, petroleum, oil and lubricants dominated and constituted the largest share for 2019–2020 with 33%, 2020–2021 with 29%, and 2021–2022 with 29%. Whereas for 2022–2023 and 2023–2024, thermal coal constituted 31% and 30% shares respectively. Other cargo makes up a substantial percentage of Paradip port's handling, and certainly the diversification of port handling reflects its handling capacity.

Figure 3: Composition of traffic handled, 2019–2020.



Source: For Annual Report 2019-20, 2020-21, 2021-22, 2022-23, 2023-24, please visit the Ministry of Ports, Shipping, and Waterways, Government of India. <https://shipmin.gov.in/publication/annual-reports>.

4. Paradip Port Integration into the Indo-Pacific Framework.

In the evolving geopolitics and geo-economics of the Indo-Pacific, the Bay of Bengal has emerged as a new geography with challenges and potential. From India's perspective, these waters provide strategic depth to its economic, strategic and security interests. Therefore, the positioning of Paradip port on the eastern coast of India attracts significant importance. This further asserts its role in the Indo-Pacific, as Paradip port is an integral part of India's geostrategic framework, representing a broader maritime vision and connectivity in the context of India's Act East Policy and the Indo-Pacific Oceans Initiative.

From the Indo-Pacific framework, Paradip Port's proximity to the Southeast Asian market holds untapped potential. The large pool of stakeholders, maritime assets, security, and maritime supply chain reinforce India's maritime frontier in the east. Paradip, being the fastest growing port in India, with its specialty in deep-draft berths and capacity to manage and handle large vessels, is further positioned as the most attractive

maritime hub. This is further evidenced by the fact that Paradip port has allotted 769 acres of land to various industries, and in return expects more than Rs. 8,700 crores of investment, adding 50 million metric tonnes of traffic to the port (Press Information Bureau, 2024a).

Strategically, Paradip's integration into the Indo-Pacific outline balances its focus on sub-regional frameworks like BIM-STEAC. This aligns with the goal of inclusive regional development and improves connectivity from Paradip port to ports in Myanmar, Singapore, Thailand, and Indonesia, thereby promoting regional trade corridors and reducing reliance on congested western ports like Mumbai, Mundra and others.

Additionally, the strategic importance of Paradip port in the Indo-Pacific framework signals India's maritime eastward shift, which echoes its Act East Policy and Sagarmala vision. Moreover, it serves as a fulcrum in advancing and developing resilient and diversified supply chains, particularly with hinterland infrastructure like the Eastern Dedicated Freight Corridor and highway networks. This will certainly enhance and boost the regional relevance of the port and infrastructure.

Last but not least, the Bay of Bengal is a volatile region due to environmental factors. More than piracy or threats from non-state actors, environmental challenges are enormous. Climate change and the constant fear of natural disasters in the region make the Bay of Bengal a curious case study. Thus, Paradip Port's integration into the Indo-Pacific framework would enhance its role as a staging ground for regional humanitarian assistance and disaster relief operations in the Bay of Bengal. Thus, the holistic development of Paradip port certainly lifts naval logistics cooperation, reinforces the maritime security pillar, and strengthens maritime trade, connectivity and HADR operations both regionally and in the broader context of the Indo-Pacific.

Conclusion.

Paradip Port has emerged as a pivotal infrastructure asset within the country's evolving maritime strategy. Its rising importance certainly reflects the significance of strategic, economic and environmental priorities within India's maritime vision of security and sustainability. It is further evident that Paradip port has transformed within the framework of India's Maritime Vision 2030, along with the Sagarmala Programme.

Thus, the first hypothesis—"The expansion and full mechanization of Paradip Port will significantly improve cargo handling efficiency and throughput, thereby enhancing India's maritime trade competitiveness and contributing to sustainable port operations"—is strongly supported by the paper, as evidenced by the record growth and doubling of cargo handling from 71.01 million tonnes in 2014-2015 to 145.37 million tonnes in 2023-2024. Simultaneously, in FY 2023–2024, it handled 2,710 ships, a 13.82% increase over the previous year (Press Information Bureau, 2024a).

Further, the mechanization process shows significant improvement in coal handling, though the port has set a target of 100% mechanisation by 2030. At the same time, the West-

ern Dock project, coming in the next couple of years, will further expand the capacity of the port beyond 300 MMT. This will enable it to accommodate larger vessels and higher trade volumes (Rediff Money Desk, 2024). In addition, the port's sustainable development initiatives in the area of the green hydrogen hub represent a significant move. It has already signed an MoU worth Rs. 50,800 crore and is expected to have a dedicated terminal by 2026 (India Sea Trade News, 2024). Thus, it is proven that Paradip has a pivotal role in promoting port-led growth, trade competitiveness, environmental sustainability and strategic significance in the Bay of Bengal as well as in the Indo-Pacific context.

The second hypothesis—"Paradip Port's strategic alignment with the Indo-Pacific Framework strengthens regional connectivity and promotes sustainable maritime development in eastern India"—is well supported by the paper across strategic and economic dimensions. Paradip Port, strategically located on India's eastern coast in Odisha near major Sea Lanes of Communication (SLOCs) in the Bay of Bengal, serves as a vital gateway for trade, security cooperation, and maritime connectivity with Southeast Asian nations such as Myanmar, Thailand, and Vietnam. At the same time, its role in India's Act East Policy, BIMSTEC, and the Indo-Pacific Oceans Initiative (IPOI) reinforces New Delhi's regional presence. In addition, integration with the Sagarmala Programme has further driven major infrastructure upgrades, including deep-draft berths, mechanized cargo systems, and multimodal corridors, enabling better connectivity to mineral-rich hinterlands.

Additionally, as discussed, the port plays a significant role in maritime security, supporting coastal surveillance, naval logistics, and potential HADR operations in the Bay of Bengal. Moreover, Paradip's growing strategic relevance also strengthens India's maritime diplomacy with Southeast Asia and Quad-aligned partners. This makes Paradip central to India's security architecture, which certainly depends on smooth connectivity and its sustainable developmental projects in the Indo-Pacific.

Thus, Paradip Port is more than a cargo-handling facility; it is a strategic enabler of India's maritime aspirations. By integrating economic growth, environmental responsibility, and strategic outreach, Paradip reinforces India's role as a proactive, responsible stakeholder in the Indo-Pacific. Its continued development will be critical in shaping a sustainable, secure,

and interconnected maritime future for the region.

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