

MARITIME STRATEGY

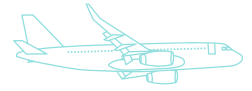
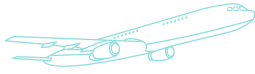
ANDHRA PRADESH

INDIA'S STRATEGIC GATEWAY
TO CONNECT THE GLOBAL EAST



Leverage Potential | Explore Prospects | Strike Partnerships

DEPARTMENT OF INFRASTRUCTURE & INVESTMENT
SEPTEMBER - 2025



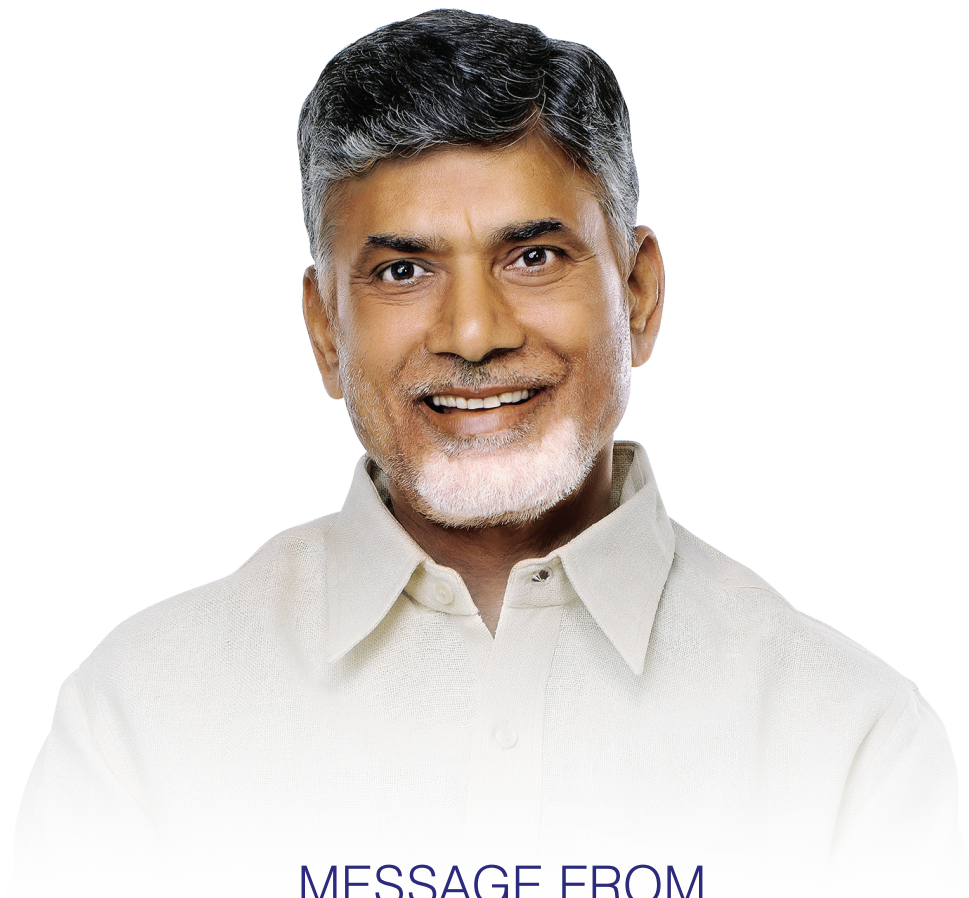
FOREWORD

The East Coast Maritime & Logistics Summit 2025 provides a timely backdrop to present this strategy paper, which outlines Andhra Pradesh's roadmap to emerge as the logistics hub of the East. While the Summit offers a space for dialogue and collaboration, this paper serves as a forward-looking framework that translates vision into actionable priorities.

Anchored in Andhra Pradesh's unique geographic advantage—with a 1,053 km coastline, six operational ports, and three greenfield ports under development—the strategy identifies the key levers of transformation. It emphasizes port-led industrialization, seamless multimodal connectivity, and the integration of inland waterways to strengthen trade flows. Equally, it highlights the adoption of smart technologies, green logistics, and skill development as enablers of long-term competitiveness and resilience.

By focusing on reducing logistics costs, boosting exports, and expanding value-added services, the paper underscores Andhra Pradesh's commitment to shaping a globally competitive, climate-smart, and inclusive logistics ecosystem. It is both a blueprint for the state's growth and a contribution to India's larger ambition of building a world-class logistics network.

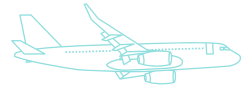
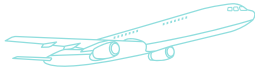




MESSAGE FROM HON'BLE CHIEF MINISTER

Andhra Pradesh is redefining its maritime future with ambition and action. As India's gateway on the east coast, we are integrating our ports, rivers, and industrial corridors into a seamless logistics ecosystem that powers energy exports, global trade, and coastal tourism. From connecting hinterlands to international markets, to transforming our rivers into trade highways, Andhra Pradesh is ready to lead. I invite global investors to join us in building a resilient, future-ready maritime economy—where your investments will shape not just infrastructure, but the future of trade in South Asia.





Sri B. C. Janardhan Reddy

Hon'ble Minister for
Infrastructure & Investments,
Government of Andhra Pradesh

MESSAGE FROM HON'BLE MINISTER - INFRASTRUCTURE & INVESTMENTS

Andhra Pradesh is building a maritime ecosystem that serves not only our state's industrial ambitions but also the growing needs of neighboring regions. Our upcoming ports—Ramayapatnam, Machilipatnam, and Mulapeta—are strategically designed to support bulk cargo, containerized exports, and specialized terminals for high-value sectors. We are shifting toward containerization to promote pharmaceuticals, seafood, and agro exports, while investing in coastal shipping and inland waterways to reduce logistics costs and transit times. This integrated approach—linking ports to industrial corridors, dry ports, and multimodal hubs—positions Andhra Pradesh as a logistics powerhouse on India's east coast. We welcome global investors and operators to partner with us in shaping a future-ready maritime economy that is efficient, scalable, and globally connected.



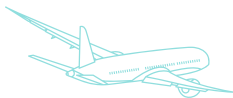
Sri Dr. N Yuvaraj, IAS

Secretary to Government,
Infrastructure & Investments
Dept. (FAC), and Industries
& Commerce Dept.,
Govt. of Andhra Pradesh

MESSAGE FROM SECRETARY - INFRASTRUCTURE & INVESTMENTS

Andhra Pradesh is embracing a bold, integrated approach to maritime development. We are open to private partnerships across port infrastructure, shipbuilding, and logistics innovation. Our ports are being designed with deep-draft capabilities to attract mother vessels and support global trade flows. By connecting ports with inland waterways, rail, and road networks, we are creating an intermodal logistics grid that delivers speed, efficiency, and cost savings. We envision a coastline dotted with fishing harbors, green ports, and shipbuilding hubs—one every 50 km—unlocking opportunities in exports, tourism, and marine industries. To support this transformation, we are investing in port cities and skilling programs to attract global talent and build a future-ready workforce. Andhra Pradesh is not just building infrastructure—we are building a globally competitive maritime economy. We invite visionary partners to join us in this journey.





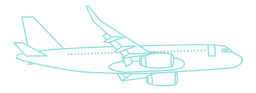
Introduction

Andhra Pradesh (AP), renowned for its rich heritage, diverse cultural landscape, and strategic geographic positioning, serves as a critical center for trade and commerce along the Bay of Bengal, with its extensive 1,053.7 km coastline. The state is home to several historically and economically significant locations, including Tirupati, Visakhapatnam, Araku Valley, and the ancient Buddhist sites of Amaravathi, each contributing to its distinct identity.

Over the past decade, Andhra Pradesh has experienced substantial economic growth, driven by targeted investments in infrastructure, industrial development, and policy initiatives. With a Gross State Domestic Product (GSDP) of approximately \$180 billion, the state is progressing toward its ambitious goal of achieving a \$2.4 trillion economy. Additionally, the per capita GSDP, currently estimated at \$3,400, is projected to rise to \$42,000, reflecting its commitment to sustained economic expansion.

A crucial pillar of Andhra Pradesh's economic advancement is its maritime and waterways infrastructure, which plays a vital role in strengthening global trade connectivity, industrial expansion, and employment generation. As India approaches its centennial year of independence, Andhra Pradesh (AP) is setting ambitious goals to transform into a high-growth, innovation-driven economy.





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1. Port-Led Industrial Growth

- The state is developing four new non-major ports at Ramayapatnam, Machilipatnam, Kakinada (Gateway), and Mulapet, expected to be operational by 2025-26.
- These ports will increase cargo handling capacity by 110 million tonnes, boosting trade and industrial activity.

2. Global Trade & Investment Hub

- Andhra Pradesh is actively seeking international partnerships to accelerate port-led infrastructure growth.
- The state aims to become a world-class maritime hub by 2030, attracting foreign investments in shipbuilding and logistics.



3. Blue Economy Expansion

- With a 1,053 km coastline, Andhra Pradesh is positioned to unlock a \$20 billion blue economy by 2035.
- Investments in fishing harbors, coastal industries, and marine exports will create thousands of jobs.

4. Logistics & Supply Chain Efficiency

- The state is expanding multimodal connectivity, reducing logistics costs from 14% to 6-8% of GDP by 2030.
- Smart port automation and AI-driven logistics will enhance trade efficiency.

5. Sustainability & Green Maritime Initiatives

- Andhra Pradesh is focusing on green shipping corridors and coastal sustainability projects.
- Investments in shipbuilding, repair, and recycling will support eco-friendly maritime development.

By 2047, Andhra Pradesh aspires to lead India's trade and logistics sector, establishing itself as a gateway to international markets, particularly in the Asia-Pacific region. Through strategic reforms, infrastructure modernization, and global partnerships, AP is determined to build a future that is economically resilient, environmentally sustainable, and globally competitive.

CURRENT MARITIME PROFILE



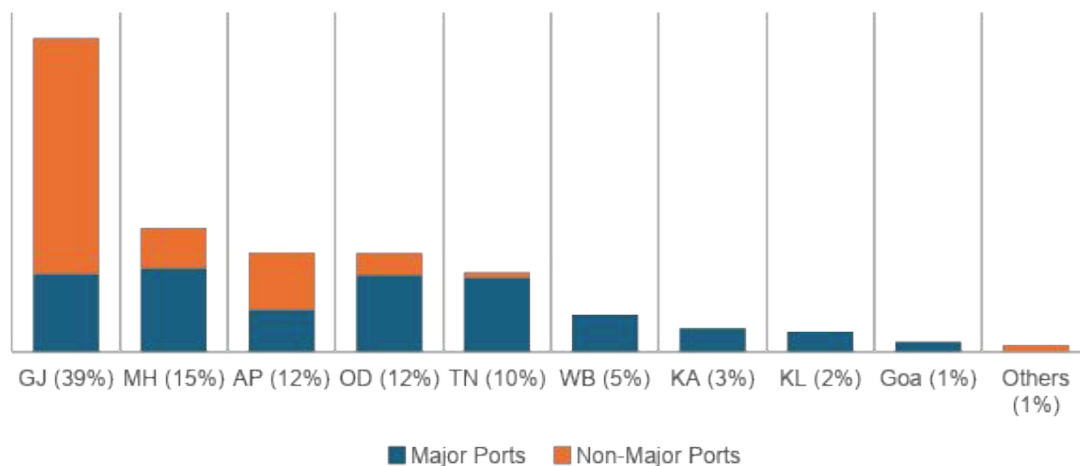


Andhra Pradesh has 1 major port and 5 non-major ports in operation with cargo handling capacity of 321 MMTPA.

Cargo Handling at Ports

India's ports collectively handle a massive 1,435 million metric tonnes per annum (MMTPA) of cargo, and Andhra Pradesh (AP) plays a significant role in this national logistics network. With a 12% share, AP ranks third in cargo handling among Indian states, following Gujarat (39%) and Maharashtra (15%). Odisha shares this third spot with AP, highlighting the eastern coast's growing importance in maritime trade.

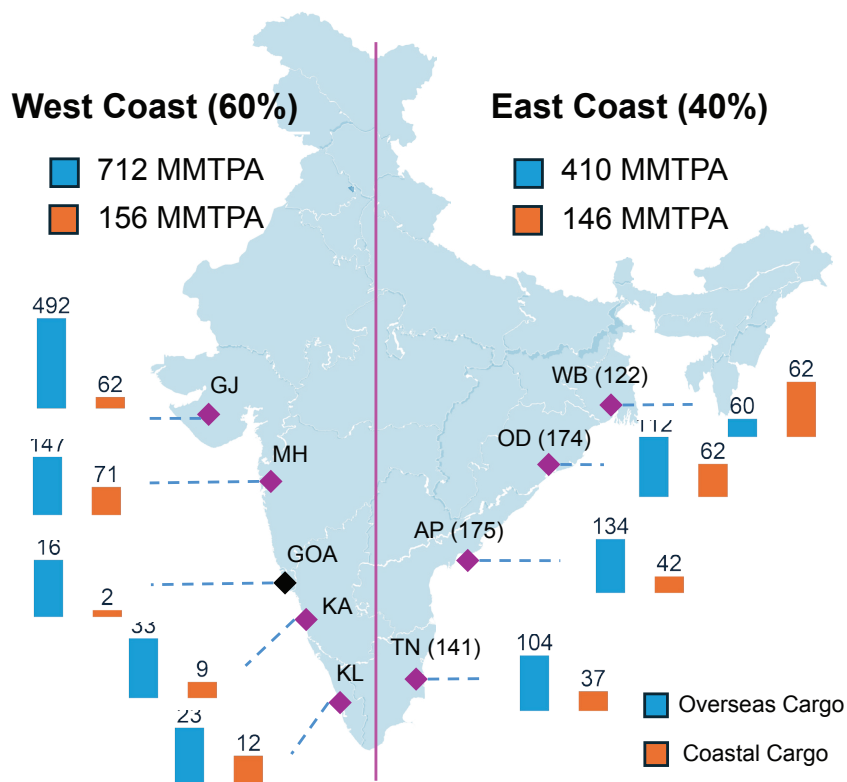
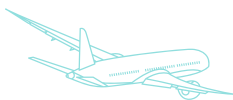
Cargo Traffic Handled (in MMTPA) - 2022-23



Zooming in on AP's own port activity, the state manages 175 MMTPA of cargo, of which 24% is coastal cargo—goods transported between domestic ports. This coastal movement is crucial for regional connectivity and economic efficiency.

On the eastern seaboard, ports collectively handle 146 MMTPA of coastal cargo. AP and Odisha dominate this segment, together accounting for over 70% of the volume. Notably, AP alone contributes 29%, underscoring its pivotal role in facilitating coastal cargo movement and reinforcing its status as a maritime hub on the east coast.

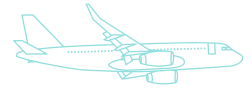
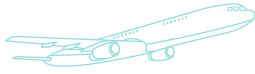




Top 10 commodities handled at AP ports

S.No.	Commodity	Cumulative Volume (MMTPA)	S.No.	Commodity	Cumulative Value of trade (INR Cr)
1	Coal	69.33	1	Crustaceans	61,050.59
2	Iron ore	10.97	2	Ships and other light vessels	30,485.12
3	Fertilizer	5.54	3	Pharmaceuticals	30,138.71
4	Break Bulk	4.63	4	Ferro-alloys	25,085.21
5	Edible oil	2.69	5	Rice	23,543.94
6	Rice	2.44	6	Chemicals	19,730.83
7	FRM – liquid	1.48	7	Automobile	18,687.14
8	Sugar	1.43	8	Tobacco	16,814.99
9	Container	2.2	9	Pepper	14,498.42
10	Crude oil	0.65	10	Fertilizers and insecticides	13,499.58
Total		101.36	Total		2,53,534.54





1. Coal – Backbone of Industrial Cargo

Andhra Pradesh's industrial landscape is heavily coal-dependent, with major power plants, steel facilities, and cement clusters relying on it as a primary energy source. Its ports and industrial zones like Vizag Steel and Kakinada further reinforce the state's role as a key coal logistics and consumption hub.

- **Volume:** 69.33 MMTPA ($\approx 59\%$ of total traffic).
- **Key Ports:** Krishnapatnam (major coal hub), upcoming Mulapeta Port.

2. Iron Ore – Supporting Steel and Export Markets

Iron ore is a key input for Andhra Pradesh's steel industry, with major plants like Vizag Steel relying on supplies from Odisha and Chhattisgarh. Despite growing demand driven by industrial corridors like VCIC, the state's limited local reserves make it dependent on imports and value-added processing facilities.

- **Volume:** 10.97 MMTPA.
- **Key Ports:** Krishnapatnam, Gangavaram, Kakinada.

3. Fertilizers – Vital for Agriculture

Andhra Pradesh's non-major ports are crucial for importing fertilizers that support its vast agricultural sector, with Kakinada serving as a key gateway. Major plants like Coromandel International and Nagarjuna Fertilizers ensure production and distribution across the region. However, heavy reliance on imported raw materials makes the supply chain vulnerable to global disruptions, highlighting the need for domestic capacity enhancement.

- **Volume:** 5.54 MMTPA.
- **Key Ports:** Kakinada, Krishnapatnam, Gangavaram.

4. Edible Oil – Import-Driven Consumer Commodity

The edible oil industry in Andhra Pradesh is centered around major refining hubs in Kakinada, Krishnapatnam, and Visakhapatnam, where companies like Ruchi Soya and Adani Wilmar process imported crude oils. The state's coastal location offers a logistical edge for importing and distributing edible oils across South India.

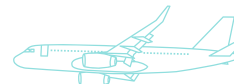
- **Volume:** 2.69 MMTPA.
- **Key Ports:** Kakinada, Krishnapatnam.

5. Container Cargo – Growing Trade Enabler

Container traffic at Andhra Pradesh's non-major ports is steadily increasing, driven by rising trade and industrial activity, with Krishnapatnam and Kakinada emerging as key hubs. These ports support export-oriented sectors like pharmaceuticals, textiles, and seafood, aided by industrial corridors such as the VCIC. While volumes remain lower than major ports, continued investment in infrastructure, automation, and connectivity is expected to enhance their competitiveness in containerized trade.

- **Volume:** 2.2 MMTPA.
- **Key Ports:** Krishnapatnam, Kakinada.

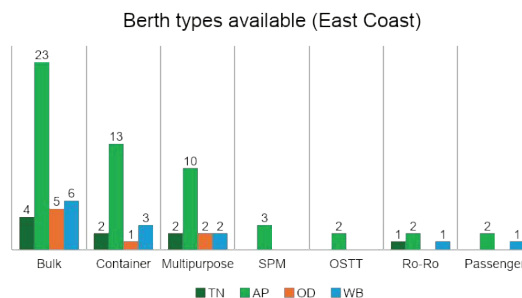
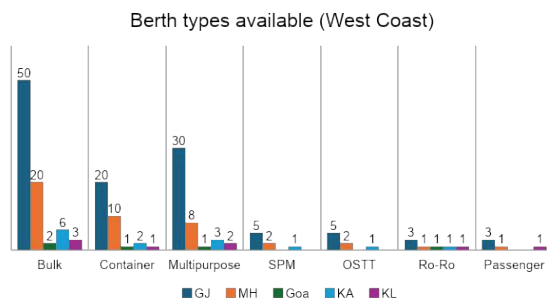




Vessel Berthing Capabilities

Berthing facilities in ports are critical components of maritime infrastructure, designed to accommodate various types of vessels and cargo operations. These facilities are categorized into berth types such as bulk, container, multipurpose, Ro-Ro (Roll-on/Roll-off), passenger, and specialized berths like SPM (Single Point Mooring) and OSTT (Offshore Tanker Terminals). Each type serves distinct industrial and logistical needs

1. **Bulk berths** correlate strongly with mining, power generation, and raw material industries.
2. **Container berths** align with global trade, manufacturing exports, and logistics hubs.
3. **SPM and OSTT berths** are indicative of energy infrastructure, especially oil and gas terminals.
4. **Ro-Ro berths** support automotive and ferry services, while passenger berths reflect tourism and regional transport.



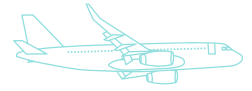
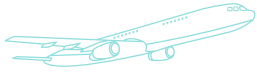
Key Insights: West Coast

1. Gujarat leads with the highest number of bulk and multipurpose berths, reflecting its dominance in petrochemicals, minerals, and general cargo. The presence of SPM and OSTT berths confirms its role in offshore oil and gas logistics.
2. Maharashtra shows a balanced mix, supporting containerized trade, automotive exports, and energy logistics.
3. Goa, Karnataka, and Kerala have modest berth infrastructure, but their Ro-Ro and passenger berths support regional tourism and coastal connectivity.

Key Insights: East Coast

1. Andhra Pradesh has a strong presence of bulk berths, indicating its role in mineral exports and resource-based industries. The presence of SPM and OSTT berths highlights oil and gas operations, while Ro-Ro and passenger berths support automotive exports and tourism.
2. Odisha and West Bengal also show a focus on bulk cargo, aligning with their mining and industrial hinterlands.
3. Tamil Nadu and Puducherry have Ro-Ro berths, supporting automobile manufacturing and exports, especially from hubs like Chennai.





Port	Draft (min-max)	Berth Type						
		Bulk	Container	Multipurpose	SPM	OSTT	Ro-Ro	Passenger
Vishakapatnam	2.5 – 17 m	10	5	3	2	1	1	1
Gangavaram	14.5 – 21 m	5	2	2				
Kakinada (deepwater)	10 – 14.5 m	4	2	2				
Kakinada (Anchorage)	5 – 7 m	2						
Rawa	5 – 8 m	1						
Krishnapatnam	13 – 18.5 m	6	4	3	1	1	1	

Visakhapatnam Port: Offers extensive berthing options including container, bulk, Ro-Ro, passenger, SPM, and OSTT facilities. It can accommodate large vessels such as **VLCCs**, **container ships**, and **cruise liners**.

1. **Gangavaram Port:** Known for its deep draft (up to 21m), it handles **Capesize bulk carriers**, container vessels, and multipurpose cargo.
2. **Krishnapatnam Port:** Equipped with container, bulk, Ro-Ro, SPM, and OSTT berths, it supports **Panamax**, **Post-Panamax**, and **VLCC-class vessels**.
3. **Kakinada Deepwater Port:** Handles container and bulk cargo with moderate draft, suitable for **Handysize** and **Supramax vessels**.
4. **Kakinada Anchorage Port:** A shallow draft port primarily for **small coastal vessels** and **lightering operations**.
5. **Rawa Port:** A captive facility with limited bulk handling capacity, suitable for **small industrial vessels**.





Shipbuilding and Repair

India's shipbuilding industry, while currently modest in scale, is poised for transformative growth driven by strategic national initiatives and rising global demand. As of 2022, India ranked **22nd globally in shipbuilding**, holding a mere **0.06% share** of the global market. In terms of ship ownership, India stood at **17th**, controlling approximately **1.3% of global tonnage**. These figures underscore the need for accelerated development to enhance India's competitiveness in the global maritime domain.

Despite these rankings, the sector is on a promising trajectory. The Indian shipbuilding market is projected to grow from **USD 1.12 billion in 2024** to **USD 8 billion by 2033**, with long-term projections reaching **USD 237 billion by 2047**. This growth is expected to be fueled by both defense and commercial segments.

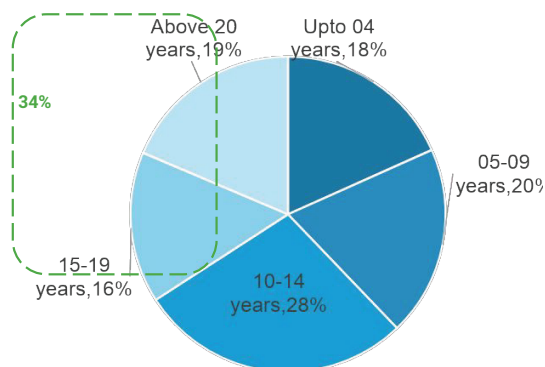
The **defense shipbuilding sector** continues to provide a stable foundation for domestic shipyards. The Indian Navy's vision to expand its fleet to **170 ships by 2027** has resulted in **49 ships currently under construction** and **50 more in the planning phase**, spanning a range of vessel types including aircraft carriers, patrol vessels, and support ships.

On the commercial front, several key drivers are contributing to rising demand:

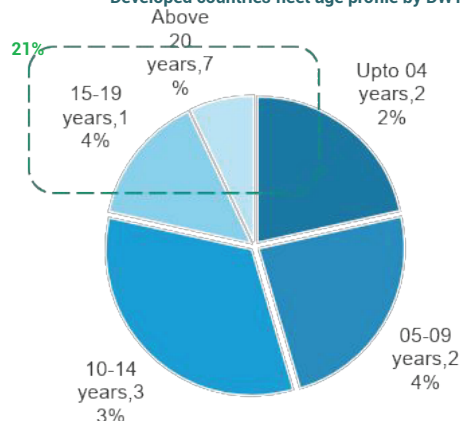
- Coastal shipping expansion**, with cargo movement targeted to increase from **120 million tonnes per annum (MTPA)** to **230 MTPA by 2025**, necessitating a significant increase in fleet capacity.
- The declaration of **111 national waterways** has created substantial demand for **inland vessels**, particularly suited for regional and small-scale shipyards.
- India's **aging maritime fleet**, with over **50% of vessels exceeding 15 years of age**, compared to the global average of 15 years, presents a compelling case for fleet replacement and modernization.

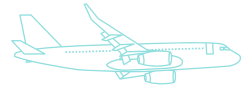
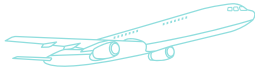
Potential Demand : 20-30% of ships are in need of replacement over next 10 years, while orderbooks of major global shipyards is full till 2030; it presents an opportunity for capacity creation

Developing countries fleet age profile by DWT



Developed countries fleet age profile by DWT





Road and Rail connectivity

A. Road Network

The **National Highways (NHs)** in Andhra Pradesh span over **8,700 km**, forming the primary corridors for interstate commerce and port access. These highways are part of national initiatives like the **Golden Quadrilateral**, **East Coast Economic Corridor**, and **Bharatmala Pariyojana**.

1. NH-16 (Part of Golden Quadrilateral)

- a) **Route:** Kolkata → Srikakulam → Visakhapatnam → Rajahmundry → Vijayawada → Nellore → Chennai
- b) **Economic Hubs:** Visakhapatnam (port, pharma, steel), Rajahmundry (oil & gas), Vijayawada (logistics, agri-trade), Nellore (aquaculture, Krishnapatnam Port)

2. NH-65

- a) **Route:** Pune → Hyderabad → Vijayawada → Machilipatnam
- b) **Economic Hubs:** Vijayawada (logistics, education), Machilipatnam (port development, textiles)

3. NH-67

- a) **Route:** Hubli → Ballari → Gooty → Tadipatri → Kadapa → Badvel
- b) **Economic Hubs:** Kadapa (mining, cement), Tadipatri (limestone, cement)

4. NH-544D

- a) **Route:** Guntur → Chilakaluripet → Narasaraopet → Vinukonda → Kurnool
- b) **Economic Hubs:** Guntur (chilli, cotton), Kurnool (granite, solar energy)

5. NH-216

- a) **Route:** Ongole → Chirala → Bapatla → Repalle → Machilipatnam → Kakinada → Rajahmundry
- b) **Economic Hubs:** Kakinada (port, seafood), Ongole (tobacco, granite)

Complementing the NHs are over 14,700 km of State Highways (SHs). These roads penetrate deep into the hinterlands, connecting rural production centers, mandals, and district headquarters to the national grid.

State Highways in Andhra Pradesh serve as **feeder routes** that:

- a) Connect **rural and semi-urban areas** to NHs.
- b) Enable **last-mile connectivity** to ports, industrial zones, and logistics parks.
- c) Reduce congestion on NHs by offering **alternate routes** for freight.





State Highway	Connects To	Linked NH	Economic Role
SH-2	Kurnool–Kadapa	NH-67	Cement, mining
SH-57	Guntur–Amaravati–Vijayawada	NH-16	Agri-trade, logistics
SH-38	Rajahmundry–Rampachodavaram	NH-216	Forest produce, tribal economy
SH-48	Anantapur–Hindupur	NH-44	Solar, dairy, logistics
SH-102	Amalapuram–Katrenikona	NH-216	Seafood, oil & gas

As of 2025, Andhra Pradesh handles **over 300 million tonnes** of cargo annually via its road network. The road network supports Andhra Pradesh's industrial corridors like **VCIC**, **CBIC**, and **HBIC**, facilitating seamless movement of goods to domestic and international markets.

- a) **Agricultural produce:** Chilli, cotton, rice, seafood
- b) **Industrial goods:** Cement, steel, textiles, pharmaceuticals
- c) **Construction materials:** Sand, granite, bricks
- d) **FMCG and perishables:** Dairy, packaged foods, consumer goods

B. Rail Network

Each year, over 150 million tonnes of goods are transported via rail across Andhra Pradesh. Key Commodities moved through rail include

- a) **Coal and iron ore:** For power and steel industries
- b) **Fertilizers and cement:** For agriculture and construction
- c) **Seafood and agri-exports:** From coastal districts
- d) **Pharmaceuticals and textiles:** From industrial hubs like Visakhapatnam and Guntur

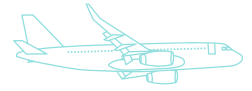
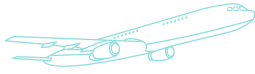
Andhra Pradesh is served by two major railway zones:

- a) South Central Railway (SCR)
- b) East Coast Railway (ECoR)

1. Key Rail Routes passing through the state

- a) **Chennai–Howrah Main Line:** Passes through Nellore, Vijayawada, Rajahmundry, Visakhapatnam, Srikakulam
- b) **Vijayawada–Guntur–Guntakal Line:** Connects central AP to western and southern India
- c) **Visakhapatnam–Koraput Line:** Links tribal and mineral-rich hinterlands to the coast





2. Major Freight-Handling Stations

- a) **Vijayawada Junction:** Central hub for freight and passenger movement
- b) **Visakhapatnam Station & Port Rail Yard:** Handles bulk cargo, containers, and petroleum
- c) **Krishnapatnam Rail Terminal:** Dedicated freight terminal linked to the port
- d) **Kakinada Port Station:** Supports seafood, fertilizers, and agri-exports
- e) **Guntur & Tenali:** Handle agricultural produce and textiles

3. Ports with Rail Links

Andhra Pradesh's ports are well-integrated with the rail network, enabling seamless cargo movement:

Port	Rail Connectivity	Cargo Handled
Visakhapatnam	Direct rail yard, connected to steel and pharma clusters	Coal, steel, pharma, containers
Krishnapatnam	Dedicated freight terminal, linked to Chennai–Howrah line	Coal, containers, bulk cargo
Kakinada	Linked to NH-216 and rail lines	Seafood, fertilizers, agri-exports
Ravva & Gangavaram	Rail sidings under development or expansion	Oil & gas, bulk cargo

Inland water Network

The state has identified 1,555 km of rivers and canals with potential for economic freight movement, of which 978 km are part of declared National Waterways.

The most prominent, National Waterway 4 (NW-4), includes the Godavari and Krishna rivers, the Buckingham Canal, and the Kakinada Canal, forming a vital corridor for cargo movement along the coast and into the hinterlands. Additionally, National Waterway 79 (NW-79) on the Penna River is under feasibility study, aiming to expand connectivity in southern Andhra.

Andhra Pradesh is, currently facilitating the movement of approximately 8 million tonnes of cargo annually through its waterways. Key industrial clusters such as Muktyala and Jaggayyapeta are already connected to the Krishna River and Bandar Canal, facilitating cargo movement to Kakinada and Machilipatnam ports.

Other water bodies like the Eluru Canal, Thungabhadra River, and various lakes also hold promise for local and regional freight movement, supporting agriculture, construction, and small-scale industries.



GAP IDENTIFICATION





Capacity Utilization of Existing ports

Non-major ports in the state are operating at a lower capacity utilization (avg. 65%) as compared to global standards (75%) and in comparison, with other states such as Gujarat where non-major ports have maintained a capacity utilization ratio of approximately 73% over the past three years.

Port Name	Cargo Handled (MMTPA)	Total Capacity (MMTPA)	Utilization (%)
Kakinada Anchorage	30.00	45.00	66.67%
Gangavaram	25.00	38.00	65.79%
Krishnapatnam	22.00	33.00	66.67%
Ravva	20.00	30.00	66.67%
Others (e.g., minor jetties)	20.46	30.46	67.17%

This underutilization of port capacities suggests the need for better cargo aggregation strategies and hinterland connectivity.

1. Incomplete Multimodal Linkages

Several ports lack **direct rail and road connectivity**, limiting efficient cargo evacuation and increasing turnaround times. The absence of **dedicated freight corridors** and inland waterway integration reduces the competitiveness of port operations.

2. Delays in Greenfield Port Commissioning

New ports like **Machilipatnam** and **Ramayapatnam** are progressing, but site-specific challenges such as **soil conditions, land acquisition, and reclamation timelines** have slowed development. These delays impact the redistribution of cargo and limit network optimization.

3. Limited Industrial Integration

Despite proximity to **three major industrial corridors (VCIC, CBIC, HBIC)**, many ports lack **direct linkages to manufacturing clusters**, reducing their ability to attract consistent cargo volumes and anchor tenants.

4. Gaps in Mechanization and Terminal Infrastructure

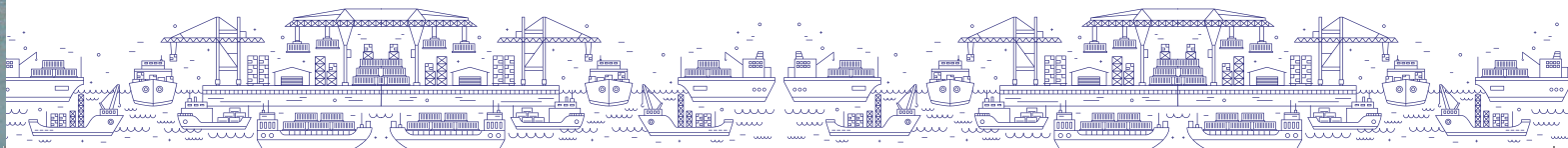
Some ports continue to rely on **manual handling and basic equipment**, which affects operational efficiency. Upgrading to **automated cargo systems and modern berths** is essential to meet global standards and reduce vessel turnaround times.

5. Absence of Value-Added Services

The lack of **container freight stations, cold storage, and warehousing** limits the ability of ports to handle diversified cargo and support export-oriented industries. These services are critical for enhancing cargo retention and value creation.

6. Coordination and Policy Execution

While the **Maritime Policy 2024–29** outlines ambitious targets—**300 MMTPA capacity and 20% national cargo share**—effective execution requires **stronger coordination between port authorities, industrial stakeholders, and infrastructure agencies**.





Bottlenecks in Inland Waterways

1. Inadequate Navigational Depth and Dredging Needs

Seasonal water level fluctuations, siltation, and inconsistent rainfall patterns have led to insufficient navigational depth across key stretches. An estimated 19.85 million cubic meters of dredging is required to restore and maintain fairway depth for uninterrupted vessel movement.

2. Bridge Clearance Limitations

Out of 190 bridges assessed along navigable routes, 47 require modification or reconstruction to meet vertical and horizontal clearance standards for modern cargo and passenger vessels. These structures currently pose significant navigational bottlenecks.

3. Deficient Navigational Lock Infrastructure

The absence or non-functionality of locks at critical dam and barrage sites disrupts vessel continuity. 48 existing locks have been identified for modification or repair, highlighting the need for urgent upgrades to enable seamless waterway connectivity.

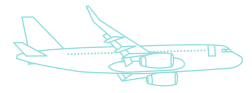
4. Terminal and Last-Mile Connectivity Gaps

Many terminals lack mechanization, multimodal integration, and last-mile road/rail links, limiting their cargo handling efficiency and commercial viability. The absence of integrated logistics hubs further constrains throughput and scalability.

5. Lack of Navigational Aids and Safety Systems

The current network suffers from insufficient channel markings, buoys, and night-time navigation aids, increasing the risk of vessel deviation, especially under low visibility or adverse weather conditions.





Barriers for shipbuilding and repairs

The Indian shipbuilding sector faces several structural and policy-related challenges that hinder its global competitiveness. These gaps can be categorized into four key areas:

A. Financial Gaps

1. High Working Capital Interest Rates

Indian shipyards operate under high interest rates of 10–11%, compared to 4–8% in competing nations. This significantly reduces their cost competitiveness and profitability.

2. Unfavorable Debt-Equity Ratios

Debt-equity ratios in Indian shipyards often reach 4:1, far exceeding the ideal 2:1, indicating over-leveraging and financial stress.

B. Taxation and Policy Gaps

1. Inverted GST Structure

Input materials are taxed at rates ranging from 5% to 28%, while the output (ship) is taxed at only 5%, leading to working capital blockages.

2. High Customs Duty on Capital Equipment

A 35% customs duty on capital equipment discourages modernization and technological upgrades.

3. Duty-Free Imports of Ships

Imported ships are exempt from duties, making them more attractive than domestically built vessels.

C. Infrastructure and Technology Gaps

1. Aging Facilities and Limited Automation

Many shipyards operate with outdated infrastructure and minimal automation, reducing productivity and quality.

2. Low Labor Productivity

Indian shipyards generate approximately \$11,134 per employee, compared to \$151,487 in Japan.

D. Ancillary Industry and Supply Chain Gaps

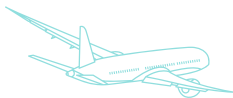
1. High Import Dependence

Around 60–65% of ship components, including critical systems like engines and propellers, are imported.

2. Lack of Volume Discourages Investment

The low volume of domestic shipbuilding creates a cycle of underinvestment in component manufacturing.





Workforce development in Maritime skills

The maritime sector in Andhra Pradesh and broader India faces several critical challenges in building a skilled workforce. These gaps hinder the sector's ability to meet global standards and respond to evolving technological and operational demands.

1. Inadequate Training Infrastructure

Many maritime training institutions lack access to advanced infrastructure such as bridge simulators, engine room mock-ups, and digital cargo-handling labs. This limits practical exposure and reduces the effectiveness of skill acquisition among trainees.

2. Absence of a Dedicated Maritime Sector Skill Council

The maritime sector's skilling needs are currently subsumed under the broader Logistics Sector Skill Council. This structure does not adequately address the specialized requirements of maritime trades, leading to gaps in curriculum relevance and occupational standards.

3. Weak Industry-Institution Linkages

There is limited structured engagement between maritime companies and training institutions. This disconnects results in a mismatch between training outcomes and industry expectations, with companies often needing to retrain new recruits for operational roles.

4. Lack of Structured Train-the-Trainer (ToT) Programs

Training delivery suffers from inconsistencies due to the absence of formal ToT programs. Many trainers lack pedagogical training and exposure to emerging maritime technologies, affecting the quality and relevance of instruction.

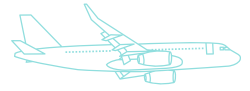
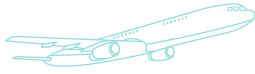
Integration and Institutional Coordination Gaps

While Andhra Pradesh has made significant strides in defining institutional roles across maritime-related sectors—such as ports, fisheries, tourism, and industrial development—effective integration across these domains remains a key challenge. The lack of cohesive planning and coordination mechanisms is increasingly seen as a bottleneck to unlocking the full potential of the state's coastal and inland waterway assets.

1. Fragmented Planning Across Departments

Maritime development in Andhra Pradesh involves multiple departments including Ports, Fisheries, Tourism, Industries, and Urban Development. However, planning processes often occur in silos, with limited cross-sectoral alignment. For instance, port expansion projects may not be synchronized with coastal tourism development or fisheries infrastructure upgrades, leading to missed opportunities for shared infrastructure and economic synergies.





2. Limited Data Sharing and Joint Project Execution

There is a noticeable lack of integrated data systems and inter-departmental platforms for collaborative project planning. Departments often maintain separate databases on coastal land use, marine traffic, fishery zones, and tourism flows. This fragmentation hampers evidence-based decision-making and delays the execution of multi-sectoral projects such as coastal economic zones, cruise terminals, or integrated fishing harbors.

3. Overlapping Jurisdictions in Coastal and Riverine Zones

Jurisdictional overlaps between central and state agencies, as well as between departments (e.g., between the Inland Waterways Authority of India and the State Ports Department), create regulatory ambiguity. This is particularly evident in estuarine and riverine areas where port development, inland navigation, and environmental conservation efforts intersect. Such overlaps often result in delays in project approvals, compliance challenges, and inefficient resource utilization.

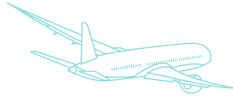
Strategic Framework

Vision Statement

To establish Andhra Pradesh as the epicentre of maritime activity on India's east coast by 2047, aligned with the nation's growth aspirations—through port-led industrialization, multimodal connectivity, and reduced logistics costs—creating a globally competitive, sustainable, and integrated maritime economy.

1. **Specific** - Establish Andhra Pradesh as the epicentre of maritime activity on India's east coast, driving regional trade, industrial growth, and coastal development.
2. **Measurable** - Achieve a significant increase in port cargo throughput, reduction in logistics costs, and expansion of multimodal connectivity across key industrial and coastal zones.
3. **Achievable** - Leverage port-led industrialization, strategic investments in infrastructure, and alignment with India's national growth objectives to build a globally competitive maritime ecosystem.
4. **Relevant** - Supports India's vision for economic transformation, blue economy expansion, and sustainable logistics, while enhancing Andhra Pradesh's role in national and international trade.
5. **Time-bound** - Realize this transformation by 2047, aligning with India's centenary of independence and long-term development goals.





Objectives

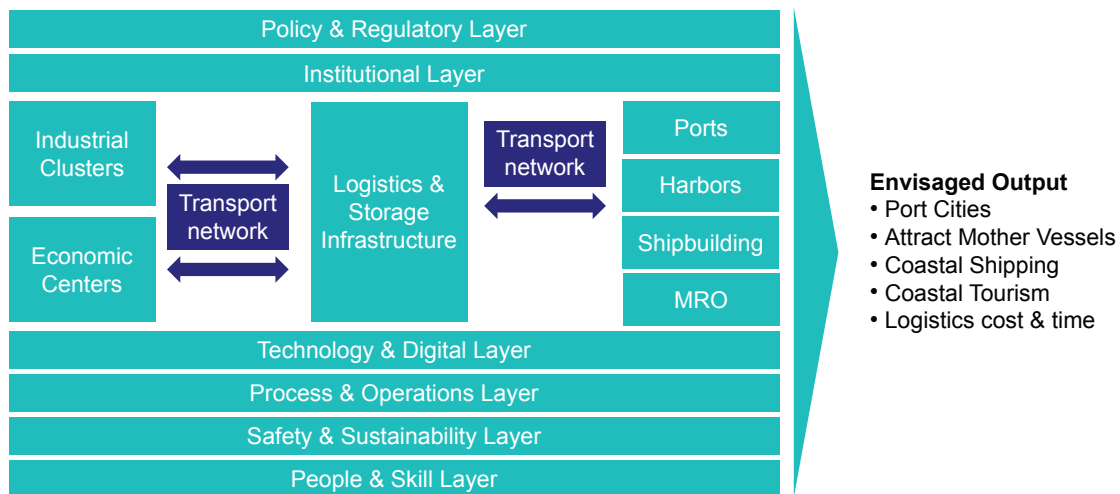
Andhra Pradesh is charting a comprehensive and layered strategy to transform its maritime and inland waterways sector into a robust engine of economic growth and sustainable logistics.

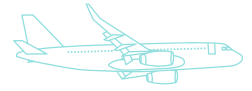
The framework connects industrial clusters and economic centers to logistics and storage infrastructure, which in turn links to ports, harbors, shipbuilding yards, and MRO (Maintenance, Repair, and Overhaul) facilities, with objective to -

- Develop **port cities**
- Attract **mother vessels**
- Expand **coastal shipping**
- Promote **coastal tourism**
- Bring down **Logistics cost & time**

Foundational pillars

The framework is built on six foundational layers that collectively address policy, infrastructure, operations, and human capital.





1. Policy & Regulatory Layer

This layer focuses on creating a conducive environment through progressive policies, streamlined regulations, and incentives to attract investment in port infrastructure, coastal shipping, and inland water transport.

2. Institutional Layer

Dedicated institutions such as the **AP Maritime Board** and **AP Inland Waterways Authority (APIWA)** are tasked with planning, coordination, and implementation of maritime projects, ensuring alignment with national initiatives like **Sagarmala** and **PM GatiShakti**.

3. Technology & Digital Layer

Digitalization of port operations, vessel tracking, cargo management, and integration with logistics platforms is central to improving efficiency and transparency across the maritime value chain.

4. Process & Operations Layer

This layer emphasizes operational excellence through optimized cargo handling, multimodal connectivity, and integration of industrial clusters with ports via road, rail, and waterways.

5. Safety & Sustainability Layer

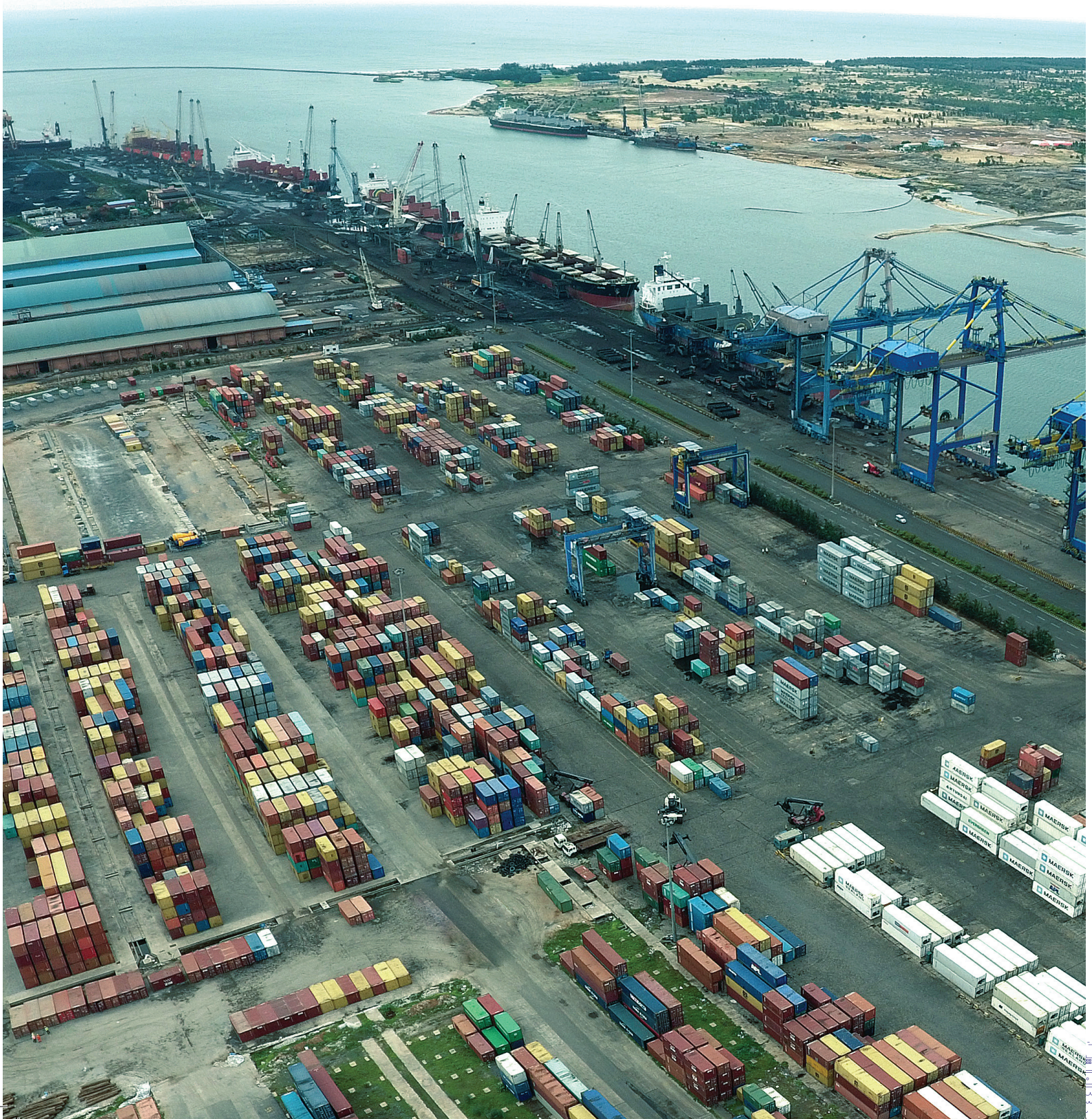
Environmental stewardship and safety protocols are embedded into the strategy, promoting green logistics, emission reduction, and climate-resilient infrastructure.

6. People & Skill Layer

Human resource development is prioritized through maritime education, skill training, and employment generation in shipbuilding, port operations, and coastal tourism.



PORT INFRASTRUCTURE DEVELOPMENT





Learnings from Global and National Best Practices

To enhance the efficiency and competitiveness of non-major ports in Andhra Pradesh, lessons can be drawn from leading global as well as Indian ports that have successfully implemented best practices in digitalization, automation, multimodal connectivity, infrastructure upgradations and promoted sustainable operations.

Parameter	Global Ports	Indian Ports	Shortcomings in Indian Ports	AP Interventions
Cargo Volume (TEUs)	Shanghai: 43.25M Singapore: 41.2M	JNPA: 85.2MTPA (non-TEU) Visakhapatnam: 81.09 MMT	Lower container throughput; limited transshipment traffic	Develop container terminals at Ramayapatnam & Machilipatnam with deep-draft capacity
Port Morphology	Deep-water seaports	Mostly deep-draft, but limited ultra-deep berths	Inadequate depth for large transshipment vessels	Upgrade draft to 16m+ at strategic ports
Berths & Terminals	Singapore: 84 berths Vancouver: 29 terminals	Paradip: 18 berths JNPA: 17 berths	Fewer specialized terminals (Ro-Ro, LNG, cruise)	Build multi-purpose terminals with container, bulk, Ro-Ro, and cruise capabilities
Operating Model	PPP, JV, private operators (Singapore, Vancouver)	BOT, landlord, captive (JNPA, Paradip)	Limited private sector diversity and innovation	Adopt hybrid PPP models with global operators and flexible concession terms
Digitalization & Automation	Guangzhou: AI, IoT, low-carbon systems	Visakhapatnam: basic automation, CPPI ranking	Limited adoption of smart port technologies	Implement Port Community System (PCS), AI-based cargo tracking, and IoT sensors
Sustainability	Guangzhou: Green port awards Singapore: EV fleets, solar terminals	Kamarajar: basic green initiatives	Lack of comprehensive green port strategy	Launch Green Port Mission: solar terminals, EV logistics, waste-to-energy systems
Specialization	Newcastle & Hay Point: coal export hubs	Paradip, Kamarajar: bulk cargo	Limited cargo clustering and specialization	Designate ports for container, coal, agri, petrochemical clusters
Global Recognition	Shanghai: #1 globally Singapore: best transshipment hub	Visakhapatnam: CPPI rank 19	Few Indian ports in global rankings	Position AP ports for CPPI, Green Port, and Smart Port certifications





1. Port of Singapore – Global Transshipment Leader

Success: Handles 41.2M TEUs; operates under a hybrid PPP model with multiple private operators (Keppel, PSA, Jurong).

Key Learning: Multi-operator ecosystem and strategic location drive transshipment success.

AP Intervention:

- Develop **Ramayapatnam** as a multi-terminal transshipment hub.
- Invite global operators under PPP and JV models.
- Create a **Port Community System (PCS)** for seamless cargo movement.

2. Shanghai Port, China – Scale & Integration

Success: World's busiest port with 43.25M TEUs; state-owned with integrated bulk and container terminals.

Key Learning: Deep-draft infrastructure and centralized planning enable scale.

AP Intervention:

- Ensure **deep-draft capability** at Machilipatnam and Mulapeta.
- Integrate container, bulk, and Ro-Ro terminals with logistics parks.

3. Guangzhou Port, China – Digital & Green Innovation

Success: Recognized for digital transformation and low-carbon practices.

Key Learning: Innovation in operations and sustainability enhances competitiveness.

AP Intervention:

- Implement **AI-driven cargo tracking**, IoT sensors, and smart berth scheduling.
- Invest in **solar-powered terminals**, EV logistics fleets, and green certifications.

4. Paradip Port, India – Cost Leadership

Success: India's cheapest port with frozen tariffs; highest coastal cargo volume.

Key Learning: Tariff stability and coastal cargo incentives attract traffic.

AP Intervention:

- Introduce **tariff rationalization** and **coastal cargo subsidies** at APMB ports.
- Promote **short-sea shipping** to Chennai, Kolkata, and Sri Lanka.

5. Visakhapatnam Port, India – Operational Excellence

Success: Ranked 19th in CPPI 2023; 21.4-hour turnaround time.

Key Learning: Efficient operations and private partnerships boost performance.

AP Intervention:

- Replicate **performance KPIs** across APMB ports.
- Expand BOT partnerships for specialized cargo handling.

6. Jawaharlal Nehru Port (JNPA), India – Container Hub

Success: India's top container port; 100% landlord model with global operators.

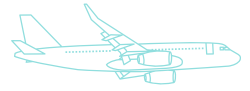
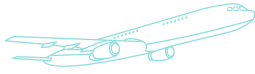
Key Learning: Institutional frameworks and global partnerships drive container traffic.

AP Intervention:

- Adopt **landlord model** at Ramayapatnam.
- Attract **global container operators** through long-term concessions.

Andhra Pradesh is strategically planning to transform its ports into world-class transshipment hubs by addressing the key shortcomings observed in Indian ports, as benchmarked against global leaders.





Projects identified for development

Andhra Pradesh is advancing the development of several greenfield ports to enhance its maritime infrastructure and stimulate economic growth. The four greenfield ports which are under development are Mulapeta Port in Srikakulam district, Ramayapatnam Port in Nellore district and Machilipatnam Port in Krishna district aimed at boosting the state's port capacity.

A. Mulapeta Port

The Port is being developed as a deep-water facility capable of accommodating large vessels, making it ideal for bulk cargo and future container operations. With projected cargo volumes rising significantly—such as thermal coal imports increasing from 3 million tonnes in 2024–25 to 20.5 million tonnes by 2039–40—the port is positioned to serve growing industrial and energy demands.

Strategically located in Srikakulam, it supports agro-industrial and mineral clusters, ensuring a stable cargo base. The port is also expected to play a key role in coastal shipping, particularly for domestic coal movement, enhancing its importance in inter-state logistics. Designed for phased expansion, Mulapeta will scale its infrastructure in line with long-term demand growth and contribute to Andhra Pradesh's export ambitions through mineral sands and other bulk commodities.

B. Machilipatnam Port

Machilipatnam Port, located on the central coast of Andhra Pradesh, is being developed as a modern, multi-cargo deep-water port with a strong focus on both exports and imports. The port's projected cargo volumes show steady growth through 2044–45, with key exports including agricultural products, cement/clinker, granite, and iron ore, and imports such as fertilizers, coal, and containerized goods.

Designed to handle a wide range of commodities, the port will feature specialized terminals and container handling infrastructure, supporting the region's industrial and agricultural sectors. Its development is aligned with the state's broader economic goals and will serve as a critical logistics hub for Krishna, Guntur, and West Godavari districts, while also benefiting Telangana and northern Tamil Nadu.

C. Ramayapatnam Port

Ramayapatnam Port, located in Nellore district, is planned as a high-capacity deep-water port with cargo handling projected to grow from 66.81 million tonnes in 2030–31 to 96.08 MT by 2035–36. Developed in phases, it will feature terminals for bulk cargo, containers, and specialized exports like cement, granite, and agricultural products. Its strategic integration with the Visakhapatnam–Chennai Industrial Corridor (VCIC) and nearby SEZs positions it as a key logistics hub.

The port meets rising demand for imports like coal, fertilizers, and edible oil, while supporting regional exports. It will benefit Andhra Pradesh, especially Prakasam, Nellore, and Guntur districts, and extend advantages to Telangana, Tamil Nadu, and Karnataka through improved trade access and reduced logistics costs.





Facilities envisaged at the ports

Andhra Pradesh is undertaking a comprehensive port infrastructure development initiative to address the structural and operational limitations of Indian ports. The goal is to transform the state into a globally competitive transshipment hub and a strategic maritime gateway to East and Southeast Asia.

1. Deep-Draft Berths for Large Vessel Handling

One of the core infrastructure priorities is the development of deep-draft berths at key ports such as Ramayapatnam, Machilipatnam, and Mulapeta. These berths are being designed with depths exceeding 16 meters to accommodate large container and bulk vessels. This directly addresses the challenge of inadequate draft at many Indian ports, which limits their ability to handle mother vessels and high-volume transshipment traffic.

2. Dedicated Container Terminals to Boost Throughput

To enhance container handling capacity, Andhra Pradesh is constructing dedicated container terminals equipped with high-capacity berths, automated stacking yards, and seamless rail-road connectivity. These terminals will significantly increase throughput and attract international shipping lines, helping to resolve the issue of low container volumes and limited transshipment capabilities.

3. Multi-Purpose Terminals for Cargo Diversification

The state is also developing multi-purpose terminals capable of handling a wide range of cargo types, including bulk, break-bulk, Ro-Ro, LNG, and cruise traffic. Ports such as Krishnapatnam, Gangavaram, and Kakinada are being upgraded with specialized facilities to support cargo diversification and improve operational efficiency.

4. Port-Linked Industrial Clusters for Cargo Generation

To ensure a steady and sustainable cargo base, Andhra Pradesh is promoting the development of port-linked industrial clusters. These include Special Economic Zones (SEZs), petrochemical parks, and food processing zones strategically located near ports. This initiative addresses the issue of weak hinterland integration and helps align port development with industrial growth.

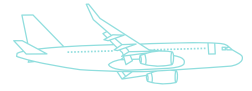
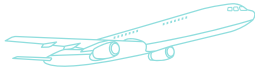
5. Multimodal Connectivity for Seamless Cargo Movement

The state is investing heavily in multimodal logistics infrastructure to connect its ports with national highways (such as NH-16), dedicated freight corridors, and inland waterways like National Waterway-4. Additionally, dry ports and Inland Container Depots (ICDs) are being developed in key cities such as Anantapur, Vijayawada and Visakhapatnam to enhance hinterland access and cargo flow.

6. Digital Port Infrastructure for Operational Efficiency

To modernize port operations, Andhra Pradesh is implementing digital infrastructure such as Port Community Systems (PCS), AI-based cargo tracking, and IoT-enabled berth management. These technologies aim to streamline operations, reduce turnaround times, and improve transparency, addressing the inefficiencies caused by manual and fragmented processes.





7. Green Port Facilities for Sustainable Development

Sustainability is a key pillar of the state's port strategy. Andhra Pradesh is launching a Green Port Mission that includes the installation of solar power systems, electric vehicle (EV) charging stations, and waste-to-energy plants. Eco-friendly dredging practices and marine biodiversity protection zones are also being incorporated to ensure environmental compliance and long-term ecological balance.

8. Smart Logistics and Warehousing Zones

To support value-added logistics and reduce port congestion, the state is developing smart logistics and warehousing zones. These zones will feature automated warehouses, cold storage facilities, and customs-bonded areas, enabling faster cargo processing and improved supply chain efficiency.

Private engagement models for port development & Operation

To encourage private sector participation in port development, Andhra Pradesh is adopting innovative engagement models that go beyond traditional PPP frameworks. These models aim to balance risk, ensure financial viability, and promote operational efficiency while clearly defining the roles of the state and private players.

1. Royalty per Metric Tonne (MT) Model

In this model, the private operator pays a fixed royalty to the state per tonne of cargo handled. This model ensures predictable revenue for the state and incentivizes the private operator to handle higher cargo volumes. The responsibilities are shared as follows:

- a) The state provides land, regulatory support, and basic infrastructure.
- b) The private player invests in terminal development, operations, and marketing.

2. Revenue Sharing Model

This model involves sharing a percentage of gross or net revenue with the state based on performance. This model aligns incentives with operational efficiency and cargo growth. The responsibilities are shared as follows:

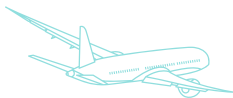
- a) The state facilitates approvals and connectivity.
- b) The private player manages operations, maintenance, and customer acquisition.

3. Minimum Guaranteed Cargo (MGC) Model

In this model, the private operator commits to handling a minimum cargo volume annually. This model reduces demand risk for the state and ensures baseline throughput. The responsibilities are shared as follows:

- a) The state offers tariff stability and policy support.
- b) The private player ensures cargo mobilization and infrastructure readiness.





4. Hybrid Annuity Model (HAM)

In this model, the state pays a fixed annuity to the private developer over time, while retaining ownership of the asset. This model reduces the upfront financial burden on the private sector. The responsibilities are shared as follows:

- a) The state finances part of the capital cost and owns the asset.
- b) The private player designs, builds, and maintains the port infrastructure.

5. Land Lease + Performance Incentive Model

In this model, the private operator leases port land and earns incentives based on cargo volume and service quality. This model encourages long-term investment and operational excellence. The responsibilities are shared as follows:

- a) The state provides land and monitors performance.
- b) The private player develops terminals and meets service benchmarks.

6. Joint Venture (JV) Model

In this model, the state and private entities co-invest and co-manage the port. This model allows for shared risk and decision-making, making it suitable for strategic assets. The responsibilities are shared as follows:

- a) The state contributes land, policy support, and equity.
- b) The private player brings capital, technology, and operational expertise.

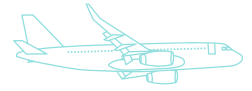
These innovative engagement models offer a range of options for private sector participation in port development, allowing Andhra Pradesh to choose the most suitable model for each project.





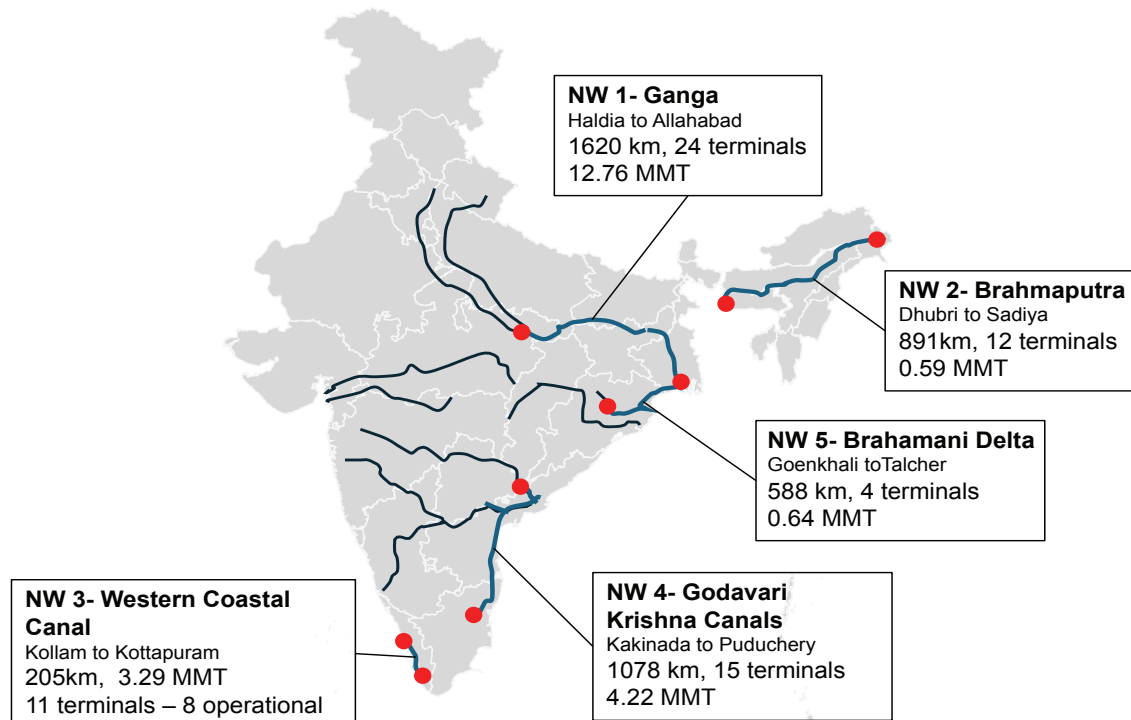
INLAND WATERWAYS DEVELOPMENT





The National Waterways Act, 2016 designated 111 National Waterways across 24 states, spanning 20,275 km. This has led to a significant growth in cargo movement, with a 66.1% increase from 2020-21 to 2022-23.

Key National Waterways:



- 1. NW-1 (Haldia–Allahabad, 1,620 km):** Handles 70% of inland cargo, with 24 terminals and a Rs.4,633.81 crore development project.
- 2. NW-2 (Dhubri–Sadiya, 891 km):** Managed 0.59 MMT of cargo, with 12 terminals, and strategic for regional trade with Bangladesh.
- 3. NW-3 (Kollam–Kottapuram, 205 km):** Saw a 337% increase in cargo movement (2021-23) to 3.29 MMT, with 11 terminals.
- 4. NW-4 (Kakinada–Puducherry, 2,916 km):** Facilitates 4.30 MMT of cargo, mainly sand, with infrastructure projects strengthening connectivity between Andhra Pradesh and Tamil Nadu.

These waterways are being developed with modern terminals, targeted depth, and navigational aids to enhance multimodal connectivity and boost economic growth.





Potential for IWT in Andhra Pradesh

Andhra Pradesh has a significant advantage in utilizing IWT due to its extensive navigable route network of approximately 1,555 km, including three key National Waterways spanning a total of 978 km, encompassing major rivers and canals. This network connects economic hubs, facilitates cargo movement, and promotes eco-tourism, positioning the state as a key contributor to India's inland waterway ambitions.

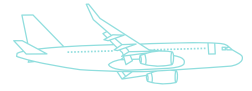
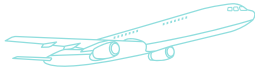
The state's inclusion in the National Waterways network, with three key waterways spanning 978 km, offers immense potential for transporting various cargo categories, including:

River/Canal Network	National Waterway	Waterway Length
Krishna, Godavari, Kakinada Canal, Eluru, Buckingham Canal	NW – 4	978 Km
River Penna	NW - 79	
River Tungabadra	NW - 104	

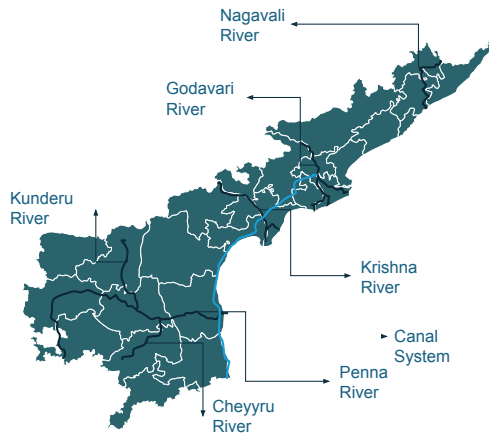
1. **Coal:** Efficient transportation from the Godavari belt to power and cement clusters.
2. **Cement:** Inland movement of cement from Andhra Pradesh to neighboring states.
3. **Fertilizers:** Transportation of inputs and finished products for fertilizer production hubs along the coastal and riverine areas.
4. **Rice:** Supplying rice from the Godavari delta to markets in Tamil Nadu and Kerala.
5. **Forest products:** Bulk water transport of forest products and paper mill inputs from the East and West Godavari districts.
6. **Other cargo:** Salt, marine products, vegetables, iron ore, granite, ceramic materials, and rice bran extractions.

By leveraging its inland waterway network, Andhra Pradesh can enhance cargo movement, reduce transportation costs, and promote economic growth.





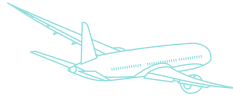
Section-wise Cargo Opportunities for IWT



Waterway	Length (Km)
Krishna River	171
Godavari River	250
Penna River	256
Tungabhadra River	232
Eluru Canal	139
Kommamuru Canal	113
Kakinada Canal	50
Buckingham Canal	258
Bandar Canal	86
Total	1555

1. **Krishna River (Wazirabad – Vijayawada):** This segment is poised for movement of agricultural produce, cement, and steel. With planned infrastructure improvements, it offers a cost-effective route for bulk commodities.
2. **Godavari River (Bhadrachalam – Rajahmundry):** Rich in coal reserves, this stretch presents significant opportunities for coal, rice, and forest products movement. It promises to deliver high logistics cost savings for industrial users.
3. **Eluru Canal:** Currently underutilized, the Eluru Canal has the potential to transport rice, fertilizers, and coal. Infrastructure upgrades and dredging will be crucial to activate its full potential.
4. **Commamur Canal:** Historically significant, this canal is a vital link for rice and forest products.
5. **Kakinada Canal:** Serving the Kakinada industrial region, this canal is essential for industrial salt and fertilizer transportation. Improvements to terminal facilities and lock systems will boost throughput.
6. **South Buckingham Canal & Kaluveli Tank:** These water bodies support salt and fish transport. With enhanced last-mile connectivity, they can become a backbone for aquaculture and coastal fisheries trade.
7. **North Buckingham Canal:** Identified as a corridor for rice, fertilizers, and granite, this segment holds strong potential for supporting industrial logistics, provided navigational aids and cargo handling systems are upgraded.



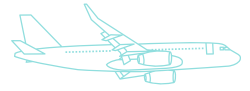
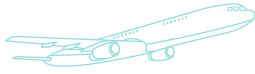


Development plan for utilizing waterways

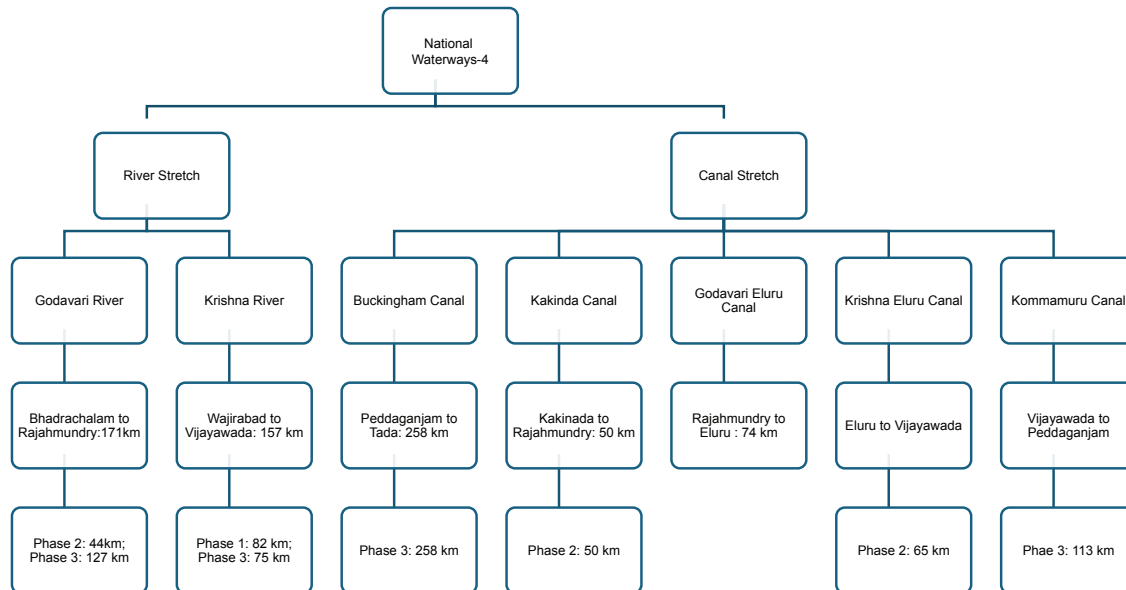
In line with national priorities, the assessment of Andhra Pradesh's Inland Waterways Transport system is structured around four key components:

1. National Waterways: Evaluating navigability, infrastructure readiness, and cargo movement potential.
2. Ro-Ro Projects: Facilitating seamless vehicle and cargo transport to reduce road congestion and transit times, catering to regional industries.
3. Ro-Pax Projects: Enhancing regional connectivity through passenger and vehicle ferry services, supporting local tourism and daily commutes.
4. Port Connectivity Projects: Integrating waterways with ports and hinterlands to enable multimodal logistics and improve last-mile efficiency.





Strategy to develop National Waterway–4 (NW–4)



The development of NW–4 is divided into two primary components: river stretches and canal stretches, with a phased approach to prioritize key segments. This strategy aims to enhance connectivity and facilitate efficient cargo movement.

- 1. River Stretches:** The Godavari River stretch from Bhadrachalam to Rajahmundry and the Krishna River stretch from Wajirabad to Vijayawada are identified as key segments for phased development.
- 2. Canal Stretches:** The Kakinada Canal, Godavari Eluru Canal, and Krishna Eluru Canal are prioritized for connectivity between industrial and agricultural hubs.

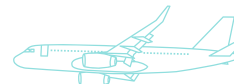
A. Interventions to make NW-4 navigable Pradesh

Intervention 1: Strategic Dredging

Implementing a strategic and adaptive dredging plan is essential for all-season navigability. This involves:

1. Prioritizing critical cargo corridors and aligning dredging activities with hydrological data and seasonal forecasts.
2. Engaging third-party contractors through output-based contracts with year-round maintenance clauses.
3. Establishing a central dredging coordination cell to oversee implementation and inter-agency coordination.





Intervention 2: Lock Infrastructure Development

A phased and collaborative lock infrastructure strategy is necessary to overcome structural limitations. This involves:

1. Conducting immediate structural assessments at key dam sites to evaluate the feasibility of retrofitting navigational locks.
2. Initiating a phased reconstruction plan for identified locks, prioritizing cargo-intensive stretches.
3. Establishing a multi-agency task force to drive coordination and execution.
4. Integrating lock infrastructure planning into future DPRs with dedicated funding provisions and cost-sharing models.

Intervention 3: Bridge Modification and Reconstruction

Addressing bridge clearance challenges requires a structured and time-bound approach. This includes:

1. Conducting a comprehensive reassessment of bridges to determine specific modifications required.
2. Developing a phased implementation plan, prioritizing high-traffic and commercially critical stretches.
3. Standardizing engineering templates for bridge modifications.
4. Using pre-fabricated and modular components to accelerate execution timelines.

Intervention 4: Standardized Navigational Aids

Deploying standardized navigational aids is crucial for safe navigation. This involves conducting hydrographic surveys, installing buoys and shore beacons, and establishing a Central Navigation Monitoring Cell to oversee deployment and maintenance. Output-based contracts with defined SLAs will ensure contractors meet performance metrics.

Intervention 5: Efficient Land Acquisition

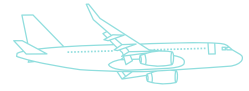
To resolve land acquisition delays, district-level implementation cells can be activated for parcel-wise tracking and coordination. A real-time GIS-linked dashboard can monitor approvals and disbursals, and Direct Benefit Transfers (DBT) should be time-bound to build trust.

Intervention 6: Efficient Terminal Development

Developing NW-4 terminals into efficient cargo hubs requires a structured plan focusing on categorization, infrastructure upgrade, hinterland connectivity, PPP, and technology integration. This includes:

1. Categorizing terminals into Primary, Feeder, and Multimodal Hubs with standard infrastructure blueprints.
2. Upgrading infrastructure at key sites with last-mile connectivity, weighbridges, and cargo sheds.
3. Improving hinterland connectivity through last-mile access assessments and collaboration with state agencies.





4. Enabling PPP and operational accountability through long-term contracts and performance-linked incentives.
5. Integrating technology and central oversight through a Central Terminal Operations Platform and Port Community Systems.

B. Phasing plan to utilize NW-4 for IWT

The development plan is structured to prioritize high-potential stretches, with the Kommamuru and Buckingham Canals planned for later phases to support broader regional integration. The phased strategy enables targeted investment, efficient cargo movement, and reinforces NW-4 as a backbone for inland water transport in southern India. However, addressing operational, infrastructural, and environmental challenges is crucial for smooth and timely execution.

Phase 1: Planning and Preparation

1. **Land Acquisition:** Resolve land acquisition delays by activating district-level implementation cells, using real-time GIS-linked dashboards, and implementing Direct Benefit Transfers (DBT).
2. **Comprehensive Reassessment of Bridges:** Conduct a comprehensive reassessment of all 84 bridges to determine specific modifications required.

Phase 2: Infrastructure Development

1. **Lock Infrastructure Development:** Conduct immediate structural assessments at key dam sites, initiate a phased reconstruction plan for identified locks, and establish a multi-agency task force.
2. **Bridge Modification and Reconstruction:** Develop a phased implementation plan for bridge modifications, prioritize high-traffic and commercially critical stretches, and standardize engineering templates.
3. **Terminal Development:** Categorize terminals, upgrade infrastructure at key sites, improve hinterland connectivity, and enable PPP and operational accountability.

Phase 3: Navigability Enhancement

1. **Strategic Dredging:** Implement a strategic and adaptive dredging plan, prioritize critical cargo corridors, and engage third-party contractors through output-based contracts.
2. **Standardized Navigational Aids:** Deploy standardized navigational aids, conduct hydrographic surveys, and establish a Central Navigation Monitoring Cell.

Phase 4: Operations and Maintenance

1. **Central Terminal Operations Platform:** Establish a Central Terminal Operations Platform for real-time tracking and deploy Port Community Systems (PCS) for stakeholder coordination.
2. **Ongoing Maintenance and Monitoring:** Ensure ongoing maintenance and monitoring of navigational aids, locks, and terminals to maintain the waterway's reliability and efficiency.





Strategy to develop infrastructure for Cargo transport

In the context of Andhra Pradesh, Ro-Ro cargo terminals present a transformative opportunity to address freight bottlenecks and optimize logistics across key industrial belts.

Based on Inland Waterways Authority (IWA) analysis, strategic locations such as Muktyala, Seethanagaram, Ibrahimpatnam, Kasarabada, and Guntupalli—all situated along the Krishna and Godavari rivers are in proximity to major industrial zones and freight routes, making them ideal for diverting significant truck traffic, saving significant travel time and distance.

The integration of Ro-Ro cargo systems in these areas will not only improve logistics efficiency but also foster industrial growth and reduce pressure on the state's road infrastructure.

1. Development of Ro-Ro Cargo Terminals: Establish Ro-Ro terminals at strategic locations such as Muktyala, Seethanagaram, Ibrahimpatnam, Kasarabada, and Guntupalli to facilitate seamless cargo movement and reduce road congestion.

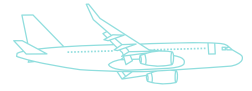
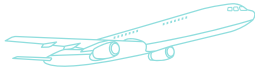
2. Integration with Multimodal Logistics: Integrate Ro-Ro systems with multimodal logistics to optimize transit times, lower freight costs, and improve supply chain efficiency.

S.No	Location	River	Feasible projects
1	Muktyala	Krishna	Ro-Ro terminal development, Multimodal integration, loading/unloading zones
2	Kasarabad	Krishna	Loading/Unloading facilities, road-rail integration, stage areas
3	Ibrahimpatnam	Krishna	Strengthen regulations, shipper incentives, automated cargo handling
4	Guntupalli	Krishna	Terminal development, Multimodal integration, loading/unloading zones
5	Seethanaragam	Godavari	Terminal facilities to Improve Cargo tracking, transporter efficiency

Strategy to develop infrastructure for Passenger transport

Ro-Pax services offer significant opportunities for growth in Andhra Pradesh, particularly in tourism development and integrated transport networks. By enhancing the overall tourism experience, Ro-Pax services can promote growth in the tourism sector, attracting more visitors and boosting local economies. Additionally, Ro-Pax services can create opportunities for integrated transport networks, improving access and connectivity across the state, and fostering economic development and regional integration.





A. Potential Routes in Andhra Pradesh

1. **Vijayawada-Amaravati:** A strategic route that can serve as a pilot corridor for expanding Ro-Pax operations.
2. **Papikondalu:** A scenic route that can attract tourists and promote regional connectivity.

B. Projects Identified for Development

To enhance regional connectivity, reduce road congestion, and promote tourism, Andhra Pradesh can develop Ro-Pax ferry services at key locations such as Vijayawada-Amaravati and Papikondalu. Additionally, constructing modern ferry terminals with integrated services, digital ticketing, and booking systems will improve the overall tourism experience, making travel more convenient and enjoyable for visitors.

1. Vijayawada–Amaravati (Krishna River)

Intervention: Development of Ro-Pax Terminal and Jetty with Integrated Tourism Services

Key Components:

- a) Construction of modern Ro-Pax terminal and jetty
- b) Integration with Andhra Pradesh Tourism Board
- c) Implementation of digital ticketing and booking systems

Expected Outcomes:

- a) Enhanced last-mile connectivity between urban and heritage zones
- b) Reduction in road traffic congestion
- c) Promotion of regional tourism under Sagarmala, Cargo Promotion, and AP Tourism Policy (2024–29)

2. Papikondalu (Godavari River)

Intervention: Ro-Pax Jetty and Terminal Facility for Eco-Tourism Access

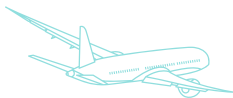
Key Components:

- a) Construction of Ro-Pax jetty and access road
- b) Development of passenger terminal with basic amenities
- c) Linkage with tourism circuits and river cruises

Expected Outcomes:

- a) Improved accessibility to Papikondalu eco-tourism zone
- b) Safe and sustainable transport alternative
- c) Boost to local economy and tourism under state and central schemes





Strategy to connect ports for inter-modal transport

1. Industrial Cluster–Port Linkages via Inland Waterways

Challenge: Bulk cargo from cement, steel, and agriculture sectors in interior regions like Kadapa, Muktyala, and Jaggayyapeta lacks direct waterway access to ports.

Intervention:

- Krishnapatnam–Kadapa Corridor:** Develop a dedicated waterway route to handle **15 MTPA** of cement and steel, reducing truck traffic and improving turnaround times.
- Machilipatnam–Muktyala Link:** Enable **3 MTPA** of EXIM cargo movement via barge, supporting the upcoming port's viability.
- Kakinada–Muktyala via Eluru Canal:** Transport **6 MTPA** of rice and cement, integrating canal infrastructure with port logistics.

These corridors will **decongest NH-16**, reduce freight costs by up to **30%**, and support **green logistics**.

2. Multimodal Integration with Riverine Industrial Zones

Opportunity: Industrial clusters along the **Krishna and Godavari rivers**—including **Vijayawada, Rajahmundry, and East Godavari**—are ideal for barge-based cargo movement.

Action Plan:

- Establish **Ro-Ro terminals** and **barge loading points** near cluster zones.
- Integrate with **rail sidings and container depots** to enable seamless modal shifts.
- Prioritize **agri exports, fertilizer movement, and coal supply** to coastal power plants.

This will enhance **port utilization**, support **rural industrialization**, and align with **PM Gati Shakti's multimodal infrastructure grid**.

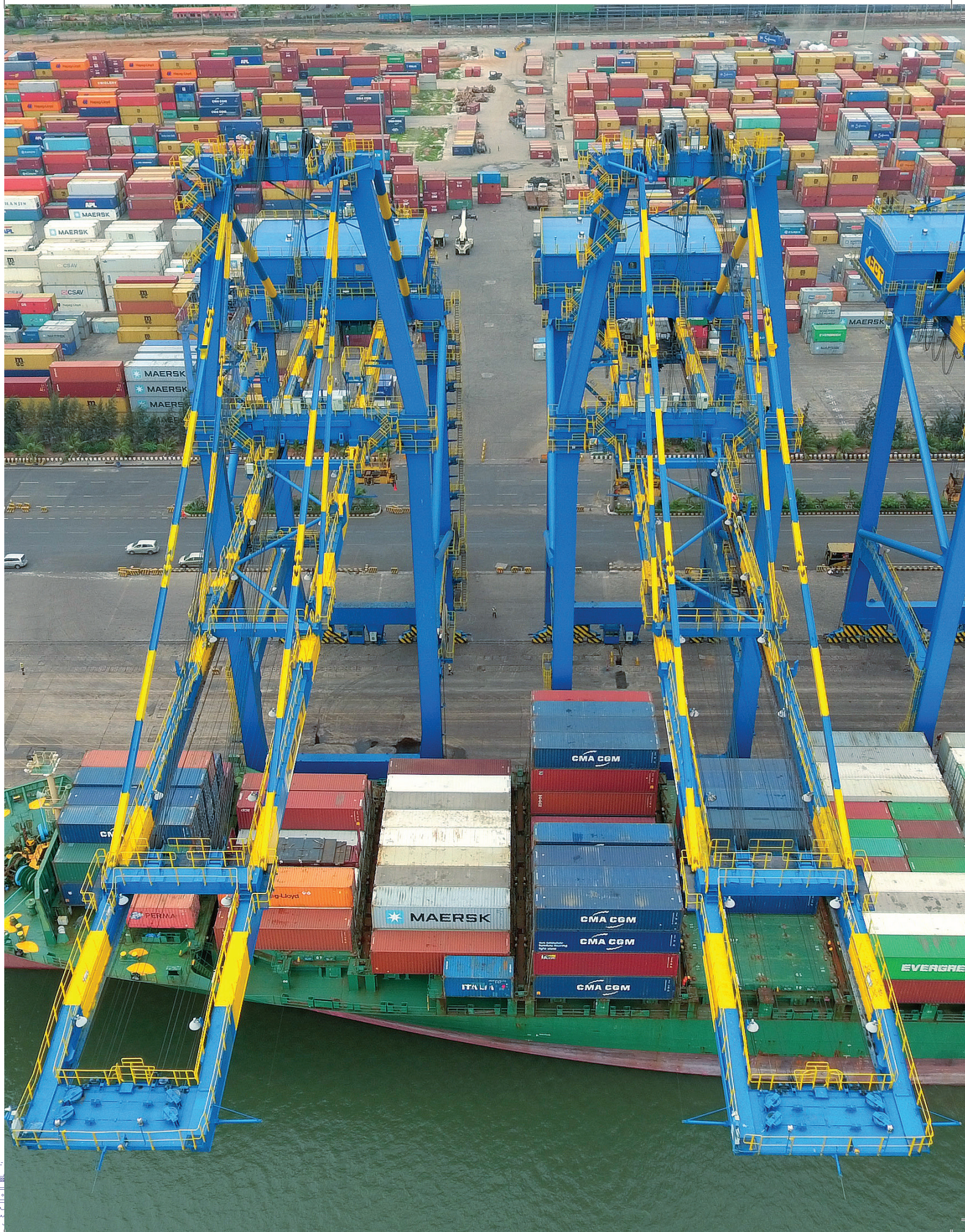
3. Feasibility Studies for New Navigable Routes

To unlock untapped river potential, initiate studies on:

- Nagavali River (Bathili–Kalingapatnam):** Potential for mineral and agri cargo.
- Sabari River (Kunavaram–Kolleru):** Link tribal regions to coastal trade.
- Kunderu, Cheyyeru, Papagni Rivers:** Explore 100 km stretches for cement and limestone movement from Penna basin.

These studies will assess **hydrology, cargo potential, and economic viability**, forming the basis for future **inland waterway investments**.







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