COASTAL STATE WORKSHOP

GOA

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1. BACKGROUND AND RATIONALE

India's maritime sector is entering a phase of accelerated transformation, driven by national priorities such as Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047. Coastal States play a pivotal role in translating these national objectives into tangible outcomes on the ground. In this context, the Goa Coastal State Workshop, being organised by the Directorate General of Shipping (DGS) under the Ministry of Ports, Shipping and Waterways, is conceived as a structured platform for collaborative dialogue between the Centre and the State.

The workshop follows an initial preliminary briefing session, intended to familiarise State departments and stakeholders with the proposed thematic areas, policy direction, and expectations. The forthcoming physical workshop in Goa is envisioned as a deeper, outcome-oriented engagement, focusing on State-specific challenges, opportunities, and implementation pathways. The detailed note accompanying the workshop builds upon the slides already prepared and seeks to articulate the intent, structure, and thematic scope of discussions in a comprehensive manner.

1.1 Structure and Intent of the Workshop

The Coastal State Workshop is designed around a six-pillar thematic framework, reflecting the core functional and developmental priorities of the maritime sector. Each pillar represents a focused domain where coordinated action between Central agencies, State governments, and industry stakeholders is essential. The structure enables targeted discussions while ensuring alignment with overarching national maritime goals.

The intent of the workshop is threefold:

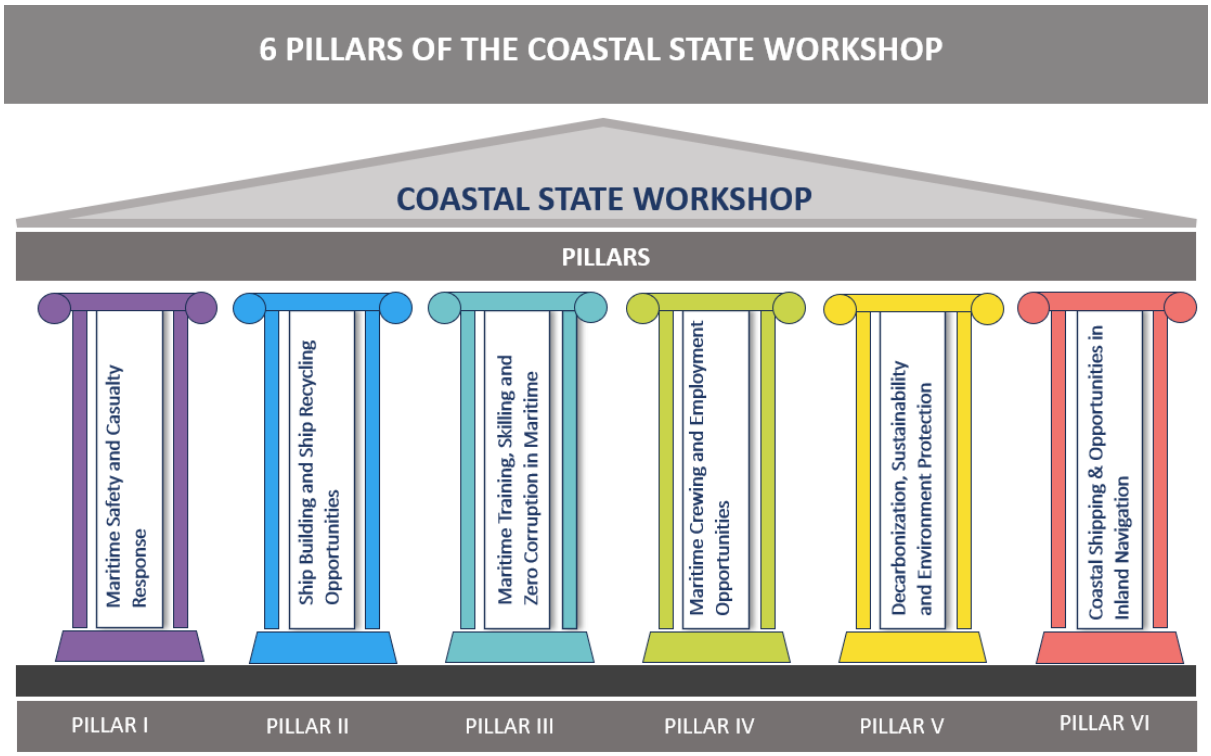
Policy Alignment: To align State-level initiatives, regulations, and infrastructure planning with national maritime policies and regulatory reforms led by DGS.

Opportunity Identification: To identify State-specific opportunities in shipbuilding, ship recycling, employment generation, sustainability, and coastal logistics.

Implementation Roadmap: To facilitate actionable outcomes through identification of nodal officers, institutional responsibilities, and follow-up mechanisms.

Each pillar will be discussed in detail during the physical workshop, supported by presentations, case examples, and interactive deliberations.

1.2 The Six Pillars: Thematic Overview



Pillar 1 – Maritime Safety & Casualty Response

This pillar focuses on strengthening maritime safety frameworks at the State level. Key discussion areas include fishing vessel collision prevention, safety awareness among coastal communities, maritime casualty investigation support, and disaster preparedness. Emphasis is placed on coordination between ports, State authorities, and central agencies to ensure timely response and effective incident management.

Pillar 2 – Shipbuilding & Ship Recycling

Pillar 2 addresses the development of shipbuilding and ship recycling ecosystems, with a focus on both greenfield and brownfield opportunities. Discussions will explore how Goa can leverage national incentives, such as shipbuilding financial assistance and ship recycling reforms, to attract investment, support MSMEs, and generate skilled employment. Integration of recycling with new-build demand and alignment with international conventions form a critical part of this pillar.

Pillar 3 – Training, Skilling & Zero Corruption in MTIs

This pillar is centred on improving the quality, governance, and credibility of Maritime Training Institutes (MTIs). Key aspects include enhancement of training standards, strengthening State support frameworks, and enforcing zero tolerance for corruption. The

objective is to ensure that maritime skilling ecosystems remain transparent, high-quality, and globally competitive.

Pillar 4 – Crewing, Employment & Zero Tolerance in Manning

Pillar 4 focuses on seafarer employment, crewing ecosystems, and manning practices. Discussions will include strengthening RPSL networks, expanding maritime employment opportunities within the State, and reinforcing ethical recruitment and manning standards. This pillar directly links maritime growth with livelihood generation for coastal populations.

Pillar 5 – Sustainability, Environment & Decarbonisation

Environmental sustainability is a cross-cutting priority, addressed explicitly under Pillar 5. Topics include port-led sustainability initiatives, emission reduction strategies, modal shift, and adoption of greener technologies. The pillar seeks to align State maritime activities with India's broader decarbonisation and climate commitments.

Pillar 6 – Coastal Shipping, Inland Navigation & Multimodal Linkages

The final pillar focuses on optimising coastal shipping and inland waterways as efficient, low-cost, and sustainable transport modes. Discussions will cover port optimisation, last-mile connectivity, and multimodal logistics integration. The intent is to enhance Goa's role in regional and national supply chains through improved maritime-logistics linkages.

1.3 Governance Framework and Nodal Officers

To ensure focused deliberations and accountability, each pillar is anchored by designated nodal officers from the Directorate General of Shipping. Their role includes guiding discussions, clarifying policy positions, capturing State-specific issues, and supporting post-workshop follow-up. A consolidated table detailing pillars, key discussion aspects, and nodal officers is provided separately in this note to serve as a ready reference for participants.

Pillar	Key Discussion Aspects	Nodal Officers
Pillar 1 – Maritime Safety & Casualty Response	1. Fishing Vessel Collisions & Safety Awareness 2. Maritime casualty legal advisory	Capt. Harinder Singh, Capt. Anish Joseph

	3. Disaster preparedness & port involvement	
Pillar 2 – Shipbuilding & Ship Recycling	1. Shipyard development – Brownfield & Greenfield opportunities 2. Ship Recycling Opportunities	Shri Pradeep Sudhakar, Shri Ravi Kumar M, Shri Gopikrishna
Pillar 3 – Training, Skilling & Zero Corruption in MTIs	1. MTI quality enhancement 2. State support frameworks 3. Zero-tolerance for corruption	Shri Praveen Nair, Shri Deependra Bisen
Pillar 4 – Crewing, Employment & Zero Tolerance in Manning	1. RPSL network 2. Maritime employment opportunities in the state	Capt. P. Meena, Capt. Nitin Mukesh
Pillar 5 – Sustainability, Environment & Decarbonisation	1. Port-led sustainability 2. Modal shift strategies	Shri Satish Kamath, Shri Pravin Roy
Pillar 6 – Coastal Shipping, Inland Navigation & Multimodal Linkages	1. Optimising ports & inland waterways 2. Multimodal logistics integration	Shri Ravi Kumar M, Shri Nebu Ommen

The Goa Coastal State Workshop is not envisaged as a one-time consultation but as part of a continuous engagement process between the Centre and the State. The detailed discussions under each pillar during the physical workshop will feed into actionable recommendations, State-specific roadmaps, and institutional coordination mechanisms. Through this structured six-pillar approach, the workshop aims to strengthen maritime governance, unlock economic opportunities, and position Goa as an active contributor to India's long-term maritime vision.

2. PILLAR I - Maritime Safety & Casualty Response

The Pillar 1 Workshop on Maritime Safety and Casualty Response under the Directorate General of Shipping (DGS) aims to sensitize coastal administrations, port operators, and maritime stakeholders to implement uniform protocols for safety, reporting, and response. The workshop serves as a platform to consolidate lessons from recent incidents, assess preparedness gaps, and operationalize a coordinated response framework across central and state agencies.

2.1 Objectives of the Workshop

The workshop objectives are structured around three interlinked thematic areas-Fishing Vessel Collision Prevention, Maritime Casualty Legal Framework, and Port Disaster Preparedness and Response.

2.1.1 Strategic Objectives

1. **Enhance Safety Governance:** Strengthen institutional and procedural mechanisms for maritime incident prevention and management across coastal jurisdictions.

2. **Standardize Reporting and Coordination:** Establish uniform incident reporting, communication, and data-sharing protocols among ports, the Indian Coast Guard, Fisheries Departments, and DGS.

3. **Build Legal and Technical Capacity:** Improve understanding of the Merchant Shipping Act 2025, Admiralty Act 2017, and related conventions among state officials to ensure timely and adequate casualty response.

4. **Promote Equipment and Compliance Upgradation:** Ensure fishing vessels, port operators, and coastal administrations adhere to DGS safety circulars, navigational equipment standards, and communication system requirements.

5. **Strengthen Cyclone and Disaster Preparedness:** Reinforce the implementation of the DGS SOP for Cyclones (2021) and MoPSW checklists to minimize operational disruption and safeguard life and property during adverse weather events.

6. **Facilitate Stakeholder Awareness and Coordination:** Sensitize fishing communities, maritime associations, and coastal industries on preventive safety practices, legal obligations, and response procedures.

2.1.2 Workshop Agenda

Sr. No.	Agenda	Key Focus Areas
1	**Fishing Vessel Collisions and Safety Awareness**	Overview of collision trends (2023–2025); reporting delays; equipment gaps (AIS/VHF);awareness on COLREGs and safe navigation practices.
2	**Maritime Casualty Legal Advisory and Institutional Roles**	Legal framework under Merchant Shipping Act 2025 and Admiralty Act 2017; claims procedures; insurance and liability systems; inter-agency coordination.
3	**Cyclone Preparedness and Port Disaster Response**	Implementation of DGS Cyclone SOP; SITREP procedures; communication protocols; lessons from Cyclone Montha (2025) case study.
4	**Consolidation and Way Forward**	Summary of key decisions, next steps for operationalization, and adoption of follow-up mechanisms for state-level implementation.

2.2 Fishing Vessels Collision

Collisions between fishing vessels and merchant ships remain one of the most persistent safety concerns in India's coastal waters. The western seaboard, including Goa, experiences dense fishing activity in proximity to commercial shipping routes. The operational overlap between small-scale fishing vessels and high-tonnage cargo ships significantly elevates collision risks.

These incidents often result from a combination of limited detectability, inadequate communication systems, non-adherence to appropriate display lights and shapes during night and day as required by COLREGS and delays in reporting, which in turn hinder timely rescue and investigation. The Directorate General of Shipping (DGS), in coordination with the Indian Coast Guard (ICG), has been monitoring such incidents to enhance early warning, improve inter-agency communication, and strengthen safety compliance among fishing vessels.

The objective of this section is to sensitize coastal stakeholders and fishing communities on the importance of timely reporting, navigational safety measures, and coordination with maritime authorities to prevent loss of life and property.

2.2.1 Historical Incident Trends

Analysis of collision data for **2023 to 2025** indicates a **recurring pattern of incidents** concentrated in specific maritime zones and seasonal windows. A broader review extending through 2025 recorded **27 collisions** (8 in 2023, 9 in 2024, and 10 in 2025), showing a gradual increase in frequency.

Key Observations:

- **Incident frequency:** 28 collisions recorded between 2023–2025, showing rising trend.
- **Seasonality:** Majority of incidents occurred during **winter months**, coinciding with peak fishing season.
- **Time of occurrence:** 11 collisions took place during **daylight hours**, 5 during **nighttime**.
- **Jurisdictional distribution: Kandla MMD** reported the highest number (7 of 16 in 2023–24), followed by **Kochi (3)** and **Chennai (3)**.
- **Flag of colliding vessel:** Both **Indian and foreign-flag vessels** were involved. Of the 16 incidents in 2023–24, **10 involved Indian vessels** and **6 involved foreign-flag vessels**.
- **Reporting delay:** Time between occurrence and reporting ranged from **4 to 196 hours**, revealing inconsistencies in communication.
- **Consequences:** Collisions resulted in 9 fatalities and 8 injuries over the three-year period. Fatalities increased in 2025 (5 deaths) despite no reported injuries that year, indicating higher severity of incidents.

These observations confirm that fishing vessel collisions are recurrent, geographically concentrated, and often reported with delay, with a tangible and escalating human cost in terms of fatalities and injuries, particularly in high-risk maritime jurisdictions.

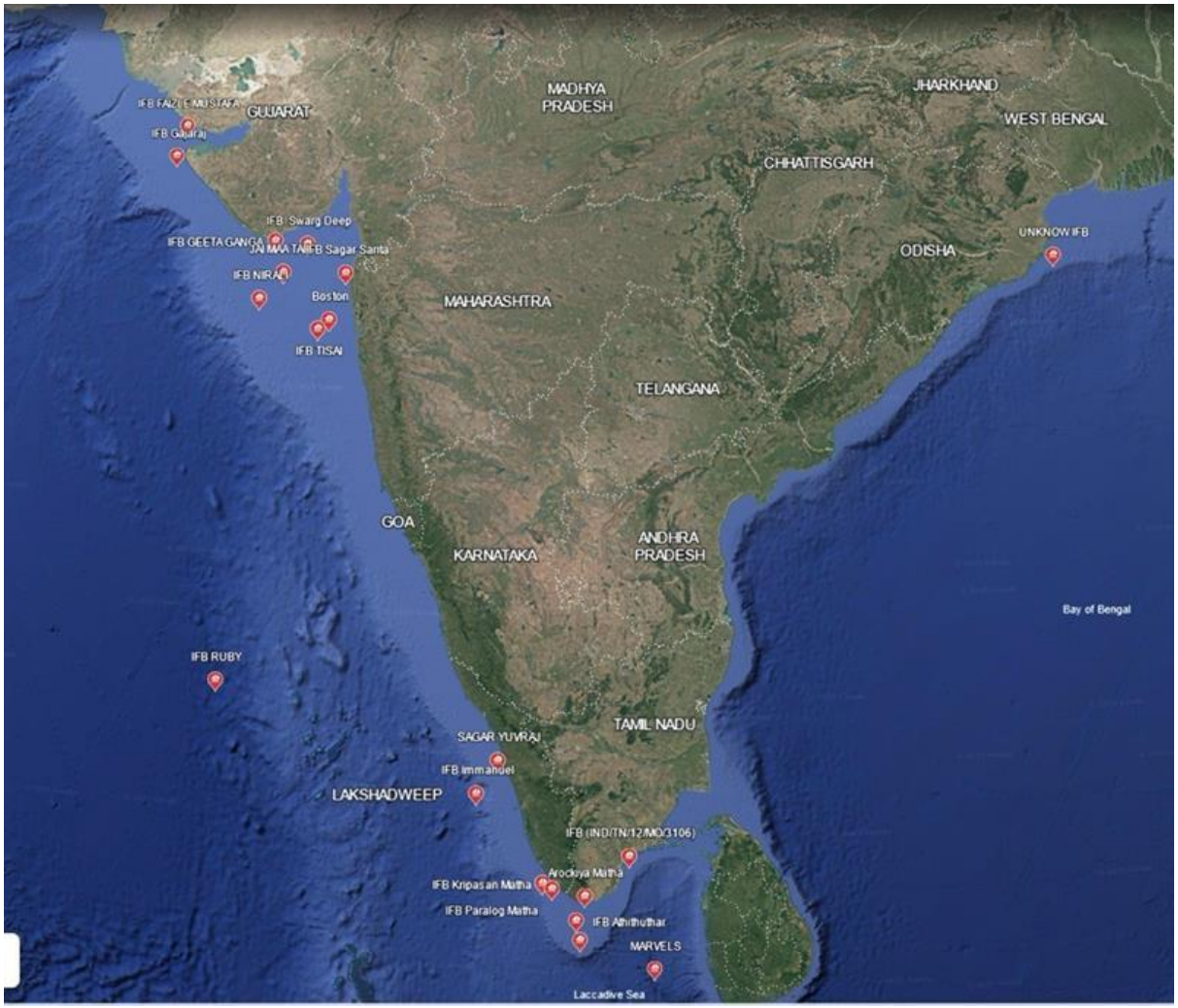


Figure 1 Location of Fishing Vessel Collision Between 2023 to 2025

2.2.2 Case Observations and Patterns

Incident analyses indicate that most fishing vessels involved in collisions operate without essential **navigational aids** such as radar reflectors, AIS transponders, or adequate navigation lights required as per COLREGS. Communication equipment such as **VHF radios** is often absent or non-functional, limiting the vessel's ability to warn or respond to approaching traffic.

Moreover, incident reporting mechanisms remain fragmented, with fishermen often relying on informal communication rather than structured reporting to port authorities, Coast Guard stations, or the DGS. The lack of uniformity in documenting vessel particulars, including dimensions, crew strength, and operational status, hinders root-cause analysis and follow-up investigations.

Often the insurance certificate of the fishing boat is not valid which thereby effects securing adequate compensation for the fishermen and the boat owner in case of any damage to the craft or loss lives.

2.2.3 Gaps and Issues Identified

The analysis identifies the following systemic gaps that require urgent attention:

1. **Delayed Reporting:** Reporting delays of up to 196 hours after an incident obstruct timely rescue, investigation, and accountability.

2. **Low Detectability:** Many fishing vessels lack radar reflectors, AIS devices, or high-visibility lighting, reducing their visibility to merchant ships during navigation.

3. **Weak Communication Framework:** Absence of a centralised location-sharing and distress communication mechanism between fishing boats and merchant traffic limits situational awareness.

4. **Incomplete Data Collection:** Essential details such as vessel type, crew count, and navigation conditions are inconsistently recorded in post-incident reports.

5. **Jurisdictional Concentration:** The clustering of incidents under certain MMD jurisdictions (notably Kandla, Kochi, and Chennai) underscores the need for region-specific preventive strategies.

6. **Mixed-Flag Involvement:** Frequent involvement of foreign-flag vessels necessitates enhanced coordination with flag states and port authorities to ensure compliance with international collision-prevention norms.

7. **Inadequate Insurance cover and oversight & Inadequate inspection and certification regime of fishing vessels by the Fisheries department**

These issues collectively highlight the need for regulatory oversight, structured detection systems, consistent reporting practices, and targeted awareness among fishing communities.

2.2.4 Recommended Actions

To address the recurring nature of fishing vessel collisions, the following **action points** are recommended for consideration by coastal-state authorities, port administrations, and fishing associations in Goa:

1. **Establish a Unified Reporting Protocol:** Introduce a single-window communication channel through the Maritime Rescue Coordination Centre (MRCC**)** for all collision and near-miss reports.

2. **Mandate Basic Navigational Equipment:** Ensure all mechanised and motorised fishing vessels operating near port approaches are fitted with radar reflectors, VHF sets, and navigation lights as per DGS safety circulars.

3. **Capacity Building for Fishermen:** Conduct periodic safety workshops through State Fisheries Departments and Port Authorities on navigation, collision prevention, and emergency response.

4. **Integrate Fishing Vessel Data:** Link fishing vessel registries with DG Shipping's central database to enable traceability and data sharing with MMDs and Coast Guard stations.

5. **Strengthen Zone-Based Monitoring:** Deploy coastal radar and AIS-based tracking near congested zones, particularly Visakhapatnam–Kakinada corridor, for real-time vessel monitoring.

6. **Enhance Coordination with Foreign Vessels:** Ensure enforcement of COLREGs (Collision Regulations) and establish coordination mechanisms for investigation of incidents involving foreign-flag ships.

7. **Establish Inspection regime and issuance of certificates to the fishing vessels** to ensure compliance with base safety requirements.

2.2.5 Expected Outcomes

Implementation of these measures is expected to:

- Reduce the frequency and severity of fishing vessel collisions.
- Strengthen real-time monitoring and early warning systems.
- Improve coordination between coastal fishing communities, ports, and maritime authorities.

- Promote a culture of safety, compliance, and accountability within the artisanal and mechanised fishing sectors.

2.3 Maritime Casualty Legal Advisory

2.3.1 Background

India's maritime domain has undergone rapid growth with increasing trade volumes, dense vessel movement, and expanding coastal industrial activities. The magnitude of these operations, particularly along the western and eastern seaboard, has heightened the risk of **marine casualties** such as collisions, groundings, wrecks, and pollution incidents. The safety and sustainability of maritime operations therefore depend on robust coastal-state management and a clear understanding of the legal framework governing post-incident actions.

The Maritime Casualty Legal Advisory seeks to sensitize coastal administrations, ports, and maritime stakeholders about the procedural, legal, and institutional steps to be taken following a marine incident. It establishes a unified framework enabling coastal states to respond in coordination with the Central Government, ensuring that the interests of sovereign authorities, local ecosystems, and affected communities are protected.

Recent legislative reforms including the Indian Ports Act 2025, Coastal Shipping Act 2025, Carriage of Goods by Sea Bill 2025, and the revised Merchant Shipping Act 2025 represent a modernized and integrated legal framework for India's maritime governance. These enactments provide clearer mandates for coastal-state implementation, strengthen institutional accountability, and streamline procedures for casualty response and environmental protection.

However, experiences from past marine incidents along the Indian coastline have shown gaps in the clarity of agency roles, claims prioritization, and liability enforcement. In several cases, incomplete awareness of legal and reporting procedures delayed effective coordination and compensation. This advisory seeks to remove such ambiguities and establish a standardized, informed, and time-bound response mechanism for managing maritime casualties.

2.3.2 Purpose and Intent

The purpose of this advisory is to provide an integrated legal and operational framework for the management of marine casualties at the state level. It aims to:

- Clarify the legal basis and procedural framework applicable to marine incidents.

- Define the roles and responsibilities of central, state, and port-level authorities.
- Guide operators, shipowners, and coastal communities on correct reporting, documentation, and claims processes.
- Establish coordination protocols for uniform implementation and accountability across coastal states.

By consolidating the relevant provisions of national laws and international conventions, the advisory seeks to enhance institutional readiness, procedural clarity, and efficiency in maritime casualty management.

2.3.3 Objectives and Scope

The advisory outlines the legal, technical, and operational dimensions of marine casualty management, with the following key objectives:

a. **Establishment of Preparedness Standards-** Define minimum standards of technical readiness, response infrastructure, and coordination capacity at both state and district levels.
b. **Role Clarification and Stakeholder Mapping-** Identify and delineate the roles of key entities including the Directorate General of Shipping, State Maritime Boards, Indian Coast Guard, Port Authorities, State Disaster Management Authorities, Pollution Control Boards, and Fisheries Departments. It also recognises the role of shipowners, insurers, and P&I Clubs in liability management.
c. **Incident Reporting and Communication Protocols-** Standardise reporting formats and establish real-time communication channels between the Directorate General of Shipping, Maritime Rescue Coordination Centres, and state-level crisis management groups.
d. **Insurance and Liability Regimes-** Clarify mandatory insurance requirements, liability limits, and compensation pathways under the Merchant Shipping Act 2025, the Civil Liability Convention, and the International Oil Pollution Compensation Fund (IOPC).
e. **Multi-Agency Coordination and Enforcement-** Define clear coordination protocols and escalation mechanisms among maritime, environmental, and disaster-response agencies.

2.3.4 Legal Framework Governing Maritime Casualties

2.3.4.1 Admiralty (Jurisdiction and Settlement of Maritime Claims) Act, 2017

The Admiralty Act, 2017 provides the legal foundation for instituting and adjudicating maritime claims in the aftermath of marine incidents. Under Section 4, it recognises several categories of maritime claims relevant to casualty management, including:

1. **Wreck Removal Costs:** Expenses incurred in raising, removing, recovering, or rendering harmless a wrecked, stranded, or abandoned vessel and its contents. Such claims may be subject to limitation under the Convention on Limitation of Liability for Maritime Claims (LLMC).

2. **Salvage Services:** Compensation for salvage operations, including special compensation for preventing or mitigating environmental harm.

3. **Environmental Damage:** Claims arising from damage or threat of damage caused by a vessel to the environment, coastline, or related interests, including costs of preventive or remedial measures and associated third-party losses.

The Act also defines the priority and ranking of maritime claims as follows:

- **Section 9:** Establishes the hierarchy of maritime liens
    - wages and crew entitlements;
    - loss of life or personal injury directly connected to vessel operations;
    - salvage and related compensation;
    - claims arising from torts for damage or loss caused by vessel operation.
- **Section 10:** Defines the inter se priority of maritime claims in the order of (a) maritime liens, (b) registered mortgages, and (c) all other claims. Further, Section 10(2)(b) specifies that salvage claims rank in inverse order of time, meaning later salvages take precedence over earlier ones.

This structure ensures transparency and fairness in the adjudication of competing claims, providing legal certainty to shipowners, salvors, and affected parties following a marine incident.

2.3.4.2 Merchant Shipping Act, 2025: Framework for Marine Incident Management

The **Merchant Shipping Act, 2025** consolidates and modernises legal provisions on marine safety, casualty response, wreck management, and compensation. It introduces new parts, Part X (Marine Incidents and Emergency Response) and Part XII (Wreck and Salvage) that codify procedures for reporting, investigation, and recovery.

Key Provisions:

- **Immediate Notification:** Masters and operators are obligated to report incidents to the Directorate General of Shipping and Maritime Rescue Coordination Centre without delay.
- **Preliminary Inquiry and Investigation:** Authorised officers conduct inquiries, followed by investigations by designated authorities, in alignment with SOLAS and IMO casualty codes.
- **Wreck Management:** Shipowners must mark and remove hazardous wrecks at their own expense, supported by compulsory insurance for such liabilities.
- **Salvage Operations:** Aligned with the Salvage Convention, ensuring environmental protection and fair compensation.
- **Limitation of Liability:** Establishes liability caps based on tonnage, as per LLMC 1976, for personal injury, property damage, and pollution claims.
- **Oil Pollution Compensation:** Ensures supplementary redress through the IOPC Fund beyond shipowner limits.

2.3.5 Insurance and Liability Framework

Maritime incidents are covered under a multi-layered insurance and liability system ensuring financial accountability and compensation:

- **Protection and Indemnity (P&I) Insurance**- mandatory for all seagoing vessels above 300 GT, covering third-party liabilities including death, injury, pollution, wreck removal, and cargo damage.

- **Hull, Machinery, and Freight Insurance**- covers direct physical and operational losses.

- **Domestic P&I Club Development**- underway to provide sovereign coverage and reduce dependence on foreign insurers.

The liability regime is harmonised with international conventions such as LLMC 1976, CLC 1992, Bunker Oil Convention 2001, and Wreck Removal Convention 2007. Compensation claims are processed through High Courts with admiralty jurisdiction, ensuring transparent and time-bound adjudication.

2.3.6 Technical and Legal Preparedness of Coastal States

Coastal states are required to maintain both technical and legal preparedness through coordination among the following entities:

- **State Maritime Boards / Port Authorities**- maintain incident registers, coordinate with DGS, and ensure harbour safety.

- **State Disaster Management Authority (SDMA)**- integrate marine casualties into coastal disaster plans by jointly working as per the Plan for Marine Incidents and Emergency Response and conducting periodic workshops and drills with the SDMA.

- **Indian Coast Guard**- lead pollution and oil spill response under the National Oil Spill Disaster Contingency Plan (NOS-DCP).

- **State Pollution Control Boards**- oversee shoreline protection, waste management, and post-incident monitoring.

- **Fisheries and Local Administrations**- support early reporting and assist in resource mobilisation.

Port Authorities must also maintain critical equipment (booms, dispersants, shoreline protection systems), identify disposal sites for debris, and convene State-level Crisis Management Groups for rapid decision-making during emergencies.

2.3.7 Claims, Compensation, and Enforcement

The legal framework enables affected parties to pursue claims for:

- Loss of life and personal injury;
- Damage to property and cargo;
- Environmental degradation and remediation costs;
- Wreck removal and salvage expenses; and
- Economic losses due to disruption of port or fishing activity.

Claims are filed before the **designated High Courts** under admiralty jurisdiction, following the order of priority under the Admiralty Act. For pollution and environmental damage, the **Merchant Shipping Act 2025** and related conventions provide recourse through domestic and international compensation mechanisms, including the **IOPC Fund**.

2.3.8 Role of Nodal Authorities

The Central Government, through the Directorate General of Shipping, designates Nodal Authorities to coordinate maritime-incident response and legal management. These authorities:

- Direct central and state agencies during incidents
- Oversee use of pollution-control resources
- Ensure compliance with statutory reporting and insurance obligations and
- Supervise claim settlement and legal follow-up.

This centralised coordination mechanism ensures uniformity in legal processes and supports states in executing statutory responsibilities.

2.3.9 Expected Outcomes

The effective implementation of this advisory will:

- Establish a clear and consistent legal response framework for marine casualties
- Reduce jurisdictional ambiguity and improve coordination among agencies
- Ensure timely and transparent compensation to victims and affected communities
- Strengthen institutional capacity and accountability in maritime governance and
- Reinforce public confidence in the state's maritime safety and environmental protection systems.

2.4 Disaster preparedness and Response in Indian Ports

2.4.1 Background

The Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways (MoPSW), has institutionalised a Standard Operating Procedure (SOP) for Cyclones (2021) aligned with the National Disaster Management Plan (NDMP-2019). The SOP provides a structured framework for communication, coordination, and on-ground action during the formation, intensification, and landfall of cyclonic systems.

This agenda aims to sensitize coastal state administrations, ports, and maritime operators on the cognizant measures to be taken during cyclonic events and to reinforce adherence to the prescribed DGS and MoPSW checklists for effective disaster management and response.

2.4.2 Coordination Framework and Objectives

The DGS functions as the central coordinating authority during cyclone events, ensuring seamless communication between the Indian Meteorological Department (IMD), Indian Navy, Indian Coast Guard (ICG), Maritime Rescue Coordination Centres (MRCC), Directorate General of Hydrocarbons (DGH), Oil Industry Safety Directorate (OISD), port authorities, and shipping stakeholders.

Objectives of the cyclone preparedness and response framework include:

- Ensuring **timely dissemination of IMD advisories** to all maritime stakeholders.
- Establishing **real-time coordination** through the DGS Communication Centre (DGComm Centre).

- Mandating **proactive actions by ports and shipping companies** in accordance with the approved SOPs.
- Maintaining **situational reporting (SITREPs)** at regular intervals.
- Facilitating **inter-agency review meetings** under the chairmanship of the Director General of Shipping.
- Ensuring adherence to the **MoPSW Cyclone Preparedness Checklist** and **Casualty SOP**.

The coordination framework ensures that each entity — central or state, public or private — performs its defined responsibilities to safeguard maritime operations and coastal infrastructure.

2.4.3 Standard Operating Procedures (SOP) for Cyclones

The Standard Operating Procedures for Cyclones (2021) issued by the DGS form the operational foundation for disaster management in the maritime domain. These SOPs establish step-by-step protocols for early warning, stakeholder coordination, monitoring, and post-event reporting.

Key SOP Actions:

1. **Forwarding Weather Warnings:**
    - DGComm Centre circulates IMD weather advisories to Indian shipping companies, charterers, port authorities, Maritime Boards, and offshore agencies (DGH, ONGC, OISD).
    - Simultaneous communication is made to ICG, MRCC, and the Indian Navy.
2. **Designation of Local Coordinators:**
    - Jurisdictional Principal Officers (POs) nominate **MMD Surveyors** to coordinate activities at the local level.
3. **Port and Operator Responsibilities:**

- Ports and oil operators are responsible for issuing vessel advisories within their jurisdiction.
- In case of non-compliance, the ICG enforces necessary safety measures.

4. **High-Risk Vessel Identification:**
   - Shipping companies identify high-risk vessels such as non-propelled, passenger, arrested, or low-powered vessels and inform DGComm and ICG for priority sheltering.
5. **Situation Reporting (SITREP):**
   - Regular SITREPs are issued every 12 hours (increasing to 6–8 hourly for severe cyclones) summarizing updates from IMD, ports, and offshore installations.
6. **Coordination Meetings:**
   - The Director General of Shipping chairs coordination meetings with oil companies, ports, industry associations (INSA, ICCSA, MASSA, FOSMA, MANSASHIP), and government agencies to ensure unified action.
7. **Emergency Towing Vessels (ETV):**
   - ETVs are mobilised to strategic locations for rapid response and salvage readiness.
8. **Standing Orders and Enforcement:**
   - Standing orders are reviewed every six hours.
   - Vessels within **50–70 nautical miles** of the cyclone's path are warned and monitored for compliance through ICG enforcement.
9. **Action Taken Reports:**

- Affected ports submit detailed **Action Taken Reports** in the prescribed format covering marine, land, and personnel safety measures, infrastructure security, and coordination with state disaster authorities.

2.4.4 Safety in Port Operations: Entry into Enclosed Spaces

Following recent fatal incidents at Indian ports, the Directorate General of Shipping issued a safety circular highlighting the hazards associated with entry into enclosed cargo spaces such as booby hatches and Australian ladders without adequate atmospheric checks.

Two incidents involving stevedores and an excavator operator resulted in loss of life due to oxygen-deficient and methane-rich environments within enclosed holds. Investigations revealed lack of access markings, insufficient coordination with shore personnel, and non-compliance with enclosed space entry procedures.

Mandatory Safety Measures:

1. **Access Control:**
    - Unused or enclosed cargo spaces must remain locked. Access to shore personnel only after authorisation by ship staff.
2. **Marking and Identification:**
    - All access points (booby hatches, ladders) must be clearly numbered and identified.
3. **Interface with Shore Personnel:**
    - Cargo operation briefings must include discussion on restricted areas and emergency procedures.
4. **Medical Equipment and Training:**
    - Vessels must maintain accessible oxygen resuscitators and ensure crew are trained in first aid and CPR.
5. **Briefing of Shore Workers:**

- Stevedores and port workers must receive detailed safety briefings on hazardous spaces prior to commencement of work.

6. **Availability of Medical and Emergency Services:**
    - Ports to ensure ambulance and trauma support at operational berths.
7. **Training and Records:**
    - All port authorities must maintain updated records of authorised stevedores and ensure mandatory training on confined-space hazards.

Compliance with these measures is mandatory for all Indian ports and vessels. Non-compliance will attract enforcement action under applicable maritime safety regulations.

2.4.5 Integration with National and International Frameworks

This sub-pillar aligns with the following institutional and international frameworks:

- **Nation**al Disaster Management Plan (NDMP-2019) — Government of India.
- DGS Disaster Management Plan and SOP for Cyclones (2021 & 2022 updates).
- IMD's Cyclone Warning SOP (2021) — for standardised weather bulletins and four-stage alerts (Pre-Cyclone Watch, Cyclone Alert, Cyclone Warning, Post-Landfall Outlook).
- IMO and WMO protocols under the Worldwide Met-Ocean Information and Warning Service (WWMIWS) ensuring that ships at sea receive and report storm data as per SOLAS obligations.

2.4.6 Expected Outcomes

Implementation of the disaster preparedness framework will:

- Strengthen **port and coastal-state readiness** for cyclonic events.
- Ensure **real-time coordination** between maritime, meteorological, and disaster agencies.

- Enhance **personnel safety** and compliance during port operations.
- Minimise **loss of life, environmental damage, and disruption** to maritime trade.
- Reinforce the role of DGS as the **national coordinating authority** for maritime disaster management.

2.5 Expected Outcomes and Conclusions

2.5.1 Expected Outcomes

Implementation of recommendations and inter-agency coordination through this workshop is expected to result in:

1. **Enhanced Safety at Sea:** Reduction in fishing vessel collisions and improved navigation safety across congested maritime zones.
2. **Legal and Administrative Clarity:** Clear understanding of agency responsibilities, claims handling, and enforcement processes.
3. **Improved Data and Communication Systems:** Establishment of centralized reporting, AIS integration, and digital linkage of fishing vessel registries.
4. **Strengthened Disaster Preparedness:** Port-level readiness aligned with DGS cyclone SOPs and NDMP guidelines.
5. **Stakeholder Sensitization:** Increased awareness among fishing communities, port authorities, and operators regarding their roles in safety and casualty management.
6. **Institutional Coordination:** Stronger operational linkages between DGS, coastal states, and central agencies for real-time response and policy alignment.

2.5.2 Conclusion

The **Pillar 1 Workshop on Maritime Safety and Casualty Response** aims to translate policy direction into operational readiness for Goa's maritime sector. The discussions on **Fishing Vessel Collision**, **Maritime Casualty Legal Advisory**, and **Port Disaster Preparedness** will jointly build a comprehensive understanding of maritime safety challenges and institutional responsibilities.

The outcomes of this workshop will feed into a **national framework of coastal-state coordination**, aligning with the Directorate General of Shipping's broader objectives of promoting **safe, sustainable, and resilient maritime operations**.

By reinforcing compliance, legal preparedness, and cross-sector cooperation, this initiative will contribute to safeguarding India's maritime domain, ensuring that the coastal and fishing communities of Goa are better protected and integrated into a unified maritime safety architect

3. PILLAR II – SHIPBUILDING AND SHIP RECYCLING OPPORTUNITIES

SHIPBUILDING

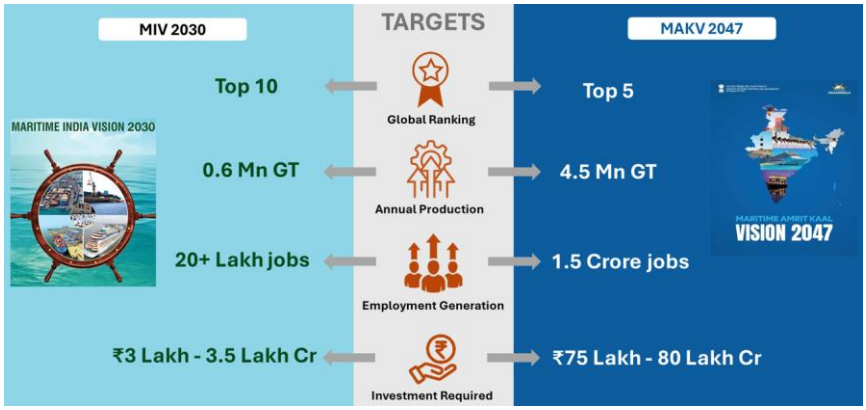
3.1 Introduction: Why Shipbuilding Matters

Shipbuilding is a strategic pillar of India's maritime and industrial ecosystem, with far-reaching implications for economic growth, national security, and self-reliance. As a mother industry for heavy engineering, shipbuilding drives demand across steel, machinery, electricals, design, and advanced manufacturing, creating strong industrial linkages. It is a major generator of direct and indirect employment, supporting a wide spectrum of skilled and semi-skilled jobs.

From a strategic perspective, shipbuilding enables the creation of critical maritime assets required for trade, energy security, defence, and coastal connectivity. With India's growing dependence on energy imports and rising seaborne trade, strengthening domestic shipbuilding capacity is essential to reduce reliance on foreign-built vessels, curb foreign exchange outflow, and enhance control over national tonnage. Recognising these imperatives, shipbuilding forms a core focus area under the Shipbuilding Pillar, aimed at building resilient, competitive, and globally integrated shipbuilding capabilities in India.

3.2 National Vision for Shipbuilding: From MIV 2030 to MAKV 2047

India's national vision for shipbuilding is anchored in a long-term, phased transformation of the sector, aligned with the objectives of **Maritime India Vision (MIV) 2030** and **Maritime Amrit Kaal Vision (MAKV) 2047**. This vision recognises shipbuilding as a strategic industry critical to economic growth, industrial deepening, employment generation, and maritime self-reliance. The approach envisages a calibrated scale-up of capacity, capability, and global competitiveness over the next two decades.



Under **MIV 2030**, India aims to emerge among the **top 10 shipbuilding nations globally**, with an annual shipbuilding production capacity of approximately **0.6 million gross tonnage (GT)**. This phase focuses on laying strong foundations through targeted policy support, development of shipbuilding and ship repair clusters, modernisation of existing shipyards, and creation of a robust domestic supply chain for key inputs such as steel, marine equipment, and design services. A significant emphasis is placed on skill development, technology adoption, and improving ease of doing business to attract both domestic and global players. By 2030, the sector is expected to generate **over 20 lakh direct and indirect jobs**, reflecting its high employment multiplier across manufacturing, logistics, and ancillary industries. The estimated investment requirement during this phase is in the range of **₹3 lakh to ₹3.5 lakh crore**, largely driven by infrastructure creation, technology upgradation, and capacity expansion.

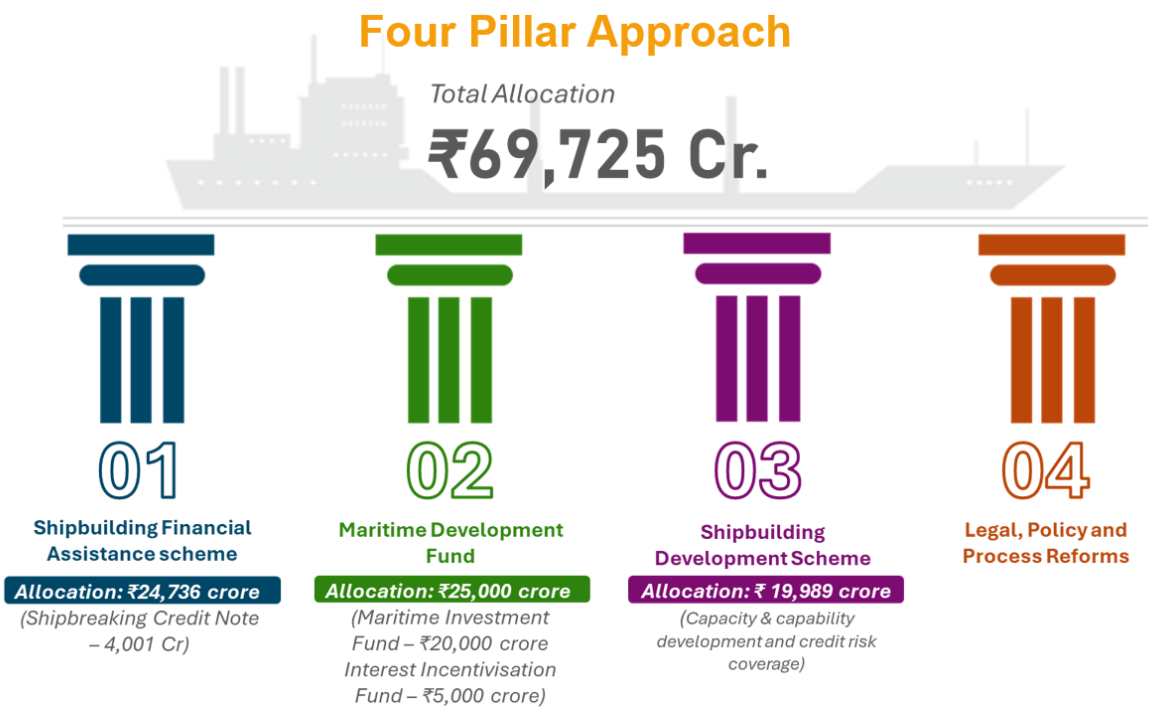
Building on these foundations, **MAKV 2047** presents a bold and aspirational roadmap aligned with India's centenary of independence. The vision targets positioning India among the **top 5 global shipbuilding nations**, with a quantum leap in annual production capacity to about **4.5 million GT**. This phase envisages India becoming a global hub for construction of large, technologically advanced vessels, including container ships, tankers, gas carriers, cruise vessels, and specialised ships. The sector is expected to support employment generation of nearly **1.5 crore jobs**, reflecting the maturation of domestic manufacturing ecosystems, advanced engineering capabilities, and export-oriented growth. Achieving this scale will require substantial investments estimated at **₹75 lakh to ₹80 lakh crore**, driven by mega shipbuilding clusters, advanced dry docks, automation, green ship technologies, and integrated industrial townships around shipbuilding hubs.

Together, MIV 2030 and MAKV 2047 articulate a clear, outcome-oriented national vision that transitions India from a modest shipbuilding presence to a globally competitive maritime manufacturing powerhouse. This vision underscores the strategic importance of coordinated policy action, Centre–State collaboration, private sector participation, and sustained investment to unlock India's full shipbuilding potential.

3.3 Four Pillar Approach for Strengthening India's Shipbuilding Ecosystem

To achieve the ambitious national targets set out under Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047, the Government of India has adopted a **Four Pillar Approach** for holistic development of the shipbuilding and ship repair sector. This approach recognises that shipbuilding is a capital-intensive, long-gestation industry requiring coordinated financial support, institutional mechanisms, capacity

augmentation, and regulatory reforms. Accordingly, a total allocation of **₹69,725 crore** has been earmarked to support the sector through four mutually reinforcing pillars.



3.3.1 Pillar I: Shipbuilding Financial Assistance Scheme (Allocation: ₹24,736 crore)

The Shipbuilding Financial Assistance (SFA) Scheme is designed to enhance the global competitiveness of Indian shipyards by addressing cost disadvantages vis-à-vis leading international shipbuilding nations. The scheme provides direct financial support to shipyards for the construction of vessels, thereby reducing the effective cost of production and encouraging domestic as well as export-oriented shipbuilding.

A key component under this pillar is the **Shipbreaking Credit Note** mechanism, with an allocation of **₹4,001 crore**, which incentivises environmentally compliant ship recycling and links shipbreaking activity with new ship construction. This creates a circular economy within the maritime sector, promotes sustainable practices, and supports domestic yards through credit offsets. Overall, Pillar I plays a critical role in stimulating demand, improving order books of Indian shipyards, and attracting private investment into the sector.

3.3.2 Pillar II: Maritime Development Fund (Allocation: ₹25,000 crore)

The Maritime Development Fund (MDF) addresses one of the most persistent challenges faced by the shipbuilding industry—**access to affordable and long-term finance**. Under this pillar, a dedicated **Maritime Investment Fund of ₹20,000 crore** has been envisaged to catalyse investments in shipbuilding, ship repair, ports, and allied maritime infrastructure.

In addition, an **Interest Incentivisation Fund of ₹5,000 crore** has been provided to reduce borrowing costs for shipyards and maritime enterprises. By lowering financial risk and improving credit availability, this pillar aims to crowd in private capital, encourage large-scale infrastructure creation, and support technology-intensive investments such as automation, advanced dry docks, and green ship technologies. Pillar II thus strengthens the financial backbone of the maritime sector and ensures sustained investment momentum.

3.3.3 Pillar III: Shipbuilding Development Scheme (Allocation: ₹19,989 crore)

Pillar III focuses on **capacity and capability development** across the shipbuilding value chain. This includes support for the creation of **mega shipbuilding clusters**, modernisation and expansion of existing shipyards, development of common infrastructure, and enhancement of ancillary and supplier ecosystems.

A significant emphasis is placed on **credit risk coverage mechanisms**, which reduce lender exposure and enable shipyards to undertake large and complex vessel construction projects. This pillar also supports technology upgradation, skill development, and adoption of global best practices in design, production, and quality assurance. By addressing structural and operational gaps, Pillar III aims to transform Indian shipyards into globally competitive facilities capable of building large, sophisticated vessels.

3.3.4 Pillar IV: Legal, Policy and Process Reforms

The fourth pillar underpins the entire framework by focusing on **systemic reforms** required to improve ease of doing business and long-term sectoral sustainability. This includes streamlining approval processes, simplifying contracting and procurement norms, harmonising regulatory frameworks, and aligning policies across central and state governments.

Pillar IV also emphasises rationalisation of taxation, standardisation of contracts, dispute resolution mechanisms, and greater clarity in land acquisition and environmental clearances. These reforms are essential to reduce project delays, improve investor confidence, and ensure efficient implementation of shipbuilding projects. By creating a predictable and transparent policy environment, this pillar enables the effective functioning of the financial and developmental instruments introduced under the other pillars.

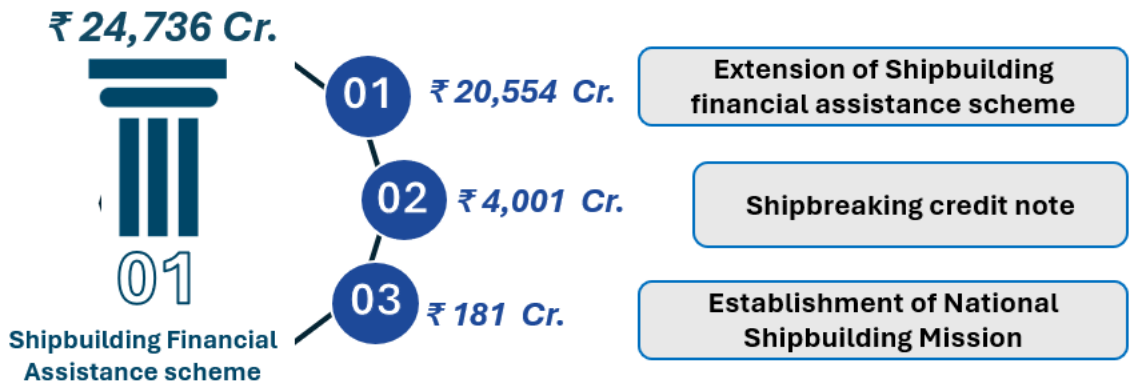
3.3.5 Integrated Impact of the Four Pillars

Together, the Four Pillar Approach provides a comprehensive and balanced framework that addresses financial viability, institutional support, physical capacity creation, and regulatory efficiency. The integrated design ensures that short-term demand stimulation is complemented by long-term structural reforms, positioning India to emerge as a

globally competitive shipbuilding hub while advancing the national objectives of *Atmanirbhar Bharat*, employment generation, and maritime self-reliance.

3.4 Shipbuilding Financial Assistance Scheme (SFAS): Structure, Incentives and State-Level Relevance

The **Shipbuilding Financial Assistance Scheme (SFAS)** constitutes a critical component of the Four-Pillar Approach under Pillar 2 – Shipbuilding, with a total allocation of **₹24,736 crore**. The scheme is designed to enhance the cost competitiveness of Indian shipyards, stimulate domestic shipbuilding demand, promote circular economy practices through ship recycling, and establish robust institutional mechanisms for sectoral coordination. For coastal States, SFAS provides a direct lever to attract shipbuilding investments and accelerate the development of shipbuilding clusters.



3.4.1 Key Components of the Scheme

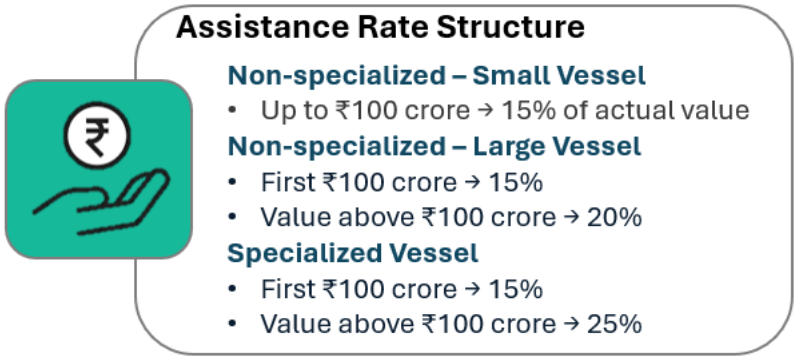
The total allocation under SFAS is distributed across three major components:

1. **Extension of Shipbuilding Financial Assistance Scheme – ₹20,554 crore:** This component extends the existing financial assistance framework to new shipbuilding contracts. Assistance is linked to the actual contract value of vessels constructed in Indian shipyards and is aimed at offsetting cost disadvantages arising from higher capital costs, taxation, and input prices compared to global competitors.
2. **Shipbreaking Credit Note – ₹4,001 crore:** To promote integration between shipbreaking and shipbuilding, a credit note equivalent to **40% of the scrap value** of a vessel is issued to the ship-owner when the ship is scrapped at an Indian yard. This credit note can be reimbursed against the cost of constructing a new vessel

at an Indian shipyard. This mechanism encourages recycling of end-of-life vessels within India while creating a direct pipeline for new ship orders.

3. **Establishment of National Shipbuilding Mission – ₹181 crore:** This component supports the creation of a dedicated institutional framework to coordinate policy implementation, monitor outcomes, and align central and State-level initiatives related to shipbuilding.

3.4.2 Assistance Rate Structure



The scheme provides differentiated assistance based on vessel type and contract value:

- **Non-specialised Small Vessels (up to ₹100 crore)**
  - Assistance of **15% of actual contract value**
- **Non-specialised Large Vessels**
  - First ₹100 crore: **15% assistance**
  - Value above ₹100 crore: **20% assistance**
- **Specialised Vessels** (such as LNG carriers, dredgers, offshore vessels)
  - First ₹100 crore: **15% assistance**
  - Value above ₹100 crore: **25% assistance**

This graded structure incentivises construction of larger and more technologically complex vessels in Indian yards.

3.4.3 Domestic Content Requirement (DCR)

SFAS strongly promotes localisation and domestic manufacturing through a defined Domestic Content Requirement:

- **Less than 30% domestic content**: No SFAS support
- **30% to less than 40% domestic content**: Pro-rata assistance
- **40% or more domestic content**: Full assistance

This provision encourages the development of indigenous component manufacturing, vendor ecosystems, and MSME participation around shipyards.

3.4.4 Implications for Coastal States

For coastal States, SFAS presents an opportunity to position their shipyards as preferred destinations for new vessel orders. States can play a facilitative role by ensuring timely approvals, supporting vendor park development, enabling ship recycling facilities, and aligning skilling initiatives with specialised vessel requirements. Effective State-level implementation will be essential to fully leverage the financial incentives under SFAS and translate them into sustained industrial and employment growth.

3.5 Shipbuilding Development Scheme (SBDS): Relevance and Opportunities for Coastal States

The Shipbuilding Development Scheme (SBDS) is a critical pillar of India's shipbuilding strategy, designed to address structural gaps in capacity, capability, technology, and risk mitigation within the domestic shipbuilding ecosystem. With a total outlay of **₹19,989 crore**, SBDS directly supports the creation and expansion of shipbuilding infrastructure while reducing financial and operational risks for investors. For coastal states, the scheme presents a strategic opportunity to anchor maritime-led industrial growth, employment generation, and regional economic diversification.

Capital support for greenfield shipbuilding capacity (₹9,930 crore) is a core component of SBDS and is particularly relevant for coastal states with available waterfront land, deep-draft access, and proximity to ports. This support enables states to attract private investment for establishing new shipyards, including facilities capable of building large commercial vessels, specialised ships, and future-ready green vessels. Coastal states can leverage this component to develop maritime industrial clusters aligned with port-led development and Sagarmala objectives.

Capital assistance for existing and brownfield shipyards (₹8,261 crore) allows coastal states with legacy shipbuilding facilities to modernise and expand production capacity. This includes investments in advanced fabrication infrastructure, dry docks, automation, and digital shipbuilding technologies. By supporting upgradation, SBDS helps coastal states revive underutilised assets, enhance productivity, and improve the global competitiveness of existing yards, while retaining skilled local workforces.

A forward-looking element of the scheme is the **capability development initiative through the India Ship Technology Centre (ISTC) (₹305 crore)**. ISTC is envisioned as a national hub for ship design, engineering, technology standardisation, and R&D. Coastal states stand to benefit from access to advanced design capabilities, technology transfer, and skilling support, enabling local shipyards and MSMEs to move up the value chain and participate in complex vessel construction.

To address risk perceptions in shipbuilding, SBDS provides **shipbuilding risk coverage (₹1,443 crore)** through pre-shipment insurance, post-shipment insurance, and vendor default insurance. This component is especially significant for coastal states seeking to attract first-time investors or expand MSME participation, as it lowers financial risks across the supply chain and improves access to institutional finance.

Finally, **administrative support (₹50 crore)** ensures effective scheme implementation, monitoring, and coordination between the Centre, states, and industry stakeholders.

Overall, SBDS empowers coastal states to play a proactive role in India's shipbuilding resurgence by providing targeted financial support, technology access, and risk mitigation—enabling them to position shipbuilding as a cornerstone of coastal economic development.

3.6 Brownfield and Greenfield Expansion under the Shipbuilding Development Scheme

The Shipbuilding Development Scheme (SBDS) adopts a dual-track approach to capacity creation by supporting both **brownfield expansion of existing shipyards** and **greenfield development of new shipbuilding clusters**. This balanced framework ensures rapid scale-up of India's shipbuilding capacity while simultaneously building long-term, world-class infrastructure aligned with global standards.

3.6.1 Brownfield Expansion: Modernising Existing Shipyards

Brownfield expansion focuses on strengthening and upgrading **existing Indian shipyards** to enhance efficiency, productivity, and competitiveness. The objective is to enable operational shipyards to scale up capacity, adopt modern technologies, and handle more complex and higher-value vessel construction.

Eligibility under the brownfield component is limited to Indian shipyards that have been **operational for a minimum of three years**, with expansion undertaken under the same legal entity. Capital assistance is provided up to **25% of the fair assessed project cost**, based on duly appraised DPRs, IEAs, or CA-certified estimates. This ensures fiscal discipline while supporting genuine capacity augmentation.

The scheme supports a wide range of critical infrastructure components, including:

- Channel and basin development to improve navigability and vessel access
- Construction and upgradation of dry docks and slipways
- Installation of ship lifts and floating docks
- Development of piers, jetties, and material handling systems

- Procurement of heavy cranes and yard equipment
- Creation of block and modular fabrication facilities

For coastal states with legacy shipyards, this component provides a pathway to **revitalise underperforming assets**, attract new orders, retain skilled manpower, and integrate local MSMEs into the shipbuilding value chain.

3.6.2 Greenfield Expansion: Creating World-Class Shipbuilding Clusters

The greenfield component of SBDS is aimed at developing **integrated shipbuilding clusters** with shared infrastructure and advanced technologies. These clusters are envisioned as large-scale, globally competitive ecosystems capable of constructing large commercial vessels, specialised ships, and next-generation green vessels.

A key feature of greenfield development is the presence of an **Anchor Shipyard** with a **minimum annual capacity of 0.5 million GT**, ensuring scale, credibility, and long-term viability. The scheme provides **100% upfront grant support for eligible common infrastructure components**, significantly reducing entry barriers for large investments.

Supported components include:

- Breakwaters, wave breakers, and tide-independent basins
- Channel and basin development
- Internal road, power, water, and utility infrastructure
- Common maritime assets and shared facilities
- Regional Shipbuilding Capability Centres for design, skilling, and technology support

Greenfield clusters are implemented through an **SPV structure**, involving Central and State Government agencies along with shipyard and private partners. While the SPV develops trunk infrastructure, individual shipyards focus on core production facilities, ensuring efficient risk sharing and governance.

For coastal states, greenfield shipbuilding clusters offer a transformational opportunity to anchor **port-led industrialisation**, generate large-scale employment, and position themselves as global shipbuilding hubs.

Together, brownfield and greenfield expansion under SBDS provide a comprehensive framework for accelerating India's shipbuilding growth while enabling coastal states to align infrastructure development with national maritime priorities.

3.7 Cluster-Based Approach: Concept, Relevance and Governance Imperatives

3.7.1 Concept and Rationale of a Maritime Industrial Cluster

A maritime industrial cluster is a geographically co-located ecosystem comprising **anchor shipyards**, **ancillary and supplier units**, **shared infrastructure**, and **supporting social and urban facilities**, planned and operated as an integrated whole. The core idea of the cluster approach is to move away from fragmented, stand-alone facilities towards a **shared-capacity, network-driven model** that enhances productivity, reduces costs, and accelerates capability development.

In the context of greenfield capacity creation, clustering allows multiple shipyards and ancillary units to leverage **common maritime frontage, breakwaters, dredging, utilities, testing facilities, and logistics infrastructure**, thereby improving capital efficiency and operational viability.

3.7.2 Relevance of Clusters in Achieving Capacity and Capability Targets

The cluster-based approach is critical for achieving national targets related to **shipbuilding, ship repair, and maritime industrial expansion** due to the following reasons:

- **Optimised Asset Utilisation:** High-cost marine infrastructure such as dry docks, heavy-lift cranes, waterfront access, and testing facilities can be shared across multiple players, improving utilisation and reducing duplication.
- **Scalable Capacity Creation:** Clusters allow phased expansion of yards and ancillaries, enabling rapid scaling of capacity in response to market demand.
- **Strengthening Domestic Value Chains:** Proximity of Tier 1, Tier 2, and Tier 3 suppliers supports localisation of components, reduces lead times, and enhances self-reliance.
- **Technology and Skill Upgradation:** Shared R&D centres, training institutes, and testing facilities accelerate technology absorption and workforce skilling.
- **Improved Global Competitiveness:** Integrated clusters reduce production costs, improve delivery timelines, and enhance quality standards, positioning Indian yards competitively in global markets.

By aggregating demand, skills, and infrastructure, clusters serve as **multipliers**, enabling faster and more sustainable achievement of sectoral growth targets.

3.7.3 Idea and Key Components of a Maritime Cluster

A well-functioning maritime cluster typically comprises the following components:

1. **Anchor Shipyard(s)**
   Large shipbuilding and/or ship repair yards that act as demand generators and technology anchors for the cluster.
2. **Ancillary and Supplier Ecosystem**
   Tier 1, Tier 2, and Tier 3 suppliers providing hull fabrication, machinery, electrical systems, coatings, outfitting, logistics, and specialised services.
3. **Common Cluster Facilities**
   - Shared dry docks and wet berths
   - Testing and certification facilities
   - R&D and design centres
   - Skill development and training institutes
   - Warehousing and logistics hubs
4. **Maritime and Connectivity Infrastructure**
   - Breakwaters, dredging, and navigational channels
   - Road, rail, and utility connectivity
   - Digital and communication infrastructure
5. **Trunk and Social Infrastructure**
   - Housing, healthcare, education, and urban amenities
   - Worker accommodation and transport systems

The integration of these elements ensures **operational efficiency, workforce stability, and long-term sustainability** of the cluster.

3.7.4 Importance of State Collaboration and Institutional Coordination

State collaboration is a **foundational requirement** for the success of maritime clusters, given the scale, complexity, and cross-sectoral nature of interventions involved. Effective cluster development requires:

- **Land Assembly and Zoning Support:** States play a key role in providing contiguous land parcels, coastal zoning approvals, and environmental clearances.
- **Infrastructure Provisioning:** Development of external connectivity, utilities, and social infrastructure largely falls within the State's mandate.
- **Policy Alignment and Incentives:** Harmonisation of central and state policies, fiscal incentives, and regulatory frameworks to improve investor confidence.

- **Single-Window Governance Mechanisms:** Coordinated approvals across departments to reduce timelines and transaction costs.
- **Public–Private Collaboration:** States act as facilitators, enabling private investment while ensuring long-term regional development objectives are met.

Strong Centre–State coordination ensures that clusters evolve not merely as industrial enclaves, but as **integrated maritime growth hubs** aligned with national strategic and economic priorities.

3.8 Konkan Maritime Cluster, Goa: Anchoring Ancillary Strengths and Enabling Scale

3.8.1 Overview and Strategic Context

The **Konkan Maritime Cluster (KMC)** represents India's first formal maritime industrial cluster, anchored in Goa's long-standing legacy of **MSME-led shipbuilding, ship repair, and marine equipment manufacturing**. Developed through a collaborative effort involving industry stakeholders and supported by the Government of Goa, MoPSW (through DGS), and the Ministry of MSME, the cluster is primarily oriented towards **ancillary and supplier development**, with the Common Facility Centre (CFC) as its institutional backbone.

The cluster reflects a bottom-up industrialisation model, wherein **small and medium enterprises are aggregated, formalised, and enabled** through shared infrastructure, technology access, and institutional support.

3.8.2 Efforts Undertaken under the Konkan Maritime Cluster

Key efforts under the Konkan Maritime Cluster focus on strengthening the ancillary ecosystem and improving MSME competitiveness:

- **Creation of Shared Industrial Infrastructure:** Establishment of a Common Facility Centre at Verna Industrial Estate providing access to fabrication, testing, and processing facilities that are otherwise capital intensive for individual MSMEs.
- **MSME Aggregation and Formalisation:** Bringing together marine equipment manufacturers, component suppliers, and service providers into a structured ecosystem.
- **Capability and Quality Enhancement:** Supporting compliance with national and international standards through shared testing, certification, and process improvements.

- **Import Substitution and Atmanirbhar Bharat:** Encouraging domestic manufacturing of marine equipment and components to reduce reliance on imports.
- **Institutional Support and Governance:** Leveraging coordinated support from State and Central Ministries to address regulatory, financial, and infrastructure constraints.

These efforts have strengthened Goa's position as a **specialised ancillary and marine manufacturing hub**, particularly for small and medium shipyards and repair facilities.

3.8.3 Relevance of Clusters for Ancillary-Led Growth

The Konkan Maritime Cluster demonstrates the importance of a cluster-based approach for ancillary-led sectors due to:

- **Cost Efficiency:** Shared facilities significantly reduce capital expenditure for MSMEs.
- **Supply Chain Integration:** Proximity of suppliers improves coordination, reduces lead times, and enhances reliability.
- **Skill and Technology Spillovers:** Co-location enables faster diffusion of skills, best practices, and incremental innovation.
- **Resilience and Sustainability:** Clusters provide scale and stability to MSMEs, improving their ability to withstand market fluctuations.

However, while ancillary clusters are essential, their long-term growth and sustainability are intrinsically linked to the presence of **large demand anchors**.

3.8.4 Need for Mega-Capacity Shipyards to Enable Scale

For Goa's maritime ecosystem to transition from **ancillary strength to global competitiveness**, the development and expansion of **mega-capacity shipbuilding and ship repair yards** is critical. Large yards serve as:

- **Demand Anchors:** Generating sustained and predictable demand for ancillaries and service providers.
- **Technology Leaders:** Driving higher standards in design, quality, automation, and environmental compliance.
- **Capacity Multipliers:** Enabling high-volume and complex vessel construction and repair that smaller yards cannot support independently.
- **Export Catalysts:** Positioning the region to participate in global shipbuilding and repair markets.

Without such anchor shipyards, ancillary clusters risk remaining **fragmented and demand-constrained**, limiting their growth potential.

3.8.5 Strategic Significance for Goa

For Goa, the Konkan Maritime Cluster offers a strong foundation to:

- Consolidate its **MSME-driven maritime manufacturing base**
- Transition towards a **cluster–anchor model**, where ancillaries and mega shipyards evolve symbiotically
- Leverage coastal and industrial strengths while minimising ecological and land-use pressures through planned clustering
- Align State-level industrial development with national maritime ambitions

A calibrated expansion strategy—combining **ancillary-focused clusters like KMC with the planned development of large-capacity shipyards**—can position Goa as a **high-value maritime manufacturing and ship repair hub**, rather than a collection of isolated industrial units.

3.9 Comprehensive Shipbuilding Portal

The Comprehensive Shipbuilding Portal is envisioned as a transformative digital platform designed to unify and streamline the diverse elements of India's shipbuilding and ship-repair ecosystem. Recognizing the fragmented nature of industry information, varying levels of technological adoption, and the growing need for coordinated stakeholder engagement, the portal aims to serve as a centralized, future-ready digital infrastructure that supports the strategic growth of the maritime sector.

At its core, the portal brings together a wide spectrum of industry capabilities, regulatory resources, technical knowledge, and collaborative interfaces under a single digital umbrella. This integration is intended to empower shipyards, design agencies, equipment manufacturers, training institutions, researchers, finance and insurance entities, and policy makers with seamless access to information and tools that enable better decision-making, enhanced productivity, and greater innovation.

The platform is structured around eight interlinked modules, each addressing a critical dimension of the shipbuilding value chain. The **Capability Insights** module offers a transparent showcase of industry strengths, ongoing projects, achievements, and standardized capability assessment frameworks, enabling stakeholders to identify opportunities and benchmark performance. The **Collaboration Hub** creates an interactive environment where industry professionals can exchange knowledge, engage

in Q&A forums, participate in closed group discussions, and foster a culture of collective problem-solving essential for a technologically evolving sector.

Workforce development forms a major pillar of India's maritime ambitions, which is reflected in the **Training & Certifications** module that aggregates information on courses, institutes, and skill-building pathways. Complementing this is the **Innovation Centre**, a dedicated space to spotlight emerging technologies, R&D initiatives, and advanced solutions that can shape the next generation of shipbuilding processes. The portal also extends support through the **Finance & Insurance** module, which consolidates information on funding schemes, incentives, and risk-mitigation options, ensuring that shipyards and ancillary units—especially MSMEs—have greater financial clarity and access.

Another critical component is the **Technical Library**, a comprehensive repository of technical documents, standards, guidelines, and best practices that ensures consistency, compliance, and safety across the sector. The **Regulatory & Compliance** module further reinforces this by offering up-to-date information on maritime regulations, safety requirements, and statutory expectations, helping stakeholders navigate the regulatory environment with ease. Finally, the **Industry Directory** provides a consolidated listing of shipyards, design houses, suppliers, and related service providers, creating a digital marketplace that increases visibility, competitiveness, and inter-industry linkages.

The portal's objectives are closely aligned with national maritime strategies, including the Maritime India Vision 2030. By enhancing global competitiveness, improving collaboration between industry and government, strengthening workforce capabilities, promoting innovation and R&D, and streamlining access to technical and financial resources, the portal seeks to create an enabling ecosystem for accelerated growth. Beyond technical integration, it also symbolizes a shift towards a digitally empowered maritime sector where transparency, accessibility, and collaboration drive long-term advancement.

In essence, the Comprehensive Shipbuilding Portal is more than a digital interface—it is an ecosystem enabler. It combines information symmetry, collaborative technology, and strategic insight to support India's aspiration of becoming a global leader in shipbuilding and ship repair. As it evolves, the platform will continue to play a pivotal role in bringing together stakeholders, promoting operational excellence, and shaping a resilient, innovative, and internationally competitive maritime future for the country.

SHIP RECYCLING

3.10 Ship Recycling: Background

3.10.1 Introduction and Global Context

Ship recycling represents the terminal yet transformative stage of a vessel's life cycle. It enables the safe dismantling of end-of-life ships and the recovery of reusable materials in a controlled, environmentally responsible manner. Beyond its operational role, ship recycling acts as a catalyst for the **circular economy**, supplying high-quality scrap steel to domestic industries, conserving natural resources and reducing dependence on imported raw materials.

Globally, more than **800 vessels** are recycled every year and almost **97 to 98 percent** of a ship's mass, including steel, machinery and fittings are recoverable. This makes ship recycling one of the most resource-efficient industrial activities in the maritime value chain.

India has emerged as the **world leader in ship recycling**, accounting for **30 to 35 percent of global tonnage**. The **Alang - Sosiya cluster in Gujarat**, recognised as the world's largest ship-recycling hub, houses over **115 facilities certified to the Hong Kong Convention (HKC)** standards. It handles nearly **6.2 million gross tonnes (GT)** of ship recycling annually, employing around **15000 workers directly** and sustaining approximately **1.5 lakh livelihoods** through allied industries such as transport, steel re-rolling, component resale and logistics.

The entry into force of the **Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (HKC)** on **26 June 2025** marks a historic global transition. The Convention establishes uniform international standards governing ship design, construction, operation and preparation for recycling, as well as mandatory requirements for the **Inventory of Hazardous Materials (IHM)**, **Ship Recycling Plans (SRP)** and facility authorisation.

India, one of the earliest signatories and among the first nations to align domestic regulations through the **Ship Recycling Act 2019** and **Ship Recycling Rules 2021**, is uniquely positioned to lead global HKC implementation. However, with nearly all national capacity concentrated in Gujarat, there is an imperative to **expand ship-recycling capacity across coastal states**, ensuring balanced regional growth, logistical efficiency and nationwide compliance coverage.

3.10.2 Ship Recycling in India's Maritime Context

Ship recycling occupies a central place within India's long-term maritime and industrial development frameworks—specifically the **Maritime India Vision 2030 (MIV 2030)**, **Maritime Amrit Kaal Vision 2047 (MAKV 2047)** and the **Blue Economy Policy (MoES**

2021), as a core driver of sustainable industrialisation, green employment and circular resource utilisation.

Sustainability

Recycling steel through ship dismantling delivers major reductions in greenhouse-gas emissions when compared with virgin steel production. Each tonne of recycled steel emits only **0.53 tonnes of CO_2**, versus **2.54 tonnes CO_2** for primary steel manufacturing. This results in potential national savings of **up to 20 million tonnes of CO_2 per year**.

Additionally, every tonne of recycled ship steel prevents extraction of approximately **1,370 kg iron ore**, **780 kg coal** and **270 kg limestone**, directly supporting India's resource-efficiency goals and reducing the ecological burden of mining and transport.

Economic Value

By 2030, ship recycling is projected to contribute **₹45,000 crore** annually—about **0.15 percent of India's GDP** and an even greater share for coastal-state economies. The sector also stimulates an extensive secondary value chain in **logistics, warehousing, fabrication, waste-handling and component resale**, strengthening India's **port-led industrialisation** under Sagarmala.

Industrial Linkages

Ship recycling supplies roughly **15 percent of India's scrap-steel demand**, feeding electric-arc and induction-furnace units, re-rolling mills, foundries and shipyards. With the introduction of the **Ship Recycling Credit Note (SRCN)** mechanism under **Shipbuilding Financial Assistance Scheme (SBFA 2.0)**, the sector now links recycling directly to **domestic shipbuilding**, creating a closed-loop cycle—"**Recycle in India – Build in India**".

Employment and Skill Development

Being highly labour-intensive, ship recycling generates large-scale employment: about **15000 workers directly** and over **1.5 lakh indirect livelihoods** nationwide. Expansion to additional coastal states could add **3,000 to 5,000 direct jobs per state**, besides broader opportunities for green-skill certification through IMU campuses, IRS academies and ITIs aligned with HKC safety modules.

3.10.3 Regulatory Framework

India's ship-recycling ecosystem operates within a structured, multi-layered regulatory regime aligning international commitments with national legislation and state-level enforcement mechanisms.

Level	Instrument / Agency	Scope and Function

International	*Hong Kong Convention (2009)* (in force 2025)	Establishes global standards for safe and environmentally sound recycling; mandates IHM, SRP and certification of authorised yards.
National	*Ship Recycling Act 2019*	Gives domestic effect to HKC; designates DGS as National Authority.
	Ship Recycling Rules 2021	Defines yard authorisation, waste management, worker safety, inspections, penalties and reporting.
	Merchant Shipping Act 2025	Integrates recycling within India's maritime-infrastructure governance and harmonises port, registration and environmental functions.
State	*Maritime Board / SPCB Jurisdiction*	Handles site clearance, CRZ compliance, CTE/CTO consents, safety audits and hazardous-waste transport to authorised TSDFs.

The Directorate General of Shipping (DGS) administers the national authorisation and compliance framework, while State Maritime Boards and State Pollution Control Boards (SPCBs) act as Competent Authorities under delegated powers to process applications, issue environmental consents and monitor adherence to HKC-aligned norms. This decentralised model ensures consistent enforcement across all maritime states while maintaining a uniform national standard.

3.10.4 Governance and Oversight Mechanism

A coordinated governance architecture ensures policy coherence, operational accountability and continuous monitoring from the national to the yard level.

Institution	Role and Responsibility
Ministry of Ports, Shipping & Waterways (MoPSW)	Provides overall policy direction and strategic oversight.
Directorate General of Shipping (DGS) *(National Authority)*	Acts as National Authority for Ship Recycling under Ship Recycling Act 2019, responsible for implementing HKC in India. Provides technical guidance, issues and oversees authorizations, approves compliance frameworks, supervises Recognized Organizations and ensures national reporting and coordination with IMO.
Captain of Ports, Government of Goa	Acts as the nodal state authority for maritime regulation and port administration, coordinating site identification, navigational safety approvals and operational oversight for ship

(State Maritime Authority)	recycling and end-of-life vessel management activities within the State's maritime jurisdiction.
Goa State Pollution Control Board (GSPCB)	Issues CTE and CTO under Environment (Protection) Act 1986; conducts environmental audits, hazardous-waste inspections and enforces zero-discharge norms.
Recognised Organisations	Conduct independent facility audits, issue HKC Certificates of Compliance and verify ISO 9001/14001/45001/30000 management systems.
Training Institutes (IMU / IRS Academy / ITIs)	Deliver skill development, safety induction and refresher training; support certification and alignment with DGS curricula.

The Directorate General of Shipping retains overarching policy authority and international reporting responsibility to the IMO. At the state level, maritime administration and operational coordination are exercised through the Captain of Ports, Government of Goa, with environmental compliance and waste-management oversight vested in the Goa State Pollution Control Board.

Given Goa's environmentally sensitive coastline and riverine maritime setting, any ship recycling or end-of-life vessel management activity would be subject to heightened inter-departmental coordination, strict regulatory scrutiny and case-specific approvals, consistent with national legislation and CRZ requirements.

To ensure effective coordination and oversight, a **Joint Monitoring Committee (JMC)** comprising representatives from MoPSW, DGS, Captain of Ports (Goa), GSPCB and Recognised Organisations may be constituted to meet periodically to:

- Review facility-wise compliance reports and audit findings;
- Monitor environmental-performance indicators and adherence to zero-discharge norms;
- Recommend corrective actions and process improvements, where required; and
- Facilitate consolidated reporting on India's HKC implementation.

This multi-tier oversight framework ensures transparency, accountability and regulatory consistency, while enabling state-specific implementation aligned with national standards, thereby reinforcing India's position as a credible and globally benchmarked jurisdiction for safe, sustainable and environmentally sound ship-recycling governance.

3.11 Present State of Ship Recycling in India

3.11.1 Current Landscape and National Capacity

India today stands as the **global leader in ship recycling**, handling nearly **30–35 percent of the world's dismantling tonnage**. The sector has evolved over four decades into a

highly structured industry that contributes simultaneously to industrial productivity, environmental sustainability and coastal livelihoods.

The **Alang–Sosiya Ship Recycling Cluster in Gujarat** is the epicentre of India's ship recycling activity, accounting for **97–98 percent of the country's total capacity**. Stretching across approximately **12- 14 kilometres of coastline**, Alang is the **largest ship-recycling yard in the world**, hosting over **115 facilities certified to the Hong Kong Convention (HKC)** standards. Collectively, these facilities process more than **6.2 million gross tonnes (GT)** of end-of-life ships annually.

The cluster employs around **15000 workers directly,** including cutters, fitters, welders, riggers, crane operators and supervisors and sustains over **1.5 lakh indirect livelihoods** in ancillary sectors such as transport, logistics, waste management and re-rolling mills. Over the years, **technical assistance programmes** supported by the **Directorate General of Shipping (DGS)**, the **Gujarat Maritime Board (GMB)** and development partners under the **Ferrous Scrap Development Fund (FSDF)** have enabled Alang to upgrade its environmental, health and safety (EHS) infrastructure.

Recycling in India contributes directly to **domestic resource efficiency** by supplying between **4 to 5 million tonnes of recycled steel per year**, which constitutes approximately **15 percent of India's total scrap-steel demand**. This steel becomes input material for electric arc furnaces, induction furnaces and re-rolling mills across western and northern India, supporting India's "**Green Steel Transition**" while reducing import dependence.

India's leadership has been further strengthened by the **Ship Recycling Act, 2019** and the **Ship Recycling Rules, 2021**, which domesticated HKC provisions years ahead of the Convention's formal entry into force in June 2025. This proactive approach has enabled Indian yards to achieve early HKC compliance, attracting international shipowners and classification societies seeking safe, environmentally sound dismantling options.

3.11.2 Concentration and Structural Limitations

While India's dominance in ship recycling is globally acknowledged, the geographic concentration of nearly all facilities in Gujarat introduces multiple structural challenges that affect both the eastern and western seaboards.

- **Geographical Imbalance**

With over 98 percent of national capacity located on the west coast at Alang–Sosiya, vessels operating in the Bay of Bengal, including coastal cargo, offshore and fishing vessels—must be towed more than 800 to 1000 nautical miles for recycling. This imposes significant logistical and cost inefficiencies, increasing towing expenses by up to 25 percent and exposing vessels to higher navigational risk, particularly during the monsoon season.

On the western seaboard as well, the absence of geographically distributed recycling or end-of-life vessel management facilities results in smaller coastal and inland vessels being either towed long distances, laid up indefinitely or dismantled in an informal and non-compliant manner, especially in states with riverine and minor-port operations.

- **Structural Gaps on the West Coast Beyond Gujarat**

While Alang serves as the national recycling hub, other western coastal states such as Goa, Maharashtra and Karnataka do not currently possess authorised or HKC-aligned facilities for managing end-of-life vessels.

In states like Goa, which have a high density of:

- small and medium coastal vessels,
- barges, tugs and inland craft and
- riverine and minor-port maritime operations,

the absence of formal end-of-life vessel management mechanisms has led to:

- prolonged anchoring or abandonment of obsolete vessels,
- informal dismantling practices with environmental and safety implications and
- regulatory challenges for port and environmental authorities.

This highlights that concentration at Alang alone does not adequately address the lifecycle management needs of India's diverse domestic fleet.

- **Capacity Saturation and Expansion Constraints at Alang - Sosiya**

The Alang - Sosiya cluster has reached near-optimal utilisation in terms of land availability, environmental carrying capacity and waste-handling infrastructure. Further large-scale expansion is constrained by:

- limited contiguous coastal land;
- environmental buffer and CRZ considerations; and
- finite capacity of downstream waste-treatment and disposal facilities.

These constraints restrict scalability and increase the systemic risk of over-dependence on a single cluster for national compliance.

- **Uneven Regional Development and Employment Distribution**

India's current ship-recycling geography has resulted in uneven distribution of economic and employment benefits. Eastern coastal states such as Andhra Pradesh, Odisha and Tamil Nadu possess:

- extensive coastlines,
- industrial corridors and port infrastructure and
- renewable-energy potential,

yet remain underrepresented in this sector.

At the same time, western states like Goa, with established maritime ecosystems focused on vessel operations, repair and logistics, remain excluded from the formal recycling value chain. This limits opportunities for regional skill development, regulated employment and integration with local maritime industries.

- **Environmental and Regulatory Risks from Informal End-of-Life Practices**

In the absence of regionally accessible and appropriately scaled facilities, end-of-life vessels, particularly smaller domestic vessels, are often managed through informal or ad-hoc arrangements. Such practices pose risks related to:

- hazardous material handling;
- riverine and coastal pollution;
- occupational safety; and
- regulatory enforcement.

This challenge is especially acute in environmentally sensitive coastal and riverine states, where even small-scale non-compliance can have disproportionate ecological and social impacts.

Compliance Scalability under the Hong Kong Convention

With the entry into force of the Hong Kong International Convention (HKC), shipowners are increasingly seeking regionally accessible, certified and compliant recycling options. India must therefore demonstrate:

- geographically distributed compliance capability;
- differentiated facility models suited to vessel type and local conditions; and
- consistent regulatory oversight across both coasts.

Failure to evolve beyond a single-cluster model could constrain India's ability to absorb future international demand and weaken its competitive position vis-à-vis emerging compliant recycling hubs in Bangladesh, Turkey and China.

3.11.3 Environmental and Economic Performance

The ship-recycling industry contributes substantially to **India's climate and economic goals**. The environmental and resource-saving benefits are quantifiable and form the foundation of India's circular-economy transition.

Parameter	**Current (National)**	**Potential Contribution**
Annual Recycling Capacity	6.2 million GT	Limited, focused on small and medium domestic vessels
CO_2 Emissions Avoided	20 million tonnes/year	Indirect contribution through compliant lifecycle closure
Steel Scrap Supplied	4–5 million tonnes/year	Marginal volumes; compliance-driven recovery
Jobs (Direct + Indirect)	~1.7 lakh	Localised skilled and semi-skilled employment

GDP Contribution	₹30,000 crore/year	Governance and environmental value rather than scale

Each tonne of recycled steel avoids the mining and processing of approximately **1,370 kg of iron ore**, **780 kg of coal** and **270 kg of limestone**, resulting in enormous savings of natural resources and energy. In emission terms, ship recycling emits only **0.53 tonnes of CO_2 per tonne of steel**, compared to **2.54 tonnes** from conventional virgin-steel production.

This translates to a **net emission reduction of up to 20 million tonnes of CO_2 annually,** a contribution directly aligned with India's **Nationally Determined Contributions (NDCs)** and the **National Resource Efficiency Policy (NREP) 2023**. Moreover, these activities reduce India's dependency on imported ferrous scrap, which often involves high embedded emissions from global shipping and processing.

3.11.4 Infrastructure and Compliance Standards

The Alang–Sosiya cluster serves as the **benchmark for HKC-aligned infrastructure** in India. Over the past decade, with guidance from the **Directorate General of Shipping**, **Gujarat Maritime Board** and **Recognised Organisations (IRS, LR, ClassNK, DNV, RINA)**, the cluster has undergone significant technological transformation. Modern yards now feature advanced containment, monitoring and worker-safety systems.

Facility Standards (HKC & ISO Aligned)

- **Impermeable concrete aprons** and **zero-discharge drainage systems** prevent soil or water contamination.
- **Oil–water separators**, hazardous-waste sheds and **storm-water segregation** systems ensure controlled waste management.
- **Ship-lift or drydock-based containment systems** have replaced traditional beaching methods, allowing precise dismantling.
- **Real-time environmental monitoring systems** track parameters such as runoff, oil content and noise levels.
- **Emergency-response infrastructure**, including fire stations, oil-spill equipment and medical clinics, ensures safety.
- **Worker welfare facilities**—canteens, PPE depots, rest shelters and training centres—meet ISO 45001 and 14001 standards.

Technology Components for HKC-Compliant Yards

Component	Function	HKC Requirement
Ship-Lift/Drydock System	Provides safe containment and ship handling	Prevents leakage and seabed contamination
Shore-Power Integration	Supplies clean energy to berthed vessels	Reduces onboard emissions during dismantling

Digital Material Tracking System	Enables end-to-end traceability of waste and material flow	Ensures transparency and reporting under HKC 210(63)
Plasma Cutting & Robotics	Enables precision dismantling with minimal human exposure	Enhances safety and efficiency
VR-Based Training Simulators	Worker training and emergency-response drills	Meets competency requirements of HKC Annex 1

These features have made Indian yards some of the safest and most environmentally sound facilities globally. The same design philosophy underpins compliant and environmentally controlled end-of-life vessel management facilities across coastal states

3.11.5 Need for Regional Diversification

While the Alang–Sosiya cluster remains India's principal ship-recycling hub, its scale and operating model are not aligned with the maritime and environmental context of all coastal states. In Goa, the absence of a formal and regulated mechanism for end-of-life vessel management represents a clear governance and compliance gap.

Goa has a high concentration of small and medium coastal vessels, including barges, tugs, fishing vessels and inland craft operating through riverine systems and minor ports. In the absence of authorised facilities within the State, obsolete or decommissioned vessels are often laid up for extended periods, towed to distant locations or managed through informal dismantling practices, creating environmental, safety and regulatory concerns.

The establishment of appropriately scaled and HKC-aligned end-of-life vessel management facilities in Goa would deliver the following strategic benefits:

- **Regulated End-of-Life Management:** Enables systematic and compliant handling of decommissioned and legacy vessels within the State's maritime jurisdiction, reducing abandonment and informal dismantling.
- **Environmental Compatibility:** Supports non-beaching, berth- or drydock-based dismantling models suited to Goa's CRZ-regulated coastline and riverine environment, ensuring adherence to zero-discharge and pollution-control norms.
- **Integration with Existing Maritime Ecosystem:** Complements Goa's established network of shipyards, repair facilities and maritime service providers by extending the vessel lifecycle from operation and maintenance to compliant recycling.
- **Support to Maritime Administration and Safety:** Assists port and river authorities in maintaining navigational safety through timely removal and compliant disposal of unserviceable, abandoned or accident-damaged vessels.

- **Local Employment and Skill Formalisation:** Generates skilled and semi-skilled employment in dismantling operations, safety supervision, waste handling and compliance monitoring, supported by structured training and certification aligned with DGS-approved curricula.

In summary, a Goa-specific, environmentally sensitive end-of-life vessel management framework would strengthen maritime governance, enhance environmental protection and complete the vessel lifecycle within the State, while remaining fully aligned with national legislation and India's international obligations under the Hong Kong Convention.

3.12 Opportunities for Coastal States – Goa

3.12.1 Strategic Case for Goa

The entry into force of the Hong Kong International Convention (HKC) in 2025 and India's early alignment with its provisions have highlighted the need for regulated, environmentally sound end-of-life vessel management across all maritime states. For Goa, this presents a distinct opportunity, not for large-scale industrial ship recycling, but for the establishment of **appropriately scaled, compliant and environmentally sensitive end-of-life vessel management mechanisms**.

Goa's maritime profile is characterised by a high density of small and medium vessels operating through riverine systems and minor ports. In the absence of authorised facilities within the State, decommissioned vessels are frequently laid up for extended periods, towed outside the State or handled through informal dismantling practices, creating regulatory, environmental and navigational concerns.

Introducing a Goa-specific, HKC-aligned framework would strengthen maritime governance, improve environmental compliance and complete the vessel lifecycle within the State, while remaining consistent with Goa's institutional structure and ecological sensitivities.

Key strategic considerations include:

- **Governance and Compliance Need:** Establishing regulated end-of-life vessel management mechanisms would address an existing compliance gap by enabling systematic and lawful handling of obsolete and legacy vessels within Goa's maritime jurisdiction.
- **Environmental Sensitivity and Suitability:** Goa's CRZ-regulated coastline and riverine environment necessitate non-beaching, berth- or drydock-based dismantling models that prioritise containment, zero-discharge operations and strict environmental safeguards.
- **Circular Economy Integration:** Even at a limited scale, regulated dismantling enables responsible recovery, segregation and disposal of materials, prevents uncontrolled release of hazardous substances and contributes to circular-

economy objectives through environmentally sound lifecycle closure of domestic vessels.

- **Employment Generation and Skill Formalisation:** Appropriately scaled facilities can generate local skilled and semi-skilled employment in dismantling operations, safety supervision, waste handling and compliance monitoring, supported by structured training and certification aligned with DGS-approved curricula.
- **Administrative and Navigational Safety:** A local end-of-life management framework would support maritime authorities in the timely removal and compliant disposal of unserviceable or accident-damaged vessels, improving navigational safety in ports and riverine channels.

This expansion aligns perfectly with the **Maritime Amrit Kaal Vision 2047** objective of "balanced coastal development," and with the **Blue Economy Policy (2021)** that emphasises regional inclusiveness, sustainability and job creation in coastal communities.

3.12.2 Goa: A Strategic Candidate

Goa's suitability for regulated end-of-life vessel management is shaped by its maritime profile and governance structure rather than industrial scale.

- **Geographic and Industrial Profile**

Parameter	Details
Coastline	~193.95 km coastline with extensive riverine navigation
Ports & Navigation	Minor ports and inland waterways administered through the Captain of Ports
Vessel Profile	High concentration of barges, tugs, fishing vessels, inland and coastal craft
Maritime Ecosystem	Established network of small shipyards, repair and retrofit facilities
Environmental Context	CRZ-regulated coast, riverine systems and tourism-sensitive areas

- **Institutional Framework**

Maritime administration in Goa is exercised through the **Captain of Ports**, supported by the Goa State Pollution Control Board and other state authorities. This framework lends itself to **case-specific, tightly regulated approvals** rather than large industrial clusters, ensuring close oversight and environmental control.

- **Environmental and Economic Opportunities**

While Goa is not positioned for large-volume ship recycling, the environmental and economic value of regulated end-of-life vessel management is significant in qualitative terms.

- Prevention of informal dismantling and associated pollution risks
- Improved handling of hazardous materials through traceable processes
- Reduction in prolonged vessel lay-ups and navigational hazards
- Formalisation of activities currently operating in regulatory grey zones
- The primary value proposition for Goa lies in **environmental protection, regulatory effectiveness and maritime safety**, rather than steel volumes or GDP scale.

- **Infrastructure and Compliance Framework**

Any end-of-life vessel management facility in Goa would follow a **scaled and controlled model**, distinct from large beaching-based yards.

Facility Standards (HKC & ISO Aligned)

- Berth- or drydock-based dismantling with full containment
- Impermeable concrete aprons with zero-discharge drainage and collection pits.
- Waste-segregation yards, oil–water separators and hazardous-waste sheds.
- Ship-lift/drydock systems ensuring containment and minimal seabed disturbance.
- Real-time effluent and air-quality monitoring with digital dashboards linked to DGS.
- Worker-welfare infrastructure – medical clinics, PPE stations, rest areas and fire-rescue units.

Technology and Digital Integration

Component	Purpose	HKC Compliance Reference
Ship-Lift / Drydock	Safe containment and handling of vessels	Prevents contamination of marine environment
Shore Power	Clean renewable energy supply for berthed ships	Eliminates onboard emissions
Digital Material Tracking	Traceability of IHM materials and wastes through e-modules	Supports transparency and reporting under HKC 210(63)
Plasma Cutting & Automation	Precision cutting with reduced manual exposure	Ensures worker safety
VR-based Training Simulators	Safety and rescue drills for workers and supervisors	Builds competence under HKC training standards

Such an approach ensures compliance with HKC principles while remaining compatible with Goa's environmental and spatial constraints.

Reference Frameworks under IMO and EU Regulations

The infrastructure and compliance framework for any proposed ship-recycling facility must align with both international and regional standards. Globally, the *Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (2009)* is supported by a series of detailed technical guidelines adopted by the IMO's Marine Environment Protection Committee (MEPC), including:

- **2012 Guidelines for Safe and Environmentally Sound Ship Recycling (MEPC.210(63))** : covering worker safety, hazardous-material handling, containment and waste-management practices.
- **2012 Guidelines for the Authorization of Ship Recycling Facilities (MEPC.211(63))** : defining the standards and verification requirements for facility authorization.

Compliance with these guidelines ensures full conformity with the Hong Kong Convention while providing a technical foundation for EU Ship Recycling Regulation (EUSRR) certification. The EUSRR further requires proof of environmentally sound operations, traceable material handling and approved yard listings within the EU Green List. Early adherence to these frameworks positions Indian facilities, particularly in emerging maritime states such as Goa, to access international markets and attract vessel owners seeking HKC- and EUSRR-compliant recycling options.

- **Capacity Building and Skill Development**

Goa's existing maritime workforce and training ecosystem provide a foundation for skill formalisation.

Targeted training modules may include:

- Safe dismantling and material handling practices
- Hazardous-waste management and occupational health
- Emergency response and incident management
- Compliance documentation and reporting

Partnerships with IMU-affiliated institutions, recognised organisations and state ITIs would enable certification aligned with DGS-approved curricula.

- **Green Steel Integration and Circular Economy**

While steel recovery volumes in Goa would be limited, regulated dismantling contributes to the circular economy by:

- Ensuring environmentally sound recovery and disposal of materials
- Preventing uncontrolled release of hazardous substances
- Supporting responsible lifecycle closure of domestic vessels

This approach complements Goa's broader sustainability objectives without introducing heavy industrial footprints.

- **Strategic Outcomes**
  - Establishment of a regulated and environmentally sensitive end-of-life vessel management framework
  - Improved maritime governance and compliance enforcement
  - Enhanced navigational safety in riverine and port areas
  - Formalisation of skills and employment in dismantling and compliance activities
  - Demonstration of a scalable model suitable for riverine and minor-port states

3.13 Way Forward

3.13.1 Implementation Roadmap

The establishment of a regulated, HKC-aligned end-of-life vessel management framework in Goa may be pursued in a **phased and calibrated manner**, ensuring that regulatory, environmental and operational considerations are addressed in a manner consistent with the State's maritime profile and ecological sensitivities.

The following roadmap provides a **suggestive and flexible framework**, which may be adapted by the Government of Goa through the Captain of Ports, with technical guidance from the Directorate General of Shipping (DGS) and coordination with relevant State authorities.

Phase	Tentative Timeline	Indicative Activities	Supporting / Advisory Agencies
I – Baseline Assessment and Scoping	0–6 months	Identification of end-of-life vessel categories; assessment of existing shipyards, berths or drydock facilities; CRZ and environmental screening; stakeholder consultations	Captain of Ports (Lead), GSPCB, DGS
II – Regulatory and Operational Framework	6–12 months	Development of approval pathways; preparation of compliance templates; alignment with HKC requirements for small and medium vessels; identification of authorised waste-handling chains	Captain of Ports (Lead), DGS, GSPCB
III – Facility Readiness and Pilot Operations	12–24 months	Upgradation of selected facilities for controlled dismantling; implementation of safety, containment and monitoring systems; initiation of pilot dismantling operations	Facility Operators under State oversight

IV – Authorisation and Compliance Stabilisation	24–36 months	HKC-aligned authorisation processes; third-party audits; operational fine-tuning; documentation and reporting systems	DGS, Recognised Organisations
V – Review and Optimisation	36+ months	Review of environmental performance; refinement of procedures; consideration of replication or scaling within defined limits	Captain of Ports, DGS, GSPCB

This approach emphasises **governance, containment and compliance**, rather than large-scale capacity creation.

3.13.2 Institutional Roles and Coordination

Effective implementation will require close coordination between national and state authorities, with clear delineation of roles.

The **Captain of Ports, Government of Goa**, may act as the nodal state authority responsible for:

- Overall coordination and operational oversight;
- Identification and approval of suitable facilities;
- Ensuring navigational safety and orderly port operations; and
- Coordination with environmental and safety regulators.

The **Goa State Pollution Control Board (GSPCB)** will continue to:

- Issue statutory environmental consents;
- Monitor hazardous-waste handling and disposal; and
- Enforce pollution-control and zero-discharge norms.

The **Directorate General of Shipping (DGS)**, as the National Authority under the Ship Recycling Act, 2019, will:

- Provide technical guidance on HKC-aligned requirements;
- Support authorisation, audit and certification processes;
- Ensure consistency with national reporting obligations to the IMO; and
- Facilitate engagement with Recognised Organisations, where required.

A **State-level Coordination Group**, comprising representatives of the Captain of Ports, GSPCB, DGS and other relevant agencies, may be convened periodically to review progress and address implementation issues.

3.13.3 Indicative Strategic Next Steps

The following actions may be considered as near-term priorities:

- **Baseline Assessment:** Undertake an assessment of end-of-life vessel profiles and existing maritime infrastructure suitable for controlled dismantling.

- **Framework Development:** Develop state-specific operational and compliance guidelines aligned with HKC principles and national regulations.
- **Pilot Identification:** Identify one or more suitable facilities for pilot-scale, non-beaching dismantling operations.
- **Capacity Building:** Initiate targeted training programmes for workers, supervisors and inspectors in coordination with DGS-approved institutions.
- **Regulatory Coordination:** Establish regular coordination mechanisms between state authorities and DGS to ensure consistent oversight and reporting.

These steps are suggestive and may be refined based on administrative priorities and operational feedback.

3.14 Conclusion

India's ship-recycling and end-of-life vessel management ecosystem has reached a stage where **regionally differentiated and environmentally sensitive approaches** are essential for sustaining compliance and leadership under the Hong Kong Convention regime. For coastal states with distinct maritime profiles, such as Goa, this necessitates solutions that prioritise governance, containment and regulatory effectiveness over scale.

Goa, with its established maritime administration, riverine navigation systems and strong emphasis on environmental stewardship, is well placed to explore the introduction of a **regulated and HKC-aligned end-of-life vessel management framework** as part of its broader maritime governance agenda. Such an approach is consistent with the objectives of **Maritime India Vision (MIV) 2030**, which emphasises safe, sustainable and efficient maritime infrastructure, as well as the **Maritime Amrit Kaal Vision (MAKV) 2047**, which calls for responsible lifecycle management and long-term resilience of India's maritime sector.

The Directorate General of Shipping (DGS), as the National Authority under the Ship Recycling Act, 2019, will continue to extend technical and policy guidance to ensure that national compliance standards, certification requirements and India's international obligations are met. Coordination with relevant State authorities will remain central to effective and consistent implementation.

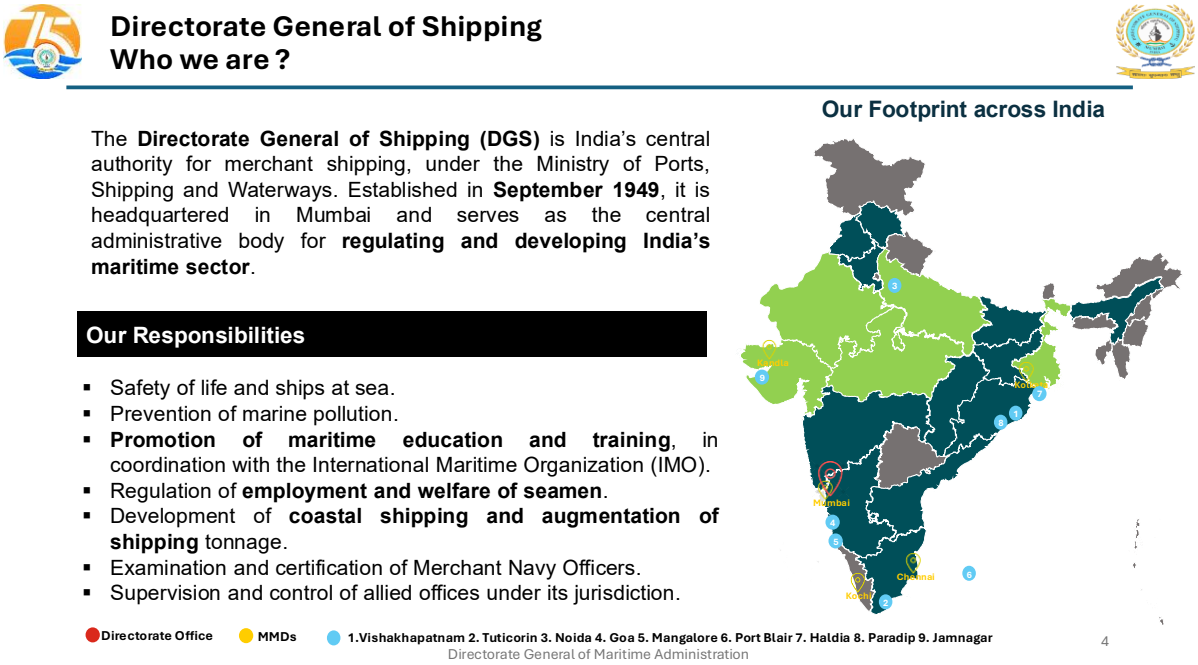
Accordingly, it is suggested that the Government of Goa, through the Captain of Ports and in coordination with the Goa State Pollution Control Board, may consider the proposal and take appropriate action, including undertaking baseline assessments, identifying suitable facilities for pilot implementation and finalising a phased approach in consultation with DGS and the Ministry of Ports, Shipping and Waterways.

Such an initiative would strengthen maritime governance, enhance environmental protection and position Goa as a **model coastal state for responsible and**

environmentally sound end-of-life vessel management, aligned with India's long-term maritime vision under MIV 2030 and MAKV 2047.

4. PILLAR III - Training, Skilling & Zero Corruption in MTIs

4.1 About Directorate General of Shipping



Directorate General of Shipping, popularly known as DGS established in September 1949, shortly after our nation's independence, the DGS functions under the Ministry of Ports, Shipping and Waterways. With its headquarters in Mumbai, this organization has been entrusted with the vital responsibility of regulating, developing, and safeguarding India's maritime domain.

The scope of DGS is vast and impactful. First and foremost, it ensures the **safety of life and ships at sea**, a duty that directly protects both human lives and national assets. It also plays a crucial role in the **prevention of marine pollution**, upholding our responsibility toward cleaner oceans and a healthier environment.

Equally significant is its role in the **promotion of maritime education and training**, carried out in close coordination with the International Maritime Organization, ensuring that Indian seafarers remain globally competitive and well-trained.

DGS also regulates the **employment and welfare of seafarers**, safeguarding their rights and improving their working conditions, thereby strengthening the human resource foundation of the industry. Furthermore, it is actively engaged in the **development of coastal shipping and augmentation of shipping tonnage**, a step that enhances both domestic trade and international competitiveness.

Another core function is the **examination and certification of Merchant Navy officers**, ensuring that only the most competent professionals serve at sea. In addition, DGS maintains **supervision and control over allied offices under its jurisdiction**, thereby bringing about uniformity, transparency, and accountability across the maritime ecosystem.

In essence, the Directorate General of Shipping is not just a regulatory body—it is the guardian, facilitator, and promoter of India's maritime growth. Its work directly influences our nation's standing as a major maritime power and ensures that India's maritime legacy continues to thrive.

As we move ahead into an era of global maritime challenges and opportunities, the DGS will remain a cornerstone in shaping a safer, greener, and stronger shipping industry for India.

4.2 About Training Branch

About Training Branch - DGS

Administration of all MTI's	Approval, regulation, and oversight of MTI's, ensuring seafarer training meets STCW and international standards through policies, accreditation, inspections, and compliance monitoring.
MTI Module	Online system for managing courses, records, and certifications, ensuring compliance with DG Shipping and STCW standards. New Module is being developed, as the old module built on an outdated stack, struggles with data volumes, usability, integration, and scalability.
CIP Improvement	Detailed evaluation by RO or MMD under a three-year cycle with Initial, Annual, and Renewal inspections as per QMS standards.
STCW Compliance Board	A strategic advisory body to DGS that strengthens governance in maritime training, reviews MTI compliance with STCW standards, and meets bi-weekly for evaluations.
MTI Exit examination + Ratings Exit Examination	Initiatives like Learning Management System (LMS), Web based simulator, Centralized Attendance System (CAS), Faculty Development Program (FDP) are initiated to ensure efficient learning and examination process.

Administration of Maritime Training Institutes (MTIs)

- Approval, regulation, and oversight of all DG Shipping–approved MTIs
- Ensures compliance with **STCW Convention** and international standards through policies, accreditation, inspections, and continuous monitoring

MTI Digital Module

- Centralized online system for management of courses, trainee records, and certifications
- Ensures regulatory compliance with DG Shipping and STCW requirements
- New MTI module under development to replace legacy system, addressing limitations related to outdated technology, high data volumes, usability, integration, and scalability

CIP (Continuous Improvement Programme) Enhancement

- Structured evaluation of MTIs conducted by **ROs / MMDs**
- Three-year inspection cycle comprising **Initial, Annual, and Renewal inspections**
- Aligned with Quality Management System (QMS) standards for continuous improvement

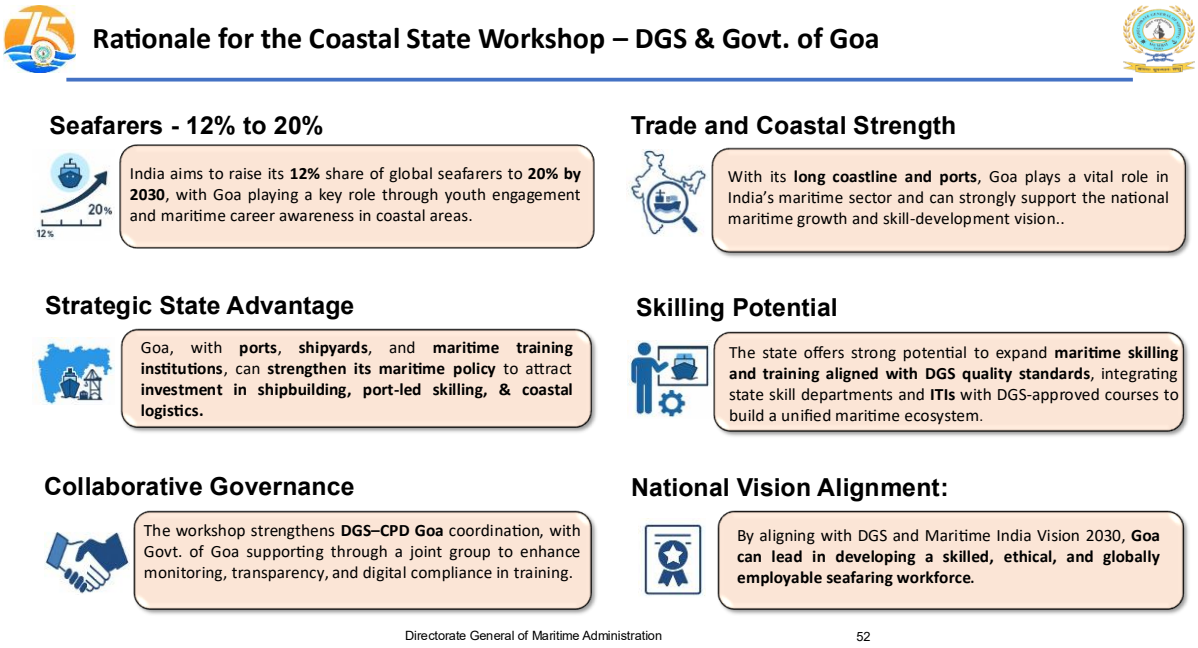
STCW Compliance Board

- Strategic advisory body to DGS for strengthening governance in maritime training
- Reviews MTI compliance with STCW standards
- Conducts **bi-weekly meetings** for evaluation and decision-making

MTI Exit Examination & Ratings Exit Examination

- Introduction of technology-enabled initiatives to improve learning and assessment outcomes
- Key initiatives include **Learning Management System (LMS), Web-Based Simulator, Centralized Attendance System (CAS), and Faculty Development Programme (FDP)**
- Aimed at ensuring transparent, standardized, and efficient training and examination processes

4.3 Rationale for the Coastal State Workshop



Rationale for the Coastal State Workshop - DGS & Government of Goa

1. **Seafarers: 12% → 20%**

India aims to increase its share of the global seafaring workforce from 12% to 20% by 2030

Goa can play a pivotal role through youth outreach, coastal community engagement, and maritime career awareness

2. **Trade and Coastal Strength**

With its strategic coastline and port infrastructure, Goa is a key contributor to India's maritime trade

The state can strongly support national maritime growth and skill-development initiatives

3. **Strategic State Advantage**

Presence of ports, shipyards, and maritime training institutions positions Goa as a maritime hub

Opportunity to strengthen state maritime policy and attract investment in shipbuilding, port-led skilling, and coastal logistics

4. **Skilling Potential**

Significant scope to expand maritime skilling and training aligned with DGS quality and regulatory standards

Integration of State Skill Departments and ITIs with DGS-approved courses can create a unified maritime skilling ecosystem

5. **Collaborative Governance**

The workshop enables closer DGS–CPD Goa coordination

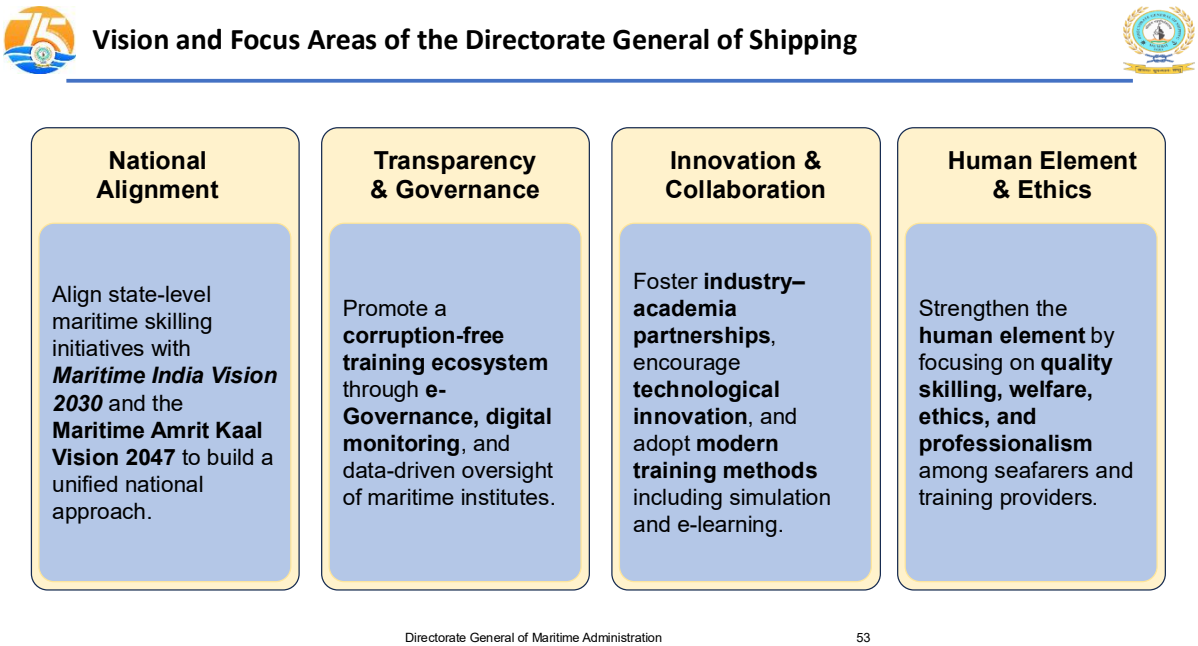
Establishment of joint working mechanisms to enhance monitoring, transparency, and digital compliance in maritime training

6. **National Vision Alignment**

Alignment with DGS initiatives and Maritime India Vision 2030

Positions Goa as a leader in developing a skilled, ethical, and globally employable seafaring workforce

4.4 Vision and Focus Areas of the Directorate General of Shipping



National Alignment

- Align state-level maritime skilling initiatives with Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047
- Promote a unified national approach to maritime training and skill development

Transparency & Governance

- Establish a transparent and corruption-free training ecosystem
- Leverage e-Governance, digital monitoring, and data-driven oversight for effective regulation of maritime training institutions

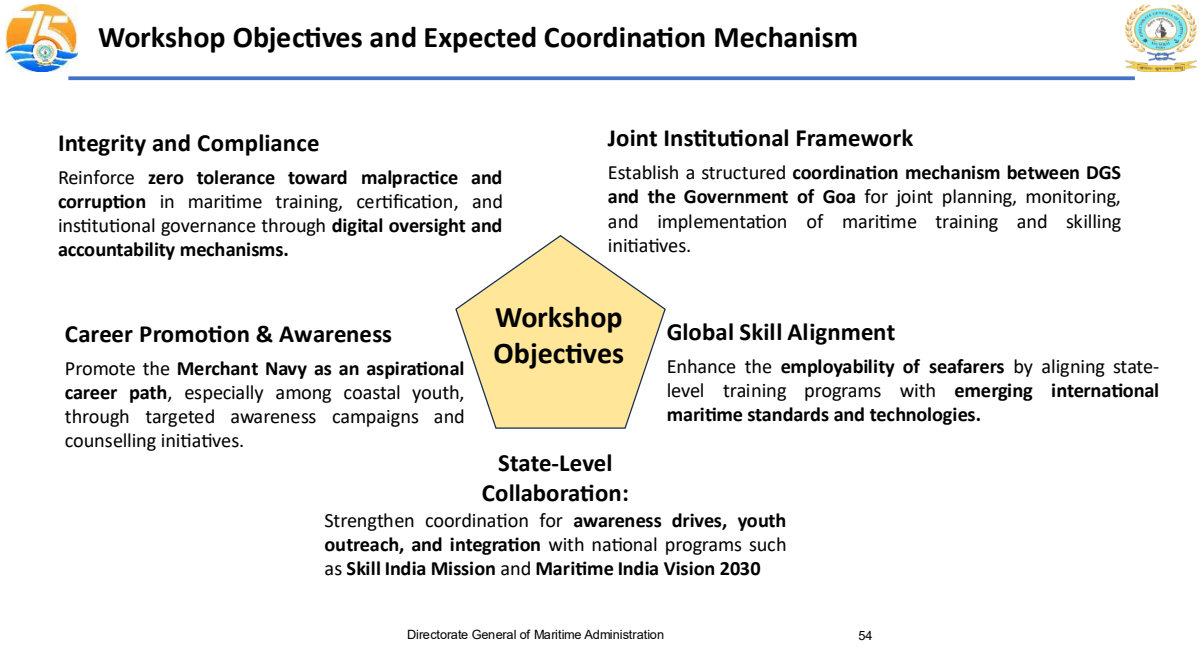
Innovation & Collaboration

- Foster industry–academia partnerships to enhance training relevance
- Encourage technological innovation and adoption of modern training methodologies, including simulation-based training and e-learning platforms

Human Element & Ethics

- Strengthen the human element in maritime operations
- Emphasize quality skilling, welfare, ethics, and professionalism among seafarers and maritime training providers

4.5 Workshop Objectives and Expected Coordination Mechanism



Integrity and Compliance

- Reinforce zero tolerance towards malpractice and corruption in maritime training, certification, and institutional governance
- Strengthen digital oversight, monitoring, and accountability mechanisms

Joint Institutional Framework

- Establish a structured coordination mechanism between DGS and the Government of Goa

- Enable joint planning, monitoring, and implementation of maritime training and skilling initiatives

Career Promotion & Awareness

- Promote the Merchant Navy as an aspirational career pathway, particularly among coastal youth
- Implement targeted awareness campaigns, counselling, and outreach programmes

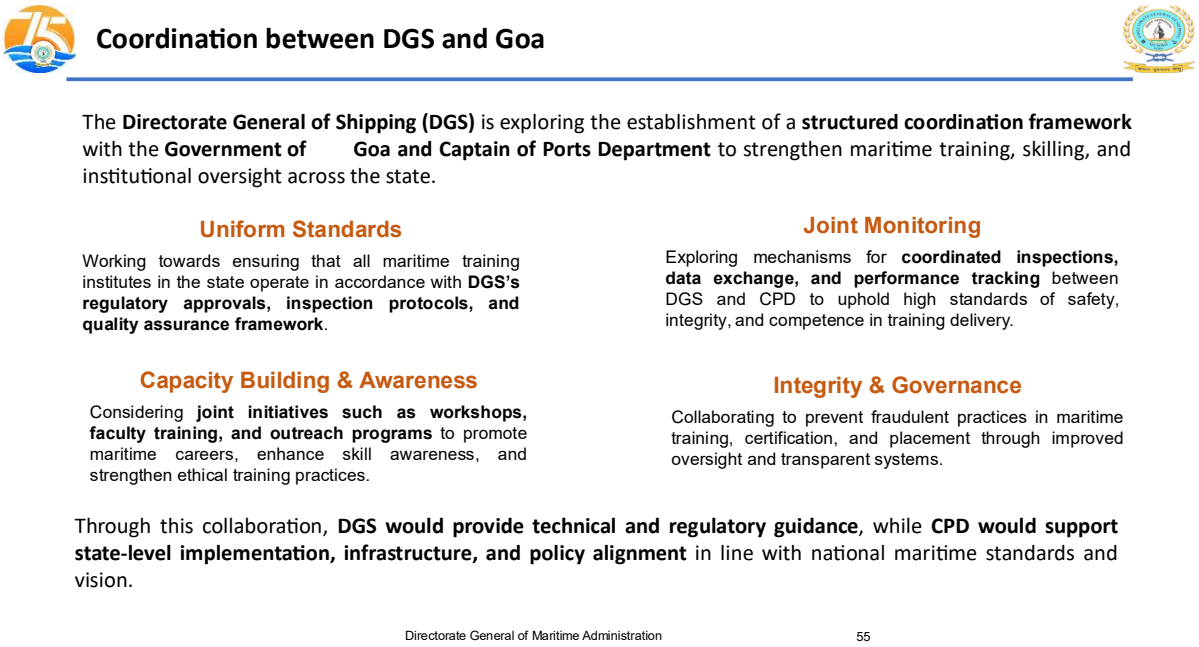
Global Skill Alignment

- Enhance employability of seafarers by aligning state-level training programmes with emerging international maritime standards and technologies

State-Level Collaboration

- Strengthen coordination for awareness drives and youth outreach
- Integrate state initiatives with national programmes such as **Skill India Mission** and **Maritime India Vision 2030**

4.6 Coordination between DGS and Goa



The **Directorate General of Shipping (DGS)** is exploring the establishment of a **structured coordination framework** with the **Government of Goa** and the **Captain of Ports Department (CPD)** to strengthen maritime training, skilling, and institutional oversight across the state.

Uniform Standards

- Ensure all maritime training institutes in Goa operate in accordance with **DGS regulatory approvals, inspection protocols, and quality assurance frameworks**
- Promote consistency and uniformity in training delivery and compliance

Joint Monitoring

- Explore mechanisms for **coordinated inspections, data sharing, and performance tracking** between DGS and CPD
- Uphold high standards of **safety, integrity, and competence** in maritime training

Capacity Building & Awareness

- Undertake **joint initiatives** such as workshops, faculty training programmes, and outreach activities
- Promote maritime careers, enhance skill awareness, and strengthen **ethical training practices**

Integrity & Governance

- Collaborate to prevent **malpractices and fraudulent practices** in training, certification, and placement
- Strengthen oversight through **transparent systems and digital governance mechanisms**

Roles and Responsibilities

- **DGS**: Provide technical guidance, regulatory oversight, and policy direction
- **Government of Goa / CPD**: Support state-level implementation, infrastructure development, and policy alignment
- Ensure alignment with **national maritime standards and vision**

4.7 Integration of ITI Ecosystem with Maritime Training

Integration of ITI Ecosystem with Maritime Training

MTI's in Goa

MTI Name	Type	District
SEA SCAN MARITIME FOUNDATION	PRESEA	South Goa
NUSI Maritime Academy	POSTSEA	SOUTH GOA
Institute of Maritime Studies	PRESEA	SOUTH GOA
SEASCAN MARINE FOUNDATION	POST SEA	SOUTH GOA
Kamaxi Maritime Academy	POST SEA	Salcette
The Institute of Marine Engineers (India), Goa	POST SEA	Goa

1. **Introducing Maritime Modules in ITIs:**
   Explore the inclusion of maritime-focused skill modules such as basic seamanship, marine safety, welding, and electrical maintenance within Industrial Training Institutes (ITIs) across Goa.
2. **Creating Career Pathways:**
   Develop structured linkages between ITI vocational programs and DGS-approved maritime courses, allowing students to transition from general trades to seafaring and port-related careers.
3. **Faculty Development & Standardization**
   Organize faculty orientation and capacity-building programs to align teaching practices, course content, and assessment methods with DGS quality and competency standards.
4. **State–Central Coordination:**
   Encourage coordination between the Captain of Ports Department (CPD) and DGS for curriculum design, certification alignment, and recognition of maritime vocational skills.
5. **Outcome & Impact:**
   Enable coastal youth to access maritime careers through locally available skill infrastructure, ensuring industry relevance, employability, and contribution to India's global seafarer pool.

List of MTI's in Goa

MTI Name	Type	District
SEA SCAN MARITIME FOUNDATION	PRESEA	South Goa
NUSI Maritime Academy	POSTSEA	SOUTH GOA
Institute of Maritime Studies	PRESEA	SOUTH GOA
SEASCAN MARINE FOUNDATION	POST SEA	SOUTH GOA
Kamaxi Maritime Academy	POST SEA	Salcette
The Institute of Marine Engineers (India), Goa	POST SEA	Goa

Proposed Integration Framework

1. Introduction of Maritime Modules in ITIs

- Explore inclusion of maritime-focused skill modules such as **basic seamanship, marine safety, welding, electrical maintenance, and fitter trades** within ITIs across Goa

2. Structured Career Pathways

- Develop clear linkages between **ITI vocational programmes and DGS-approved maritime courses**
- Enable progression from general trades to **seafaring, port, and allied maritime careers**

3. Faculty Development & Standardisation

- Conduct **faculty orientation and capacity-building programmes**
- Align teaching methods, curricula, and assessment with **DGS quality and competency standards**

4. State–Central Coordination

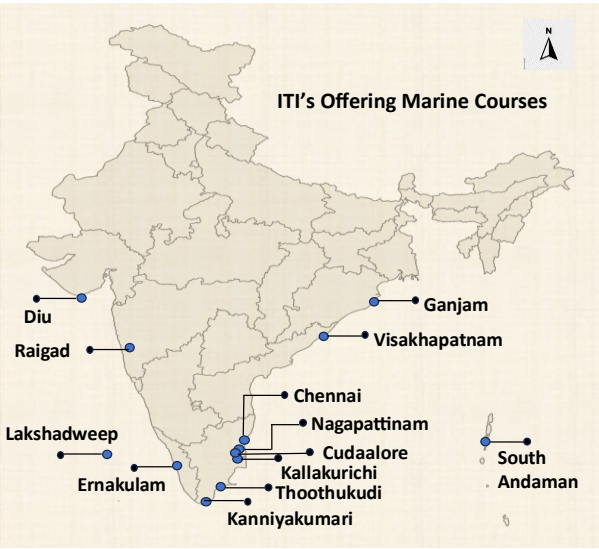
- Strengthen coordination between **Captain of Ports Department (CPD)** and **DGS**
- Ensure alignment in **curriculum design, certification pathways, and recognition of maritime vocational skills**

5. Outcome & Impact

- Enable **coastal youth** to access maritime careers through locally available skill infrastructure
- Improve **employability, industry relevance**, and contribute to **India's global seafarer workforce**

4.8 ITIs Offering Marine Courses under the Craftsmen Training Scheme (CTS)

ITI's Offering Marine Courses under Craftsmen Training Scheme (CTS)



- The integration of the ITI ecosystem with maritime training aims to introduce maritime-focused modules in ITIs, create clear career pathways into seafaring and port-related roles, and align teaching standards with DGS guidelines.
- Through coordination between DGS and CPD Govt. of Goa the initiative enhances faculty capacity, ensures curriculum alignment, and enables coastal youth to access industry-relevant maritime careers.

National Footprint

- Marine-related CTS courses are offered through select **ITIs located in coastal and island regions**, reflecting region-specific maritime workforce demand
- The geographical spread highlights opportunities to **replicate and scale similar models** in other coastal states, including Goa

Integration with Maritime Training

- Integration of the **ITI ecosystem with maritime training** aims to introduce **maritime-focused skill modules** in ITIs
- Establishes **clear career pathways** into seafaring, ports, shipyards, and allied maritime sectors
- Ensures alignment of **curriculum, training delivery, and assessments** with **DGS guidelines and quality standards**

State–Central Coordination

1. Through coordination between **DGS and the Captain of Ports Department (CPD), Government of Goa**, the initiative seeks to:
    - Enhance **faculty capacity and standardisation**
    - Ensure **curriculum alignment and certification pathways**
    - Enable **coastal youth** to access industry-relevant maritime careers locally

4.9 ITI's Offering Marine Courses under Craftsmen Training Scheme (CTS)

ITI's Offering Marine Courses under Craftsmen Training Scheme (CTS)

Sr. No.	District Name	Name	Name Of Course	Duration	Entry Qualification	NSQF LEVEL	Seating Capacity	Enrolment (2024-25)
1.	SOUTH ANDAMANS, Andaman And Nicobar Islands	Government Industrial Training Institute	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	20	20
			Marine Fitter (NSQF)	2 Years	10th Passed	4	40	20
			Vessel Navigator (NSQF)	2 Years	10th Passed	4	40	20
2.	VISAKHAPATNAM, Andhra Pradesh	Central Institute of Fisheries Nautical Engg. Training Unit	Marine Fitter (NSQF)	2 Years	10th Passed	4	20	20
			Vessel Navigator (NSQF)	2 Years	10th Passed	4	20	20
3.	ERNAKULAM, Kerala	Central Institute of Fisheries Nautical and Engineering Training	Marine Fitter (NSQF)	2 Years	10th Passed	4	20	20
			Vessel Navigator (NSQF)	2 Years	10th Passed	4	20	20
4.	LAKSHADWEEP DISTRICT, Lakshadweep	Dr B R Ambedkar ITI	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	40
5.	RAIGAD, Maharashtra	Anjumane Waseeul Taleem Edu.Trust Raigad	Marine Fitter (NSQF)	2 Years	10th Passed	4	20	20
6.	GANJAM, Odisha	Govt Industrial Training Institute, Berhampur	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	60	20
7.	CHENNAI, Tamil Nadu	Central Institute Of Fisheries Nautical & Engineering Training Institute	Marine Fitter (NSQF)	2 Years	10th Passed	4	20	20
			Vessel Navigator (NSQF)	2 Years	10th Passed	4	20	20
8.	CUDDALORE, Tamil Nadu	Government Industrial Training Institute, Cuddalore	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	40
9.	KALLAKURICHI, Tamil Nadu	Government Industrial Training Institute, Sankarapuram	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	38
10.	KANNIYAKUMARI, Tamil Nadu	Government Industrial Training Institute, Nagercoil	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	37
11.	NAGAPATTINAM, Tamil Nadu	Goverment Industrial Training Institute,Nagapattinam	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	21
12.	THOOTHUKKUDI, Tamil Nadu	Government Industrial Training Institute,,Thoothukudi	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	25
13.	THOOTHUKKUDI, Tamil Nadu	Govt. ITI, VEPPALODAI	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	40	28
14.	DIU, The Dadra And Nagar Haveli And Daman And Diu	Govt Industrial Training Institute, Ghoghala	Marine Engine Fitter (NSQF)	1 Year	10th Passed	3.5	20	18

4.10 Pathways to Join Merchant Navy

Pathways to Join Merchant Navy

Education Level	Course / Route	Eligibility	Duration & Training Focus	Career Path / Progression
After 10th Standard	**GP Rating Course** (General Purpose Rating)	10th pass with 40% aggregate and 40% in English. Age: 17.5–25 years.	**6 months** – Basic seamanship, firefighting, first aid, survival, and engine room safety.	Starts as **Ordinary Seaman (Deck)** or **Wiper (Engine)** → **Able Seaman / Bosun / Officer** through DGS-approved competency exams.
After 12th (Science Stream)	**Deck Cadet** (Navigating Officer)	10+2 (PCM) with 60% aggregate and 50% in English.	**B.Sc. Nautical Science (3 years)** or **Diploma in Nautical Science (DNS, 1 year)** leading to B.Sc. (Applied Nautical Science).	Starts as **Deck Cadet → Third Officer → Second Officer → Chief Officer → Master (Captain)** after DGS/IMO exams.
After 12th (Science Stream)	**Engine Cadet** (Marine Engineering)	10+2 (PCM) 60% or Degree in Mechanical/Marine Engineering.	**B.Tech Marine Engineering (4 years)** or **GME (1-year pre-sea)** for Mechanical Engineers.	Starts as **Junior Engineer (JE) → Fourth → Third → Second Engineer → Chief Engineer** after competency exams.
After Diploma	**Lateral Entry** (Deck or Engine Side)	Diploma in Nautical, Marine, or Mechanical/Shipbuilding Engineering.	**Lateral Entry:** DNS/B.Sc. Nautical Science or 2nd Year Marine Engineering (DGS-approved institutes).	Fast-track route to join as **Deck/Engine Cadet**, progressing to **Officer/Engineer** ranks.
After Degree	**Electro-Technical Officer (ETO)**	B.E./B.Tech. in Electrical, Electronics, or Instrumentation.	**4 months Pre-Sea ETO Course (DGS approved)** – Electrical & automation systems training.	Starts as **Trainee ETO → ETO → Senior ETO / Chief Electrical Engineer**.
	Graduate Marine Engineer (GME)	B.E./B.Tech. in Mechanical or Naval Architecture.	**1-year Pre-Sea GME Course (DGS approved)** – Marine systems and machinery training.	Starts as **Trainee Engineer → Fourth → Third → Second → Chief Engineer** after sea service and exams.

1. After 10th Standard – GP Rating Course:

Candidates who have passed 10th standard with at least **40% aggregate and 40% in English**, and are between **17.5 to 25 years of age**, can join the **GP Rating course**. The **6-month training** focuses on basic seamanship, firefighting, first aid, survival techniques, and engine-room safety. On completion, candidates join ships as **Ordinary Seaman (Deck)** or **Wiper (Engine)** and can progress to higher ranks such as **Able Seaman, Bosun, or Officer** through DGS-approved competency examinations.

2. After 12th (Science Stream) – Deck Cadet:

Students who have completed **10+2 with Physics, Chemistry, and Mathematics (PCM)** with **60% aggregate and 50% in English** can opt for the **Deck Cadet route**. Training is undertaken through **B.Sc. Nautical Science (3 years)** or **Diploma in Nautical Science (DNS – 1 year)** leading to a degree. Career progression follows the hierarchy of **Deck Cadet → Third Officer → Second Officer → Chief Officer → Master (Captain)** after required sea service and examinations.

3. After 12th (Science Stream) – Engine Cadet:

Candidates with **10+2 (PCM) with 60% marks** or those holding a **degree in Mechanical or Marine Engineering** can enter as **Engine Cadets**. Training is through **B.Tech Marine Engineering (4 years)** or a **1-year Graduate Marine Engineer (GME) pre-sea course**. Career growth progresses from **Junior Engineer → Fourth Engineer → Third Engineer → Second Engineer → Chief Engineer**.

4. After Diploma – Lateral Entry:

Diploma holders in **Nautical, Marine, Mechanical, or Shipbuilding Engineering** are eligible for **lateral entry** into maritime careers. They may join through **DNS/B.Sc. Nautical Science** on the deck side or enter directly into the **second year of Marine Engineering** at DGS-approved institutes, offering a **fast-track route** to officer and engineer ranks.

5. After Degree – Electro-Technical Officer (ETO):

Graduates with **B.E./B.Tech in Electrical, Electronics, or Instrumentation Engineering** can join the Merchant Navy as **Electro-Technical Officers (ETO)** after completing a **4-month DGS-approved pre-sea ETO course**. The career path includes progression from **Trainee ETO → ETO → Senior ETO / Chief Electrical Engineer**, handling shipboard electrical and automation systems.

6. After Degree – Graduate Marine Engineer (GME):

Candidates holding a **B.E./B.Tech in Mechanical Engineering or Naval Architecture** can pursue the **1-year DGS-approved GME course**, which focuses on marine machinery and ship systems. After sea service and competency examinations, they progress from **Trainee Engineer → Fourth Engineer → Third Engineer → Second Engineer → Chief Engineer**.

4.11 Basic Courses for Entry into the Merchant Navy

Basic Courses for Entry into Merchant Navy

- As per **STCW 2010 Convention** and **DGS Circular 12/20**, all seafarers irrespective of rank or department must complete **five mandatory basic safety courses** before joining a ship.
- These courses ensure every seafarer is trained to handle emergencies, operate safely, and protect life, property, and the marine environment.

Sr. No	Course Name	Purpose & Outcome
1	**Personal Survival Techniques (PST)**	Trains seafarers to **survive at sea during emergencies**, including ship abandonment and rescue procedures.
2	**Fire Prevention and Fire Fighting (FPFF)**	Equips trainees to **prevent, control, and extinguish onboard fires** safely and efficiently.
3	**Elementary First Aid (EFA)**	Enables seafarers to **provide immediate medical care** in case of accidents or health emergencies onboard.
4	**Personal Safety and Social Responsibilities (PSSR)**	Develops awareness of **safe working practices, teamwork, and shipboard discipline**.
5	**Security Training for Seafarers with Designated Security Duties (STSDSD)**	Prepares seafarers to **recognize and respond to shipboard security threats** in line with the ISPS Code.

- **Mandatory Requirement under STCW & DGS:**

  As per the **STCW 2010 Convention** and **DGS Circular 12/20**, all seafarers—irrespective of rank or department—are required to complete **five mandatory basic safety courses** before joining a ship. These courses form the foundation of safe shipboard operations and compliance with international maritime standards.

- **Purpose of Basic Safety Training:**

  The objective of these courses is to ensure that every seafarer is adequately trained to **handle emergencies**, **operate safely onboard**, and **protect human life, property, and the marine environment** during routine and emergency situations at sea.

- **Personal Survival Techniques (PST)**

  This course trains seafarers in **survival at sea during emergencies**, including abandonment procedures, use of life-saving appliances, and rescue techniques, enabling them to respond effectively in life-threatening situations.

- **Fire Prevention and Fire Fighting (FPFF):**

  Seafarers are equipped with the knowledge and practical skills to **prevent, control, and extinguish onboard fires**, ensuring preparedness to manage one of the most critical shipboard emergencies safely and efficiently.

- **Elementary First Aid (EFA):**

  The course enables seafarers to **provide immediate medical assistance** in the event of accidents or health emergencies onboard, ensuring timely care until professional medical help is available.

- **Personal Safety and Social Responsibilities (PSSR):**

  This training develops awareness of **safe working practices, teamwork, shipboard discipline, and effective communication**, contributing to a safe and harmonious working environment onboard ships.

- **Security Training for Seafarers with Designated Security Duties (STSDSD):**

  The course prepares seafarers to **recognize, prevent, and respond to shipboard security threats** in accordance with the **ISPS Code**, strengthening ship security and situational awareness.

4.12 Skill Development and Training for Safe Operations

Skill Development and Training for Safe Operations

"While compliance with standards is essential for serving on board ships, the skills and competence of seafarers can only be adequately underpinned, updated and maintained through effective **Maritime Education, Training , Assessment and reliable Certification of their Competency**"

- Koji Sekimizu (Ex- Secretary-General of IMO)

Who is a Competent Seafarer?

Continuous Skill Upgradation

- Regular **refresher & revalidation courses** as per STCW and DGS norms.
- Includes **Advanced Fire Fighting, PSC&RB, Tanker Familiarization**, etc.
- Focus on **competency-based and simulation training** for real-time learning.
- Encourages adaptability to **emerging technologies and alternate fuels**.

Skill Development and Training for Safe Operations

Importance of Competency-Based Training:

Compliance with standards alone is not sufficient for safe shipboard operations. As emphasized by **Koji Sekimizu, Former Secretary-General of the IMO**, the skills and competence of seafarers must be continuously **developed, updated, and sustained** through effective **Maritime Education, Training, Assessment, and reliable Certification of Competency**.

Who is a Competent Seafarer:

A competent seafarer is one who possesses the right combination of **medical fitness, formal qualifications, structured training, adequate sea service, successful examinations, and valid certification**, all of which together ensure safe, efficient, and professional performance onboard ships.

Role of Medical Fitness:

Medical fitness ensures that seafarers are physically and mentally capable of performing demanding shipboard duties and responding effectively during emergencies.

Training, Examination, and Certification:

Structured training followed by objective examinations and certification ensures that seafarers meet **STCW and DGS competency standards**, validating their ability to perform assigned roles safely.

Sea Service and Experience:

Practical sea service provides real-world exposure, enabling seafarers to apply theoretical knowledge, develop situational awareness, and build operational confidence.

Continuous Skill Upgradation:

Seafarers are required to undergo **regular refresher and revalidation courses** in accordance with **STCW and DGS norms** to maintain and enhance their operational readiness throughout their careers.

Advanced and Specialized Training:

Continuous upskilling includes courses such as **Advanced Fire Fighting, Proficiency in Survival Craft and Rescue Boats (PSC&RB), and Tanker Familiarization**, ensuring preparedness for specialized ship operations.

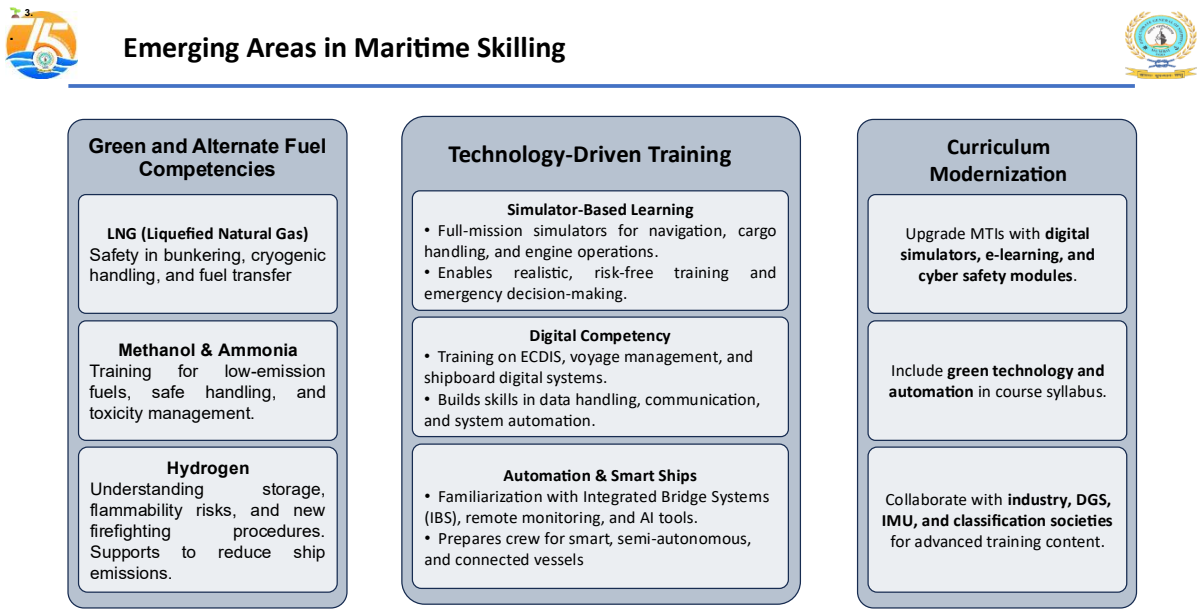
Simulation and Competency-Based Learning:

Emphasis is placed on **competency-based training and simulation-based learning**, allowing seafarers to gain hands-on experience in realistic, risk-free environments.

Adaptation to Emerging Technologies:

Continuous training enables seafarers to adapt to **new ship technologies, automation, digital systems, and alternate fuels**, ensuring future readiness and enhanced safety.

4.13 Emerging Areas in Maritime Skilling



Green and Alternate Fuel Competencies:

With the global shift towards decarbonisation, maritime skilling is expanding to cover **green and alternate fuels**. Training on **Liquefied Natural Gas (LNG)** focuses on safe bunkering operations, cryogenic handling, and fuel transfer procedures. Emerging fuels such as **methanol and ammonia** require specialised training in low-emission operations, toxicity management, and safe handling practices. Additionally, competencies related to **hydrogen** include understanding storage systems, flammability risks, new firefighting techniques, and safety protocols, supporting the reduction of ship emissions.

Technology-Driven Training through Simulation:

The adoption of **simulator-based learning** enables realistic and risk-free training for navigation, cargo handling, and engine operations. Full-mission simulators allow seafarers to practice routine and emergency scenarios, strengthening decision-making skills and operational confidence without real-world risk.

Digital Competency Development:

Modern maritime operations demand strong **digital skills**. Training now includes use of **ECDIS, voyage management systems, and shipboard digital platforms**, along with competencies in data handling, communication systems, and system automation, ensuring readiness for digitally enabled vessels.

Automation and Smart Ships:

As shipping moves towards automation, seafarers are being familiarised with **Integrated Bridge Systems (IBS)**, remote monitoring tools, and **AI-assisted ship operations**. This prepares crews to operate **smart, connected, and semi-autonomous vessels** safely and efficiently.

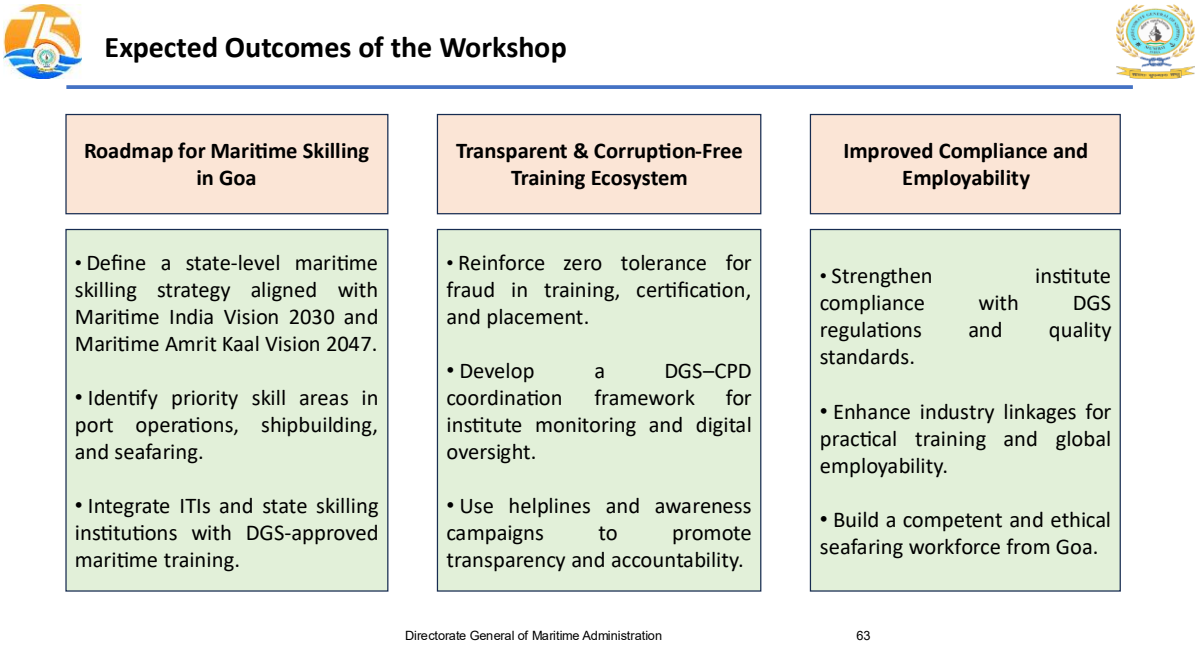
Curriculum Modernisation in MTIs:

Maritime Training Institutes are being encouraged to upgrade curricula through **digital simulators, e-learning platforms, and cyber safety modules**. Course syllabi are being modernised to include **green technologies, automation, and advanced operational practices**, ensuring alignment with future industry needs.

Industry and Institutional Collaboration:

Curriculum development and advanced training content are strengthened through collaboration with **industry stakeholders, DGS, Indian Maritime University (IMU), and classification societies**, ensuring training remains relevant, compliant, and globally benchmarked.

4.14 Expected Outcomes of the Workshop



The workshop is expected to result in a **clear roadmap for maritime skilling in Goa**, aligned with the objectives of **Maritime India Vision 2030** and **Maritime Amrit Kaal Vision 2047**. It will help define a state-level maritime skilling strategy, identify priority skill areas in **port operations, shipbuilding, and seafaring**, and promote the integration of **ITIs and state skilling institutions** with DGS-approved maritime training programmes.

Another key outcome will be the strengthening of a **transparent and corruption-free maritime training ecosystem**. The workshop will reinforce **zero tolerance towards fraud** in training, certification, and placement processes, while facilitating the development of a **DGS–Captain of Ports Department (CPD) coordination framework** for institutional monitoring and digital oversight. Increased use of **helplines and awareness campaigns** is also expected to promote transparency and accountability.

The workshop will further contribute to **improved compliance and employability** by strengthening institutional adherence to **DGS regulations and quality standards**. Enhanced collaboration with industry stakeholders will improve access to **practical training opportunities** and support **global employability** of trainees. Overall, the initiative aims to build a **competent, ethical, and industry-ready seafaring workforce from Goa**, contributing meaningfully to India's maritime sector.

5. PILLAR IV- Maritime Crewing, Employment & Zero Tolerance in Manning

5.1 Ports in Goa

Ports in Goa

Goa, with a coastline of ~**105 km**, is a strategically located maritime state on India's west coast, anchored by the **Mormugao Port Authority**, a key gateway for iron ore, coal, and container traffic. The port supports coastal shipping, cruise tourism, offshore services, and maritime trade, contributing significantly to logistics and blue economy activities. With growing focus on cruise tourism, coastal connectivity, and sustainable maritime development, Goa is strengthening its role in regional trade and marine-based economic growth.

Category	Key Ports	Description
Major Port	Mormugao Port Authority (MPA)	• One of India's 12 major ports • Handles bulk cargo such as iron ore, coal, fertilizers, containers, and cruise vessels • Located in **South Goa**
Non-Major / Private Ports	• **Panaji** • **Chapora** • **Betul** • **Talpona** • **Tiracol**	• Goa has several minor ports administered by the **Goa Ports Department**, mainly supporting fishing, coastal shipping, barges, and tourism

Goa, with a coastline of approximately **105 km**, is a strategically important maritime state located on **India's west coast** along the Arabian Sea. Its coastal position makes it a key player in regional maritime trade, logistics, and the blue economy. The state's port infrastructure supports cargo handling, coastal shipping, tourism, and offshore services.

Strategic Importance

- Goa plays a vital role in maritime trade and logistics on the western coast of India.
- The ports support iron ore exports, coal imports, container traffic, and cruise tourism.
- There is an increasing focus on coastal connectivity, cruise tourism, and sustainable maritime development, strengthening Goa's contribution to regional economic growth.

Major Port in Goa

Mormugao Port Authority (MPA)

- Mormugao Port is one of India's 12 major ports.
- It primarily handles bulk cargo, including:
    - Iron ore

    - Coal
    - Fertilizers
- The port also manages container traffic and cruise vessels.
- It is located in South Goa and acts as a major gateway for exports and imports.
- The port significantly contributes to industrial development, employment, and international trade.

Non-Major / Private Ports in Goa

Goa has several minor (non-major) ports administered by the Goa Ports Department. These ports mainly support local and regional maritime activities.

Key Non-Major Ports:

- Panjim (Panaji)
- Chapora
- Betul
- Talpona
- Tiracol

Functions of Non-Major Ports:

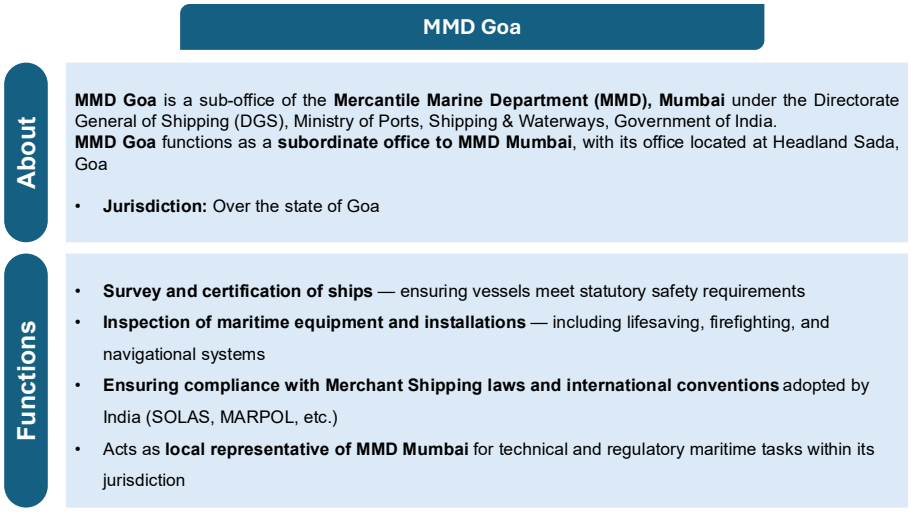
- Support fishing activities
- Enable coastal shipping and barge traffic
- Promote tourism, including river cruises and small passenger vessels
- Assist in local trade and transportation

Overall Significance

- Goa's port system balances large-scale commercial shipping through Mormugao Port with regional and tourism-oriented activities through minor ports.
- The integration of ports with tourism, fisheries, and coastal trade supports Goa's blue economy.
- With growing emphasis on sustainable maritime practices, Goa is strengthening its role in regional trade, connectivity, and economic development.

5.2 Maritime Landscape in Goa – Mercantile Marine Department

Maritime Landscape in Goa– Mercantile Marine Department (MMD)



The **Mercantile Marine Department (MMD) Goa** plays a crucial role in regulating and ensuring safety in maritime activities within the state. It functions under the **Directorate General of Shipping (DGS)**, which operates under the **Ministry of Ports, Shipping and Waterways, Government of India**.

About MMD Goa

- MMD Goa is a sub-office of the Mercantile Marine Department, Mumbai.
- It operates as a subordinate office to MMD Mumbai, handling maritime regulatory responsibilities within Goa.
- The office is located at Headland Sada, Goa.
- Jurisdiction: The department has authority over the entire state of Goa.

MMD Goa acts as the local extension of the central maritime administration, ensuring that national and international maritime regulations are properly enforced at the state level.

Functions of MMD Goa

1. Survey and Certification of Ships

- Conducts statutory surveys of vessels.
- Ensures ships meet safety, construction, and operational standards as required by law.
- Issues necessary certificates for ship operation.

2. Inspection of Maritime Equipment

- Inspects lifesaving appliances, firefighting equipment, and navigational systems.

- Ensures all maritime installations and equipment comply with safety regulations.

3. Compliance with Maritime Laws and Conventions

- Enforces provisions of Merchant Shipping laws.
- Ensures compliance with international maritime conventions adopted by India, such as:
    - SOLAS (Safety of Life at Sea)
    - MARPOL (Marine Pollution Prevention)

4. Regulatory and Technical Role

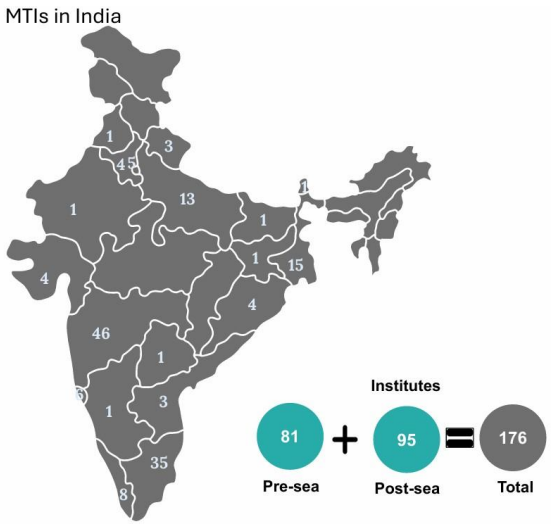
- Acts as the local representative of MMD Mumbai.
- Handles technical and regulatory maritime matters within its jurisdiction.
- Supports safe, lawful, and environmentally responsible maritime operations.

Overall Importance

- MMD Goa ensures maritime safety, environmental protection, and regulatory compliance.
- It strengthens Goa's maritime governance by linking central maritime authorities with local maritime activities.
- The department plays a vital role in supporting shipping, port operations, and coastal trade in Goa.

5.3 Maritime Training Institutes

Maritime Landscape in Goa– Maritime Training Institutes (MTI)



MTIs in Goa

- There are **06 DG** Shipping-approved MTIs in Goa, with **04** post-sea training MTIs and **02** pre-sea course

1. Institute of Maritime Studies
2. Kamaxi Maritime Academy
3. NUSI Maritime Academy
4. Sea Scan Maritime Foundation, Verna
5. Seascan Maritime Foundation, Vasco
6. The Institute of Marine Engineers

Maritime Training Institutes (MTIs) play a crucial role in developing skilled human resources for the shipping and maritime sector. These institutes provide pre-sea and post-sea training and are approved by the Directorate General of Shipping (DG Shipping), Government of India.

MTIs in India (Overview)

- India has a wide network of DG Shipping–approved MTIs spread across coastal and non-coastal states.
- Total MTIs in India: 176
    - 81 Pre-sea training institutes
    - 95 Post-sea training institutes
- These institutes train seafarers for careers in navigation, marine engineering, safety, and maritime operations, supporting India's global maritime workforce.

MTIs in Goa

- Goa has 06 DG Shipping–approved Maritime Training Institutes.
- These include:
    - 04 Post-sea training institutes
    - 02 Pre-sea training institutes
- Despite its small size, Goa holds an important position in maritime education due to its strong seafaring tradition and coastal location.

List of Maritime Training Institutes in Goa

1. Institute of Maritime Studies
2. Kamaxi Maritime Academy
3. NUSI Maritime Academy
4. Sea Scan Maritime Foundation, Verna
5. Seascan Maritime Foundation, Vasco
6. The Institute of Marine Engineers

Role and Importance of MTIs in Goa

- Provide professional maritime education and skill development.
- Train candidates for careers as deck officers, marine engineers, and maritime professionals.
- Offer post-sea competency enhancement courses for experienced seafarers.
- Contribute to employment generation and strengthen Goa's role in India's maritime sector.

- Support national goals of safe shipping, regulatory compliance, and skilled manpower development.

Conclusion

Maritime Training Institutes in Goa form an essential part of the state's maritime ecosystem. Along with ports and regulatory bodies like MMD Goa, MTIs help build a **competent, skilled, and internationally compliant maritime workforce**, reinforcing Goa's contribution to India's maritime economy.

5.4 Career Prospects in the Merchant Navy in Goa

Career prospects in the Merchant Navy in Goa

Goa contributes **nearly 5.8% of India's total seafarers** and has a strong port-led growth and employment potential. The limited presence of active RPSL operators indicates a **need for greater compliance support and capacity building** in the state.

Valid RPSL Companies in Goa	Invalid RPSL companies in Goa
Joncia Marine Services, Goa	METI Shipping Mgmt
Crest Maritime Services	Anchorjobs Goa Private Limited
M/S.Seafarers	M/S. Sasas Manpower Serivces Private Limited
QShip Maritime Management Pvt. Ltd.	M/S. New Era Shipping Private Limited
Marinetech Ship Managers And Surveyors	M/S. Siyaram Marine Services Private Limited
Kamaxi Overseas Consultants	Regal International Private Limited
M/S Shipteck Marine Solutions Pvt. Ltd.	Shirodkar Ocean Empire Private Limited
M/S. Aark Shipping & Manning Pvt. Ltd.	
Ouvert Marine Solutions Private Limited	
Kamaxi Overseas Consultants LLP	

- *While Goa provides a promising career in the Merchant Navy, yet the limited presence of RPSL companies suggest a need for strong regulations.*
- *DG Shipping is proactively managing the maritime ecosystem to provide fruitful Merchant Navy careers.*

Awareness and monitoring initiatives

- Prevent **fraudulent recruitment** and exploitation of aspiring seafarers
- Promote **ethical and transparent recruitment practices**
- Ensure engagement **only with licensed and verified RPSL operators**

Goa plays a significant role in India's maritime workforce, contributing nearly 5.8% of the country's total seafarers. With its strategic coastal location, port-led economic activities, and maritime heritage, the state offers strong potential for employment generation in the Merchant Navy. However, this potential needs to be supported by a robust and well-regulated recruitment ecosystem to ensure sustainable and ethical career pathways for aspiring seafarers.

RPSL Presence and Regulatory Landscape

Despite Goa's considerable contribution to the seafaring workforce, the number of active and compliant Recruitment and Placement of Seafarers License (RPSL) operators in the state remains limited. The slide highlights a clear distinction between valid RPSL companies and those that are invalid or non-compliant, underscoring the regulatory challenges in the region.

The presence of invalid or non-licensed entities increases the risk of:

- Fraudulent recruitment practices
- Exploitation of seafarers, especially first-time entrants and ratings
- Lack of grievance redressal and accountability

This situation points to the need for greater compliance support, stricter monitoring, and increased awareness among seafarers regarding engagement only with authorized RPSL holders.

Role of DG Shipping

The Directorate General of Shipping (DG Shipping) plays a pivotal role in managing and regulating the maritime recruitment ecosystem. As reflected in the slide, DG Shipping is proactively engaged in strengthening oversight mechanisms, promoting transparency, and ensuring that recruitment practices align with national and international maritime standards. These efforts are essential to ensure that the promising career opportunities in the Merchant Navy translate into safe, ethical, and rewarding employment for seafarers from Goa.

Awareness and Monitoring Initiatives

The slide emphasizes the importance of targeted awareness and monitoring initiatives, particularly in regions with high seafarer concentration and limited licensed recruiters. Key focus areas include:

- **Prevention of fraudulent recruitment and exploitation** of aspiring seafarers by unlicensed agents or intermediaries.
- **Promotion of ethical and transparent recruitment practices**, ensuring fair contracts, proper documentation, and compliance with statutory requirements.
- **Encouraging engagement only with licensed and verified RPSL operators**, thereby reducing risks related to illegal placement and employment disputes.

To fully harness Goa's potential as a seafarer-supplying state, coordinated efforts are required involving DG Shipping, state authorities, maritime training institutes, welfare organizations, and industry stakeholders. Strengthening regulatory compliance, expanding the presence of valid RPSL operators, and enhancing awareness among seafarers will collectively contribute to a safer and more resilient maritime employment ecosystem.

5.5 Seafaring as a Lucrative Career for Youth in Goa

Seafaring as a lucrative career for youth in Goa

With a growing talent pool that ranks seventh nationally, contributing approximately **38,669** seafarers as of June 2024, Goa possesses immense human capital potential

Strategies to realise the full potential of the human capital of the state

- Addressing governance challenges, particularly the prevalence of fraudulent recruitment, unregistered crewing agents, and exploitation of aspiring seafarers
- Aggressively expand its ethical recruitment network
- Explore employment opportunities in the cruise tourism sector in Goa
- Strengthening regulatory oversight through the existing MMD Goa
- Strengthening of state-specific welfare and insurance scheme (Comprehensive Goa Welfare/Pension Scheme)
- Build a conducive environment for on-shore employment opportunities post retirement of the seafarers

Seafaring continues to be a high-value employment avenue for Indian youth, offering competitive remuneration, global exposure, and long-term career progression. Goa, with its maritime legacy and coastal advantage, has emerged as a significant contributor to India's seafaring workforce.

As of **June 2024**, Goa ranks **seventh nationally**, contributing approximately **38,669 seafarers**, reflecting the state's strong and growing human capital in the maritime sector. This sizeable talent pool underscores Goa's potential to position seafaring as a preferred and sustainable career choice for its youth, provided enabling policy, regulatory, and welfare frameworks are strengthened.

Human Capital Potential

The presence of a large number of trained and aspiring seafarers highlights Goa's comparative advantage in the maritime labour market. However, realizing the full economic and social benefits of this human capital requires addressing systemic challenges related to recruitment, regulation, welfare, and post-sea employment.

Strategies to Realise the Full Potential of Goa's Seafaring Workforce

1. **Addressing Governance and Recruitment Challenges**

   A key concern affecting the attractiveness of seafaring as a career is the prevalence of fraudulent recruitment practices, unregistered crewing agents, and exploitation of aspiring seafarers. Strengthening enforcement, increasing awareness, and ensuring strict action against non-compliant entities are critical to restoring confidence among youth and their families.

2. **Expansion of Ethical Recruitment Networks**

There is a need to aggressively expand and promote ethical, transparent, and licensed recruitment channels. Encouraging engagement only with authorized RPSL operators will help safeguard seafarers' rights and improve employment outcomes.

3. **Exploring Opportunities in Cruise Tourism**

   Goa's growing prominence as a cruise tourism destination presents significant employment opportunities for local youth in hospitality, marine operations, and support services aboard cruise vessels. Focused skilling and placement initiatives can help tap this emerging segment.

4. **Strengthening Regulatory Oversight through MMD Goa**

   Enhancing the role and capacity of the Mercantile Marine Department (MMD) Goa is essential for effective oversight of certification, documentation, recruitment compliance, and grievance redressal, thereby ensuring a secure and well-regulated seafaring ecosystem.

5. **Strengthening State-Specific Welfare and Insurance Schemes**

   Augmenting existing state-level welfare measures, including comprehensive welfare and pension schemes for seafarers, will provide long-term financial security and improve the overall attractiveness of maritime careers.

6. **Creating On-Shore Employment Opportunities Post Retirement**

   Building a conducive ecosystem for shore-based employment after sea service—such as roles in maritime training, port operations, logistics, safety management, and administration—will ensure career continuity and better life-cycle planning for seafarers.

By addressing governance gaps, strengthening ethical recruitment, expanding welfare support, and creating post-sea employment pathways, Goa can fully harness its maritime human capital. A coordinated approach involving state authorities, DG Shipping, industry stakeholders, and welfare institutions will be key to positioning seafaring as a safe, aspirational, and lucrative career for the youth of Goa.

5.6 Growing number of seafarers require a better training and placement ecosystem

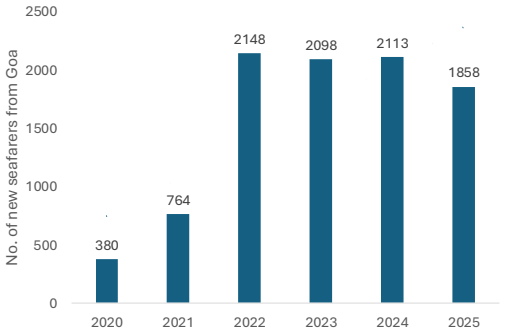
Growing number of seafarers require a better training and placement ecosystem

As of June 2024, Goa ranks **seventh** among Indian states in seafarer supply, contributing around **5.8% of India's total seafaring workforce**. The state's maritime talent pool has shown steady growth at a rate of **37% from 2020,** reaching a cumulative strength of **38,669 seafarers**.

With rising seafarer numbers, the **demand for Maritime Training Institutes (MTIs)** is expected to increase.

The existing and new MTIs shall also prioritize on-

- Equipped with **modern simulators and digital training tools**
- Supported by **qualified and industry-experienced faculty**
- Focused on producing **competent, future-ready seafarers** aligned with emerging technologies and global standards



Goa has emerged as a key contributor to India's maritime workforce, reflecting both its coastal advantage and long-standing maritime culture. As of June 2024, Goa ranks seventh among Indian states in terms of seafarer supply, contributing approximately 5.8% of India's total seafaring workforce. The state's maritime talent pool has witnessed steady growth of about 37% since 2020, reaching a cumulative strength of 38,669 seafarers.

This sustained increase in seafarer numbers highlights the growing interest of Goan youth in maritime careers and underscores the importance of developing a robust training and placement ecosystem to support this growth.

Rising Demand for Maritime Training Institutes (MTIs)

With the increasing number of aspiring and active seafarers, the demand for Maritime Training Institutes (MTIs) both existing and new is expected to rise significantly. MTIs play a critical role in shaping the competence, safety awareness, and employability of seafarers, and their capacity and quality must keep pace with workforce growth.

The data trend depicted in the slide shows a sharp rise in the number of new seafarers from Goa between 2020 and 2024, reinforcing the need for scalable and high-quality training infrastructure.

Focus Areas for Strengthening MTIs

To meet future requirements and global industry expectations, MTIs in Goa need to prioritize the following key areas:

1. **Modern Training Infrastructure**

MTIs should be equipped with advanced simulators, digital learning platforms, and technology-enabled training tools that reflect real-world shipboard operations and emerging maritime technologies.

2. **Qualified and Industry-Experienced Faculty**

   Training quality is directly linked to instructor capability. MTIs must be supported by qualified faculty with relevant sea-going and industry experience, ensuring practical, up-to-date, and regulation-compliant training.

3. **Future-Ready Skill Development**

   Training programs should focus on producing competent, future-ready seafarers, aligned with:

   - Emerging technologies such as automation and digital navigation systems
   - International conventions and standards (STCW and beyond)
   - Evolving industry requirements and safety expectations

Need for an Integrated Training and Placement Ecosystem

Beyond training capacity, there is a growing need to strengthen placement linkages between MTIs, licensed recruitment agencies (RPSLs), and shipping companies. A coordinated ecosystem will help ensure that trained seafarers are smoothly absorbed into employment, reducing underemployment and skill mismatches.

The steady growth of Goa's seafaring workforce presents both an opportunity and a responsibility. By investing in modernized MTIs, skilled faculty, and industry-aligned training frameworks, Goa can ensure that its expanding maritime talent pool remains globally competitive, employable, and well-prepared for the future of the shipping industry. A strong training and placement ecosystem will be central to sustaining this growth and maximizing the long-term benefits of seafaring as a career for Goan youth.

5.7 Steps taken by Government of Goa

Multiple steps are being taken to improve the lives of Goan seafarers – Home Department, Government of Goa

Case Study: Goa Welfare / Pension Scheme for Seafarers, 2023

- A state government initiative by the Home Department, Government of Goa, designed to provide financial security to retired seamen.
- **Eligible Beneficiaries:**
  - Must be an Indian citizen and a bona fide resident of Goa (by birth or parentage).
  - Retired or medically invalidated seafarer, aged 60 years or above.
  - Minimum 10 years (120 months) of sea service; up to 6-month break allowed.
  - Widows of deceased seafarers eligible if Goan residents for 15+ years and annual income below ₹1.2 lakh.
- **Financial Assistance:** A monthly gross pension of ₹2,500/- directly through Direct Benefit Transfer (DBT)
- **Aim:** To help retired seafarers and, on compassionate grounds, the widows of deceased seamen, maintain a decent standard of living during their retirement.

Goa Welfare / Pension Scheme for Seafarers, 2023

Home Department, Government of Goa

The Government of Goa, through its Home Department, has undertaken multiple initiatives aimed at improving the socio-economic well-being of Goan seafarers and their families. One of the key measures in this direction is the Goa Welfare / Pension Scheme for Seafarers, 2023, which addresses the long-term financial security of retired seafarers and the dependents of deceased seamen.

Background and Rationale

Seafaring is a demanding profession that involves prolonged periods away from home, exposure to occupational risks, and limited opportunities for post-retirement income. While Goan seafarers have historically contributed significantly to the maritime workforce, many face financial uncertainty after retirement, especially in the absence of structured pension systems in earlier decades.

Recognizing this gap, the Government of Goa introduced this welfare-cum-pension scheme to ensure dignity, financial stability, and social security for retired seafarers and, on compassionate grounds, for widows of deceased seamen.

Nature of the Scheme

The scheme is a state government welfare initiative administered by the Home Department, Government of Goa. It is designed as a direct financial assistance program, with benefits transferred directly to eligible beneficiaries through the Direct Benefit Transfer (DBT) mechanism, ensuring transparency and efficiency.

Eligibility Criteria

The scheme clearly defines eligibility to ensure that benefits reach genuine and deserving beneficiaries:

1. **Citizenship and Residency**
    - The applicant must be an Indian citizen.
    - Must be a bona fide resident of Goa, either by birth or parentage.
2. **Seafarer Status**
    - The applicant must be a retired seafarer or a seafarer who has been medically invalidated.
    - The minimum age requirement is 60 years or above.
3. **Sea Service Requirement**
    - A minimum of 10 years (120 months) of sea service is mandatory.
    - A cumulative break of up to six months in service is permissible.
4. **Widows of Deceased Seafarers**
    - Widows are eligible on compassionate grounds, provided:
        - They have been residents of Goa for 15 years or more.
        - Their annual income does not exceed ₹1.2 lakh.

Financial Assistance

- Eligible beneficiaries receive a monthly gross pension of ₹2,500.
- The pension amount is disbursed directly into the beneficiary's bank account through DBT, minimizing delays and administrative inefficiencies.

Objectives of the Scheme

The primary objectives of the Goa Welfare / Pension Scheme for Seafarers are:

- To provide financial security to retired seafarers who no longer have a steady source of income.
- To offer compassionate support to widows of deceased seamen, helping them maintain a basic standard of living.
- To acknowledge and honor the contribution of Goan seafarers to the maritime sector.
- To promote social welfare and dignity in retirement for maritime professionals.

Significance and Impact

This scheme represents an important step by the Government of Goa in strengthening the social safety net for seafarers. By institutionalizing pension support, it sets a benchmark for other

maritime states to follow. The initiative also reinforces the government's commitment to inclusive growth and welfare-oriented governance within the maritime sector.

Overall, the Goa Welfare / Pension Scheme for Seafarers, 2023, is a meaningful intervention that addresses long-standing concerns of retired seafarers and their families, ensuring financial assistance, social recognition, and improved quality of life.

5.8 Steps taken by DG Shipping, Government of India

Steps are being taken by the DG Shipping, Government of India for the welfare of seafarers

DG Shipping has taken multiple steps for the welfare of seafarers, including provisioning of welfare schemes, development of seafarers welfare infrastructure, and other welfare initiatives.

No.	Welfare Schemes	No. of Benef.	Amt. (01.04.2024 - 30.11.2025)
1	Survivor's Benefit Scheme	97	₹ 3,15,80,000.00
2	Old Age Benefit Scheme	439	₹ 2,19,50,000.00
3	MEMA Assistance	135	₹ 16,87,500.00
4	Invalidity Benefit Scheme	1	₹ 2,00,000.00
5	Family Benefit Scheme	8	₹ 3,25,000.00
6	Maternity Benefit Scheme	1	₹ 25,000.00
7	COVID-19 Assistance Scheme	1	₹ 65,000.00
8	Spouses of Deceased Seafarers	3,246	₹ 8,11,50,000.00
9	Super Senior Indian Seafarers	1,278	₹ 3,19,50,000.00
10	Death on Board Benefit Scheme	34	₹ 65,60,000.00
	Total	**5,240**	**₹ 17,54,92,500.00**

- *The DG Shipping, along with port authorities and funding from the SWFS, is building or revamping seafarers' welfare facilities across India*
- *Seafarers' Club is being re-constructed in Mormugao Port complex at a cost of INR 12.5 crores.*

The Directorate General of Shipping (DG Shipping), under the Ministry of Ports, Shipping and Waterways, Government of India, has undertaken several comprehensive measures to enhance the welfare, social security, and quality of life of Indian seafarers and their families. These initiatives encompass financial assistance schemes, infrastructure development, and long-term welfare support systems, implemented in collaboration with port authorities and funded through the Seafarers' Welfare Fund Society (SWFS).

Welfare Schemes and Financial Assistance

DG Shipping administers a range of welfare schemes aimed at addressing various life-cycle needs of seafarers, including old age support, survivor benefits, family assistance, and emergency relief. Between 1 April 2024 and 30 November 2025, the following schemes were implemented:

Overall Impact:

A total of 5,240 beneficiaries were supported under various schemes, with cumulative financial assistance amounting to ₹17.54 crore, reflecting the government's strong commitment to seafarer welfare.

No.	Welfare Schemes	No. of Benef.	Amt. (01.04.2024 - 30.11.2025)
1	Survivor's Benefit Scheme	97	₹ 3,15,80,000.00
2	Old Age Benefit Scheme	439	₹ 2,19,50,000.00
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10	Death on Board Benefit Scheme	34	₹ 65,60,000.00
	Total	**5,240**	**₹ 17,54,92,500.00**

Development of Welfare Infrastructure

In addition to direct financial assistance, DG Shipping has focused on strengthening welfare infrastructure across India:

- In collaboration with port authorities and funding from the Seafarers' Welfare Fund Society (SWFS), DG Shipping is actively building and revamping seafarers' welfare facilities at multiple ports.
- These facilities aim to provide recreational, accommodation, counselling, and support services for seafarers during shore leave and transitional periods.

A flagship project under this initiative is the reconstruction of the Seafarers' Club at Mormugao Port, which is being redeveloped at an estimated cost of ₹12.5 crore. The upgraded facility is expected to serve as a modern welfare and recreational hub for seafarers, significantly enhancing their onshore experience.

The multi-pronged approach adopted by DG Shipping demonstrates a holistic vision for seafarer welfare combining financial security, social protection, and infrastructure development. These initiatives not only support seafarers during active service and retirement but also extend compassionate assistance to their families in times of need.

By strengthening welfare mechanisms and investing in dedicated infrastructure, DG Shipping continues to reinforce India's position as a responsible maritime administration committed to the well-being, dignity, and long-term security of its seafaring community.

5.9 Alternate Career Pathways

Leverage economy of Goa to build alternate career pathways post Merchant Navy careers

Goa may build a conducive environment for seafarers who have completed their on-sea careers and help them reintegrate with on-shore careers post retirement.

Port-led development	Ship repair and maintenance	Cruise Tourism
• Marmugao Port Authority is being targeted for targeted investments in modernisation, mechanisation, and hinterland connectivity to expand its role in regional trade, cruise, costal shipping etc.	• Goa has considerable presence of shipyards and technical institutions • Potential to develop ship repair, dry docking, and ancillary marine services	• Strong and competitive advantage for cruise tourism in Goa • Strong competitive advantage with presence of high number of domestic and international tourists

Marine Surveying and Classification	Logistics, Supply Chain, and Port-based Industries	Maritime Entrepreneurship
• Roles in ship survey, marine inspection, and statutory certification processes, leveraging their hands-on operational expertise	• Leadership roles in coastal shipping, logistics parks, and multimodal transport hubs	• Entrepreneurship through incubation and financial support for startups in ship repair, marine equipment services, green shipping technologies, and coastal tourism

Leveraging the Economy of Goa to Build Alternate Career Pathways Post Merchant Navy Careers

This slide focuses on how **Goa's unique maritime-oriented economy** can be strategically leveraged to create **sustainable on-shore career opportunities** for seafarers after they complete their active sailing careers. Given Goa's strong port infrastructure, tourism base, and maritime ecosystem, the state is well positioned to support the **reintegration of retired or shore-transitioning seafarers** into productive employment.

Overall Objective

To create a **conducive post-sea career ecosystem** that utilizes the skills, experience, and leadership qualities of seafarers, while simultaneously strengthening Goa's maritime and coastal economy.

Key Opportunity Areas

1. Port-led Development

Mormugao Port Authority is undergoing targeted investments in:

- Modernisation and mechanisation
- Improved hinterland connectivity
- Expansion of cargo handling and cruise operations

Career Opportunities for Seafarers:

- Port operations and management
- Marine terminal supervision

- Safety, compliance, and operational planning
- Coastal shipping and cruise-related services

Impact:
Experienced seafarers can transition into supervisory and managerial roles, leveraging their operational knowledge of port and ship interfaces.

2. Ship Repair and Maintenance

Goa has a strong base of:

- Shipyards
- Engineering workshops
- Technical and training institutions

Growth Potential Includes:

- Ship repair and refit services
- Dry docking operations
- Marine equipment servicing
- Ancillary maritime services

Career Opportunities for Seafarers:

- Technical supervisors
- Marine engineers and inspectors
- Maintenance planners and trainers

Impact:
Creates technically aligned employment for ex-seafarers, especially marine engineers and technical officers.

3. Cruise Tourism

Goa enjoys a **strong competitive advantage** in cruise tourism due to:

- Established tourism infrastructure
- High domestic and international tourist inflow
- Growing cruise ship calls at Goan ports

Career Opportunities for Seafarers:

- Cruise operations management
- Port cruise coordination
- Shore excursion planning

- Maritime hospitality and safety roles

Impact:
Allows seafarers to apply their passenger ship experience in a fast-growing tourism-driven maritime sector.

4. Marine Surveying and Classification

Seafarers possess hands-on operational expertise that is highly relevant for:

- Ship surveys
- Marine inspections
- Statutory certification processes
- Compliance with international conventions

Career Opportunities Include:

- Marine surveyors
- Flag state and port state inspectors
- Classification society roles
- Safety and quality auditors

Impact:
Provides high-value professional pathways with strong alignment to global maritime standards.

5. Logistics, Supply Chain, and Port-based Industries

With the expansion of:

- Coastal shipping
- Logistics parks
- Multimodal transport hubs

Career Opportunities for Seafarers:

- Leadership and management roles in logistics operations
- Coastal shipping coordination
- Port-linked supply chain planning

Impact:
Utilizes leadership, coordination, and risk management skills developed during seafaring careers.

6. Maritime Entrepreneurship

Goa can encourage **maritime entrepreneurship** through:

- Startup incubation
- Access to finance and mentoring
- Policy and institutional support

Potential Venture Areas:

- Ship repair and marine equipment services
- Green shipping and maritime technologies
- Coastal and marine tourism enterprises

Impact:
Empowers ex-seafarers to become job creators, not just job seekers, while strengthening the local maritime economy.

By strategically leveraging its port infrastructure, tourism strength, technical base, and entrepreneurial ecosystem, Goa can emerge as a model state for post-Merchant Navy career transitions. Creating structured pathways for seafarers to move into onshore roles will:

- Enhance workforce retention within the maritime sector
- Ensure economic security for seafarers post-retirement
- Support sustainable growth of Goa's maritime economy

This approach not only benefits individual seafarers but also contributes to the long-term resilience and competitiveness of India's maritime ecosystem.

5.10 Maritime Events

Maritime events regularly being held to improve careers in the Merchant Navy

Maritime Skill Conclave 2025 – Panjim – November 2025

Focus Areas-

- **Talent** – Building the Global Maritime Workforce
- **Training** – Standards, Certification & Competency Pathways
- **Technology** – Smart Shipping & Digital Transformation
- **Teamwork** – Industry–Academia–Government Collaboration
- **Thrive** – Sustainability & Blue Economy

Day of the Seafarers, Margoa–June 2025

Focus Areas-

- Recognizing and celebrating the contribution of Indian seafarers
- Highlighting skill development, STCW compliance, and career growth
- Showcasing innovations in shipping and maritime operations
- Strengthening industry–academia–government collaboration
- Promoting welfare, safety, and sustainability in the maritime sector

"Mighty Mariner" – Maritime Career Guidance Summit (Goa Edition) - July 2025

Focus Areas-

- Inspiring and Guiding the Next Generation of Seafarers
- Regulatory Awareness, Standards & Career Pathways
- Professional Ethics, Resilience & Career Growth
- Diverse Opportunities Across the Maritime Sector
- Aligning Education with Evolving Industry Needs

- Focus on building employability and competency frameworks by addressing concerns of technological and regulatory shifts
- Focus on building respectful and safe working environments aboard ships
- To inspire and guide aspirational youth to take up role in the maritime industry, including seafaring

Maritime Events Regularly Being Held to Improve Careers in the Merchant Navy

This slide highlights key maritime-focused events that are being regularly organized in India to strengthen career pathways, skills, and long-term employability in the Merchant Navy. These initiatives collectively aim to build a future-ready maritime workforce by addressing talent development, training standards, technology adoption, welfare, and sustainability.

1. Maritime Skill Conclave 2025

Location: Panjim, Goa

Timeline: November 2025

The Maritime Skill Conclave serves as a high-level platform bringing together industry leaders, training institutions, policymakers, and government bodies to discuss the future of maritime skills.

Key Focus Areas:

- **Talent Development:**

  Emphasis on building a globally competitive maritime workforce capable of meeting international shipping demands.

- **Training & Certification:**

  Strengthening standards, certification systems, and competency-based training pathways aligned with global norms.

- **Technology & Digital Transformation:**

  Focus on smart shipping, automation, and digital tools shaping modern maritime operations.

- **Teamwork & Collaboration:**

  Promoting coordinated efforts between industry, academia, and government to bridge skill gaps.

- **Sustainability & Blue Economy:**

  Encouraging environmentally responsible shipping practices and sustainable maritime growth.

Overall Objective:

To align India's maritime skill ecosystem with future industry needs and global benchmarks.

2. Day of the Seafarers

Location: Margao, Goa

Timeline: June 2025

This event is dedicated to recognizing and celebrating Indian seafarers and their vital contribution to global trade and maritime safety.

Key Focus Areas:

- Acknowledging the role and sacrifices of Indian seafarers
- Highlighting skill development, STCW compliance, and structured career growth
- Showcasing innovations in shipping and maritime operations
- Strengthening industry–academia–government collaboration
- Promoting welfare, safety, mental well-being, and sustainability in maritime careers

Overall Objective:

To enhance awareness, morale, and professional standards while reinforcing India's position as a major seafaring nation.

3. "Mighty Mariner" – Maritime Career Guidance Summit (Goa Edition)

Timeline: July 2025

The "Mighty Mariner" summit is a career-oriented initiative focused on youth engagement and guidance for aspiring seafarers.

Key Focus Areas:

- Inspiring and guiding the next generation of seafarers
- Creating awareness about regulatory frameworks, standards, and career pathways
- Emphasizing professional ethics, resilience, and long-term career growth
- Showcasing diverse career opportunities across the maritime sector
- Aligning maritime education with evolving industry requirements

Overall Objective:

To provide clarity, motivation, and direction to students and young professionals considering maritime careers.

Cross-Cutting Themes Across All Events

Few common strategic priorities shared across these initiatives:

- **Employability & Competency Frameworks:**

  Addressing challenges posed by rapid technological advancements and regulatory changes.

- **Safe and Respectful Work Environments:**

  Promoting dignity, safety, and well-being onboard ships.

- **Youth Inspiration & Career Awareness:**

  Encouraging aspirational youth to pursue careers in maritime and seafaring professions.

6. PILLAR V - Sustainability, Environment & Decarbonisation

6.1 Background

6.1.1 Introduction

The maritime sector forms the backbone of global trade, handling nearly **80 percent of global merchandise by volume and 70 percent by value**, making it one of the most critical enablers of the world economy. Its scale and connectivity also mean that its environmental footprint is significant, particularly in terms of **greenhouse gas emissions, waste generation and impacts on coastal ecosystems**.

In recognition of these challenges, the **International Maritime Organization (IMO)** adopted in 2023 its **Revised Strategy on Reduction of GHG Emissions from Ships**, targeting **Net Zero emissions by 2050**. This global goal necessitates systemic decarbonisation, enhanced energy efficiency and adoption of cleaner fuels across the shipping and port ecosystem.

India, as a major maritime nation, has aligned itself with this agenda through the **Maritime India Vision 2030 (MIV 2030)**, the **Maritime Amrit Kaal Vision 2047 (MAKV 2047)** and the forthcoming **National Green Shipping Policy (NGSP)**, all of which establish structured pathways for green port operations, low-carbon shipping and digitalised environmental governance.
The **Harit Sagar – Green Port Guidelines (2023)** further institutionalise environmental accountability by mandating a **30 percent reduction in carbon intensity per tonne of cargo handled by 2030 and 70 percent by 2047**, achieved through clean energy, efficient waste systems and monitoring via defined **Environmental Performance Indicators (EPIs)**.

The **Directorate General of Shipping (DGS)**, as India's national maritime authority, is implementing these priorities through conventions such as **MARPOL**, digital platforms like the **Swachh Sagar Portal** and initiatives on **green-fuel readiness, environmental auditing and marine-ecosystem management**.

6.1.2 Waste Management and Disposal (at Ports and Along the Coast)

Waste management forms a fundamental component of port environmental performance. Ports generate multiple waste streams like **oily residues, bilge water, sewage, garbage, plastics, hazardous waste and e-waste**, all of which, if mishandled, can cause severe marine pollution and ecological damage.

In addition, the growing concern of **Lost, Abandoned and Discarded Fishing Gear (LADFG)**, or "ghost gear," has emerged as a critical issue along India's coastline. Such gear contributes substantially to marine debris, entangling fish, marine mammals and turtles and damaging benthic habitats. The **IMO - FAO GloLitter Partnership** encourages port authorities and coastal states to recover, register and recycle LADFG through port reception systems, a practice that can be adopted within India's Swachh Sagar framework.

Major ports have implemented structured waste systems with **segregation, storage and certified disposal** through authorised vendors. The **Swachh Sagar Portal** digitally records the type, volume and disposal pathway of ship-generated waste, ensuring traceability and accountability. Some ports, such as **JNPA** and **Cochin**, have also introduced real-time waste tracking, vendor-performance evaluation and automated waste receipts.

However, **non-major and private ports** still lag behind in establishing certified reception and treatment facilities. Smaller fishing harbours and coastal jetties frequently rely on informal or manual disposal, leading to unmonitored dumping of waste and fishing gear in near-shore waters. Integrating these smaller facilities into **digital waste-management networks**, supported by **cluster-based collection and disposal systems**, will ensure environmental uniformity across India's 11098 km coastline.

Extending port waste-management frameworks to **coastal settlements, shipyards and fisheries landing sites** is equally vital. Collaboration with local municipal bodies, fisheries departments and SPCBs can help extend the circular economy to cover **ship waste, plastics, used oil and recovered LADFG**, thus enabling comprehensive coastal cleanliness and ecosystem protection.

6.1.3 MARPOL Annexes and Environmental Compliance

The **International Convention for the Prevention of Pollution from Ships (MARPOL)**, implemented in India through DGS, remains the global cornerstone for marine environmental protection. It comprises six key Annexes governing:

- **Annex I:** Oil pollution prevention,
- **Annex II:** Noxious liquid substances,
- **Annex III:** Harmful substances in packaged form,
- **Annex IV:** Sewage from ships,
- **Annex V:** Garbage from ships and
- **Annex VI:** Air pollution and GHG emissions.

India enforces MARPOL through **Port State Control (PSC)** inspections of foreign vessels and **Flag State Inspections (FSI)** of Indian ships. DGS periodically issues circulars

specifying compliance procedures and reporting protocols. Major ports such as **JNPA, VOC and Deendayal** maintain established inspection teams and vendor networks. However, non-major ports face persistent gaps, shortage of trained personnel, lack of integrated digital reporting and dependence on third-party handlers. Improved coordination between DGS regional offices, SPCBs and State Maritime Boards will strengthen uniform enforcement nationwide.

6.1.4 Port Reception Facilities (PRFs)

Port Reception Facilities (PRFs) constitute a critical component of maritime environmental governance, ensuring that ship-generated waste is received, handled and disposed of in an environmentally sound manner. PRFs serve as the operational interface between the requirements of MARPOL Annexes I to V and port-level waste-management systems, preventing the discharge of oily residues, sewage, garbage and other harmful substances into coastal and inland waters.

In India, major ports under the Ministry of Ports, Shipping and Waterways maintain established PRFs for oily waste, sewage and garbage through certified service providers, with waste-receipt and disposal data digitally recorded on the Swachh Sagar Portal. In contrast, non-major ports, fishing harbours and riverine jetties often face structural constraints arising from lower waste volumes, seasonal vessel traffic and limited investment viability. As a result, PRF coverage at such locations is frequently partial, with facilities largely restricted to oily sludge and basic garbage handling, and limited arrangements for sewage, plastics, hazardous waste or recovery of lost, abandoned or discarded fishing gear.

The Harit Sagar – Green Port Guidelines (2023) mandate all ports, including non-major ports, to establish or access certified PRFs for all applicable waste streams and to undergo periodic independent environmental audits. The Guidelines also encourage shared or cluster-based PRF models where individual port volumes do not justify standalone facilities, enabling cost efficiency while maintaining regulatory compliance and digital traceability.

6.1.5 PRFs in the Goa State

Goa's maritime profile presents a distinct PRF requirement compared to large cargo-handling states. With a coastline of 193.95 km, a dense network of inland waterways and rivers, and extensive use of jetties by fishing vessels, passenger ferries, tourism crafts and inland vessels, the majority of waste generation occurs in dispersed, riverine and near-shore environments rather than at a single large port interface.

The Captain of Ports Department, Government of Goa, as the nodal authority for non-major ports and inland waterways, oversees a wide network of government and private jetties, fishing landing centres and inland vessel operations. In this context, PRF systems

must cater not only to conventional ship-generated waste but also to sewage and solid waste from passenger vessels, cruise support crafts and tourism-oriented water transport, in addition to fishing-related waste and gear.

Strengthening PRFs in Goa therefore calls for a river- and cluster-based approach, wherein strategically located reception and aggregation points along major waterways such as the Mandovi, Zuari, Chapora and Sal rivers serve multiple jetties and vessel categories. Such an approach would allow waste to be collected at scale, transported to authorised treatment or disposal facilities and digitally tracked through integrated reporting systems.

6.1.6 Shore Power (Onshore Power Supply – OPS)

Shore Power enables vessels to connect to the port's electrical grid while berthing, allowing auxiliary engines to be shut down. This eliminates in-port emissions of CO_2, NO_x, SO_x and particulate matter, significantly improving local air quality and reducing noise levels. Globally, ports such as **Rotterdam, Los Angeles and Singapore** have adopted OPS as a key decarbonisation measure, with major cruise and cargo operators now preferring OPS-enabled ports for their sustainability credentials.

In India, Shore Power, often referred to as **Shore Power Supply (SPS)** is being gradually implemented in line with the **Harit Sagar – Green Port Guidelines (2023)**, which outline a phased deployment plan:

- **Phase I (by 2025):** For tugs, pilot boats and small crafts.
- **Phase II (by 2030):** For coastal and feeder vessels.
- **Phase III (beyond 2030):** For international and cruise ships.

Implementation in Key Indian Ports:

- **Kamarajar Port (Ennore):** 500 kW SPS operational at 400 V, 50–60 Hz, installed at Coal Berths 1 and 2.
- **VO Chidambaranar Port (Tuticorin):** 305 kW SPS operational at 400 V, 60 Hz, serving VOC Berths 2 and 3.
- **Jawaharlal Nehru Port Authority (Mumbai):** SPS currently used for tugs; expansion planned for all terminals (45 MVA capacity, estimated investment ≈ INR 600 crore).
- **Cochin, Kandla and Paradip Ports:** Feasibility studies in progress for large-vessel OPS integrated with renewable energy sources.

Goa's maritime profile presents a distinct and particularly relevant use case for Shore Power. With a coastline of 193.95 km, an extensive network of inland waterways and a high concentration of passenger ferries, tourism vessels, cruise support crafts and small harbour vessels, the environmental benefits of OPS in Goa are closely linked to local air quality, noise reduction and protection of sensitive riverine and coastal ecosystems.

Unlike large cargo-dominated ports, vessel activity in Goa is heavily concentrated around riverine jetties, ferry terminals and near-shore berthing locations in close proximity to urban centres and tourism hubs. In such settings, emissions from auxiliary engines during berthing can have a direct impact on surrounding communities, heritage zones and ecologically sensitive stretches of rivers such as the Mandovi and Zuari.

The Captain of Ports Department, Government of Goa, oversees a wide network of government and private jetties supporting inland vessel operations, passenger transport, water sports and tourism activities. Shore Power, in this context, is relevant not only for conventional port operations but also for improving the environmental performance of inland waterways and jetty-based maritime services.

Adoption of Shore Power Supply (SPS) in such a setting would:

- Contribute to measurable reductions in localised air and noise pollution at jetties and ferry terminals.
- Improve environmental conditions in densely populated and tourism-sensitive coastal and riverine areas.
- Enhance the overall sustainability profile of inland water transport and jetty-based maritime services.
- Support alignment with emerging national green-port benchmarks and performance frameworks.
- Reinforce convergence with broader initiatives on clean energy, sustainable tourism and urban liveability.

National experience with phased SPS implementation, as articulated under the Harit Sagar – Green Port Guidelines (2023), provides a structured framework within which Goa's jetty- and inland-vessel-oriented maritime ecosystem can be aligned with broader green-port and green-shipping objectives, while remaining consistent with India's commitments under international maritime environmental conventions.

6.1.7 Green Shipping and Green Fuels

The transition to low- and zero-carbon fuels such as LNG, biofuels, methanol, ammonia and hydrogen is central to the decarbonisation of the shipping sector. The forthcoming National Green Shipping Policy (NGSP) is expected to provide a structured framework for green-fuel certification, bunkering standards and incentive mechanisms, while the National Green Hydrogen Mission (NGHM) supports the development of hydrogen and ammonia ecosystems for maritime applications.

At the national level, pilot LNG and biofuel bunkering initiatives are underway at ports such as VO Chidambaranar and Kandla, with Jawaharlal Nehru Port Authority advancing towards multi-fuel infrastructure. In parallel, the Green Tug Transition Programme (GTTP)

aims to deploy 50 hybrid or green tugs by 2030, signalling a gradual shift towards cleaner propulsion in port and harbour operations.

In the Goa context, the green-fuel transition aligns closely with the state's inland-waterway- and tourism-oriented maritime profile. A large share of vessel activity comprises passenger ferries, tourism crafts, patrol vessels and inland cargo barges operating on rivers and near-shore waters, making Goa particularly suited to cleaner fuels and alternative propulsion technologies for short-distance and low-speed operations.

Ongoing initiatives and feasibility efforts in Goa span LNG, CNG, electric propulsion and emerging hydrogen-based solutions for inland and near-shore vessels. Together, these developments position Goa as a practical test bed for green-shipping solutions tailored to inland waterways and tourism-linked maritime services within India's broader low-carbon shipping transition.

6.1.8 Environmental and Port Impact Assessment (EIA)

Environmental Impact Assessment (EIA) is a statutory requirement for port development, expansion and associated maritime infrastructure under the EIA Notification, 2006 and the Coastal Regulation Zone (CRZ) Notification, 2019. EIAs assess potential impacts on air and water quality, sediments, hydrodynamics, marine ecology, fisheries and coastal biodiversity through baseline surveys, modelling and impact-mitigation planning.

Specialised institutions such as the National Institute of Ocean Technology (NIOT), the National Centre for Sustainable Coastal Management (NCSCM), the Central Marine Fisheries Research Institute (CMFRI) and the Centre for Earth Science Studies (CESS) support EIA processes through hydrodynamic modelling, shoreline-change analysis, sediment-transport studies and cumulative impact assessments. Contemporary EIAs increasingly incorporate fishing-route mapping, spawning and nursery areas and species-distribution data to minimise ecological conflicts and impacts on livelihoods.

In Goa, the role of EIA assumes particular importance due to the state's compact coastline of 193.95 km, the dominance of estuarine and riverine systems and the close interface between maritime infrastructure, urban settlements, tourism hubs and ecologically sensitive zones. Port- and jetty-related development, dredging for navigation, inland-waterway operations and shoreline-protection works in Goa often interact directly with river mouths, tidal creeks and near-shore environments, necessitating careful assessment of cumulative impacts.

Integration of EIA outputs with digital platforms and environmental monitoring systems, including national waste-tracking and port sustainability frameworks, enhances transparency, traceability and regulatory oversight. Such integration supports informed decision-making and consistent compliance monitoring across Goa's ports, jetties and inland-waterway infrastructure.

6.1.9 Marine Ecology, Biodiversity and Conservation

India's coastal and marine environment supports diverse ecosystems, including mangroves, seagrass beds, mudflats, estuaries, sandy beaches, rocky shores and coral remnants. These ecosystems sustain fisheries, protect shorelines from erosion and flooding and contribute to blue-carbon sequestration, while remaining sensitive to changes in hydrodynamics, sediment regimes and water quality.

Goa's coastal and marine ecology is shaped by an interconnected network of estuaries, rivers and backwaters, including the Mandovi, Zuari, Chapora and Sal systems, along with extensive mangrove belts, intertidal zones and near-shore habitats. These ecosystems support rich biodiversity, artisanal fisheries and tourism-linked livelihoods and play an important role in shoreline stability and flood moderation.

Ecological mapping and studies by agencies such as NCSCM and CMFRI have identified environmentally sensitive areas in Goa, including mangrove forests, fish-breeding and nursery grounds, turtle-nesting beaches and wetland-associated bird habitats. These areas require due consideration in port master planning, jetty development, dredging and inland-waterway projects to avoid ecological degradation.

The "Working with Nature" approach, advocated by PIANC, promotes nature-based solutions in dredging, sediment management and coastal-protection works, enabling maritime infrastructure to function in harmony with natural processes. Conservation of marine biodiversity and protection of critical habitats therefore remain central to sustaining the long-term resilience of Goa's maritime and coastal systems.

6.1.10 Ecosystem-Based Management (EBM)

Ecosystem-Based Management (EBM) provides a holistic framework for balancing economic development with the long-term health and productivity of coastal and marine ecosystems.
Unlike traditional sectoral management, which treats port operations, fisheries and conservation as separate domains, EBM integrates them within a single ecological and spatial context.

Key elements of EBM include:

- **Integrated Planning:** Considering the cumulative impact of shipping, dredging, fisheries and coastal industry on interconnected habitats.
- **Spatial Mapping:** Using marine spatial planning tools to designate compatible activity zones and ecological buffer areas.
- **Adaptive Management:** Using continuous monitoring data from EIA studies, biodiversity baselines and digital dashboards to adjust decisions as environmental conditions evolve.

- **Stakeholder Collaboration:** Engaging coastal communities, fishers and industry partners in decision-making to ensure equitable and sustainable outcomes.

In India, Ecosystem-Based Management (EBM) principles are increasingly reflected in national initiatives such as the Integrated Coastal Zone Management (ICZM) programme, the Harit Sagar – Green Port Guidelines (2023) and the draft Blue Economy Policy framework. These frameworks promote integrated planning across ports, fisheries, coastal infrastructure and environmental conservation, particularly in coastal states with dense estuarine systems and multi-use maritime zones. Adoption of EBM supports the alignment of port and inland-waterway development with the protection of mangroves, estuaries and fishing grounds, enabling balanced growth that strengthens ecological resilience alongside blue-economy objectives.

6.1.11 Regulatory and Governance Framework

Environmental governance in India's maritime domain operates through a coordinated multi-tier system:

- **MoPSW:** Policy direction and oversight under Harit Sagar Guidelines and the proposed **National Port Sustainability Code (NPSC)**.
- **DGS:** Implementation of IMO conventions (MARPOL, Ballast Water, Ship Recycling) and operation of digital systems like **Swachh Sagar Portal**.
- **MoEFCC:** EIA and CRZ clearances, biodiversity protection and national environmental approvals.
- **State Maritime Boards / SPCBs:** Implementation, monitoring and coordination for non-major ports.

Enhanced digital integration between **DGS, MoPSW and SPCBs**, particularly linking **Goa State Pollution Control Board**'s (**GSPCB) online monitoring systems** with DGS dashboards will enable unified oversight and transparent reporting across coastal states.

6.2 Present State in India

India's maritime system is transitioning toward sustainability, with all ports now operating within a structured framework of environmental accountability. Major ports under the **Ministry of Ports, Shipping and Waterways (MoPSW)** and non-major ports under **State Maritime Boards** have adopted systematic mechanisms for waste management, MARPOL compliance, environmental monitoring and green-port certification.

Coastal states such as **Goa**, with a compact yet intensively utilised coastline and a dense network of ports, jetties and inland waterways, reflect this national progress while presenting distinct opportunities for integrating sustainability measures across port, riverine and near-shore maritime operations.

6.2.1 Waste Management and Disposal

India has achieved measurable progress through **digital waste tracking, certified vendor systems and regular audits**.
All ports are now mandated to operate under the **Swachh Sagar Portal** of the **Directorate General of Shipping (DGS)**, which facilitates real-time recording of ship-generated waste, waste-type classification and traceable disposal through authorised handlers. The system has replaced legacy manual processes, ensuring transparency and accountability.

Major and non-major ports alike are covered under periodic audits in line with the **Harit Sagar – Green Port Guidelines (2023)**. Each port maintains arrangements for waste collection, segregation, storage and final disposal through authorised vendors, integrated with **State Pollution Control Boards (SPCBs)** and **Urban Local Bodies (ULBs)** for final treatment.

Growing attention is also directed toward **Lost, Abandoned or Discarded Fishing Gear (LADFG)**, which contributes to marine litter and coastal entanglement risks. Recovery, registration and recycling of LADFG are being mainstreamed through the Swachh Sagar framework and linked community clean-up initiatives in fishing harbours.

In Goa, waste-management arrangements are in place across major port, jetty and inland-waterway operations, with systems aligned to national requirements under Swachh Sagar and related environmental frameworks. Government and private jetties, along with fishing harbours and inland vessel operations, are progressively integrating structured collection, segregation and disposal mechanisms, supported through coordination between the Captain of Ports Department and the Goa Pollution Control Board.

6.2.2 MARPOL Annex Compliance

India, as a contracting state to all six **MARPOL Annexes**, ensures uniform compliance through the **Merchant Shipping Act, 1958** and DGS circulars.
Port State Control (PSC) and **Flag State Inspections (FSI)** verify adherence to standards covering oil pollution prevention, control of noxious liquids, sewage management, garbage segregation and air-emission norms.

All ports, major and non-major, are covered under the national inspection and reporting systems (**SIRS** and **Swachh Sagar**). Compliance performance remains strong, supported by periodic audits, trained surveyors and certified reception networks.

In Goa, MARPOL provisions are implemented under DGS oversight across port, jetty and inland-waterway operations. Coordination between the Captain of Ports Department and the **Goa Pollution Control Board** supports integration of inspection findings, waste-

handling data and environmental monitoring outcomes, reinforcing transparency and regulatory traceability.

6.2.3 Port Reception Facilities (PRFs)

All ports in India are now mandated to maintain certified **Port Reception Facilities (PRFs)** under **MARPOL Annex I–V** and **Harit Sagar Guidelines**. These facilities provide the critical interface for safe reception and disposal of ship-generated waste—oily residues, bilge water, sewage, garbage, plastics and chemical residues.

Every port, including non-major and private ones, operates under DGS-approved or shared PRF arrangements and undergoes annual audits. The Swachh Sagar Portal ensures end-to-end digital traceability of waste receipts, treatment and disposal documentation.

In Goa:

- PRF arrangements are in place across major port, jetty and inland-waterway operations, aligned with national requirements.
- Government and private jetties, fishing harbours and inland vessel operations are progressively integrating structured waste collection and disposal mechanisms.
- Oversight and coordination are supported through engagement between the Captain of Ports Department and the **Goa Pollution Control Board**.

6.2.4 Shore Power (Onshore Power Supply – OPS)

OPS allows berthed vessels to draw electricity from the port grid, cutting emissions and improving local air quality. India's early pilots, **Kamarajar (Ennore)**, **VOC Tuticorin** and **JNPA Mumbai**, demonstrate feasibility for port crafts, tugs and terminal equipment. Feasibility studies at **Cochin** and **Kandla** are assessing large-vessel integration.

The Harit Sagar Guidelines prescribe phased implementation up to 2030, covering:

- Tugs and small crafts
- Coastal and feeder vessels
- Cruise and international vessels

In Goa, OPS relevance is closely linked to inland-waterway operations, passenger ferries, tourism vessels and near-shore berthing locations. The predominance of riverine jetties and proximity to urban and tourism areas underscores the importance of emissions reduction and noise control in berthing operations.

6.2.5 Green Fuels and Decarbonisation Readiness

India's transition toward alternative fuels is advancing through pilot projects and private investment. LNG and biofuel bunkering are operational at select major ports, while Jawaharlal Nehru Port Authority is progressing towards multi-fuel infrastructure. The Green Tug Transition Programme (GTTP) targets the deployment of 50 hybrid or green tugs by 2030.

In Goa, decarbonisation readiness is shaped by:

- A maritime profile dominated by inland vessels, passenger ferries, tourism crafts and harbour support vessels.
- Ongoing initiatives and feasibility efforts covering LNG, CNG, electric propulsion and emerging hydrogen-based solutions for inland and near-shore operations.

These developments align with national clean-fuel pathways while reflecting operational characteristics specific to inland waterways and short-distance maritime services.

6.2.6 Environmental Infrastructure and Monitoring

Environmental infrastructure has strengthened nationally through the **Harit Sagar Guidelines**.
All ports now maintain **Environment Cells**, periodic audits and continuous monitoring systems that track air, water, noise and biodiversity indicators.

- **CAAQMS**, **ETPs/STPs** and smart metering systems are standard across major ports.
- **Greenbelt programmes**, mangrove restoration and biodiversity mapping support carbon-sequestration goals.

In **Goa**:

- Environmental monitoring and compliance mechanisms are being applied across port, jetty and inland-waterway operations.
- Coordination between maritime authorities and environmental regulators supports consistent monitoring and reporting.

Integration with the **Swachh Sagar Portal** and the **Green Port Index (GPI)** will enable unified tracking of port sustainability metrics and transparent disclosure of annual performance.

6.3 Opportunities for Coastal States (with Reference to Goa)

6.3.1 Introduction

Coastal states are central to India's maritime and environmental transformation. As the nation advances toward a low-carbon, resource-efficient blue economy, state maritime administrations hold the operational levers of change, from infrastructure development and compliance enforcement to ecosystem stewardship and community engagement. The success of national frameworks such as the **Harit Sagar – Green Port Guidelines (2023)**, the forthcoming **National Green Shipping Policy (NGSP)** and the **Maritime Amrit Kaal Vision 2047 (MAKV 2047)** will ultimately depend on how effectively they are localised and implemented by coastal states.

Goa occupies a distinctive position among India's coastal states. With a coastline of 193.95 km, a compact yet intensively utilised maritime space and a dense network of ports, jetties and inland waterways, the state's maritime activity is closely interlinked with tourism, passenger transport, fisheries and riverine operations. This profile presents unique opportunities for advancing sustainability measures across port operations, inland water transport and near-shore maritime services, while maintaining a high degree of environmental sensitivity.

While national policies define standards and long-term objectives, the execution of initiatives relating to waste management, port reception facilities, shore power, green fuels and marine-ecology protection will be driven at the state level. The Directorate General of Shipping (DGS) will continue to provide policy alignment, technical standards and digital integration, while the State authorities, including the Captain of Ports Department, Government of Goa, will determine the sequencing and implementation of initiatives in accordance with state priorities and operational considerations.

These opportunities collectively position Goa to advance **a clean-seas, high-compliance and biodiversity-sensitive maritime model,** well aligned with tourism-led growth and national green-shipping objectives.

6.3.2 Waste Management and Circular Economy

Goa's maritime waste-management challenge is shaped by its dispersed network of ports, jetties, fishing harbours and inland-waterway terminals operating across multiple river systems. Strengthening waste governance in this context requires scalable, flexible and digitally traceable solutions that ensure uniform MARPOL compliance while supporting Goa's clean-coast and tourism objectives.

A circular-economy approach—linking waste interception, recovery and authorised recycling—can reduce marine pollution, improve operational efficiency and generate local green employment, particularly in riverine and near-shore environments.

6.3.3 Cluster-Based PRFs

Goa can strengthen maritime waste management through cluster-based Port Reception Facilities (PRFs) serving multiple jetties, fishing harbours and inland-waterway terminals. Given the dispersed nature of maritime activity along river systems such as the Mandovi, Zuari, Chapora and Sal, shared PRF clusters can efficiently handle oily waste, sewage, garbage, plastics and other regulated waste streams. Such facilities may be developed through PPP arrangements or suitable viability-support mechanisms, ensuring cost efficiency and uniform compliance across smaller and medium-traffic locations.

6.3.4 Expansion of Authorised PRF Service Providers

To improve service coverage, competition and response times, Goa may consider encouraging a larger pool of authorised Port Reception Facility (PRF) service providers for both major port operations and non-major ports, jetties and inland-waterway facilities.

Expanding the number of licensed vendors for oily waste, sewage, garbage, plastics and fishing-gear waste can reduce operational bottlenecks, improve cost efficiency and ensure continuity of services during peak tourism and fishing seasons.

Such an approach would be particularly relevant for dispersed riverine operations, where multiple small-scale vendors operating under standardised certification and digital reporting requirements can collectively enhance coverage while remaining compliant with MARPOL and Harit Sagar Guidelines.

6.3.5 Integration with Swachh Sagar Portal

Comprehensive integration of all ports, jetties, fishing harbours and inland-vessel operations in Goa with the Swachh Sagar Portal will enable end-to-end digital traceability of ship-generated waste and recovered lost or abandoned fishing gear (LADFG).

Such integration will provide real-time visibility of waste generation, collection and disposal across dispersed riverine locations, supporting unified auditability and regulatory oversight by the Directorate General of Shipping (DGS), the Captain of Ports Department and the Goa Pollution Control Board (GSPCB).

Extending Swachh Sagar coverage to smaller jetties and inland-waterway operations is particularly critical for Goa, where a large proportion of maritime activity occurs outside conventional port boundaries and in close proximity to urban settlements, tourism hubs and sensitive ecosystems.

6.3.6 Circular-Economy Linkages

Waste streams recovered through PRFs, including used oils, plastics and metal scrap, can be channelled into authorised recycling, reprocessing and re-refining facilities within

or proximate to Goa's industrial and municipal waste-management ecosystem. Such linkages can support circular-economy value chains, reduce landfill dependence and generate local green employment opportunities connected to maritime operations.

6.3.7 Marine-Litter and LADFG Management

Lost or abandoned fishing gear constitutes a significant component of marine litter along Goa's coast and inland waterways. Mapping of high-intensity fishing zones and riverine fishing activity can enable targeted gear-recovery initiatives integrated with PRF logistics. Establishing coordination mechanisms involving ports, municipal bodies and fisheries authorities can facilitate harmonised litter collection, segregation and recycling, reinforcing coastal cleanliness efforts under the Swachh Sagar framework and allied national initiatives.

Given Goa's tourism-driven coastal economy, marine cleanliness assumes heightened significance not only from an environmental perspective but also for sustaining the state's brand as a clean and attractive coastal destination. Clean seas, litter-free beaches and unpolluted rivers are integral to tourism, public health and community livelihoods.

Strengthening port- and jetty-linked waste interception, systematic LADFG recovery and coordinated coastal clean-up programmes therefore represents both an environmental necessity and an economic imperative for Goa.

6.3.8 Strengthening MARPOL Compliance

- **State MARPOL Facilitation Cell**

Given the fragmented nature of maritime operations in Goa—spanning ports, riverine jetties, passenger ferry terminals, fishing harbours and inland-waterway services—a coordinated State-level MARPOL Facilitation Cell may be considered to strengthen compliance and oversight.

Such a mechanism can facilitate structured coordination among the Directorate General of Shipping (DGS), the Captain of Ports Department and the Goa Pollution Control Board for inspections, reporting, data consolidation and follow-up actions across all operating locations.

The Cell can also support the **phased inclusion of operational readiness for all applicable MARPOL Annexes (Annexes I to VI)** across ports, jetties and inland-vessel operations, calibrated to vessel types, traffic intensity and local environmental sensitivities, thereby ensuring uniform standards without imposing disproportionate compliance burdens.

6.4 Inspection & Training Capacity

Goa's maritime ecosystem encompasses a wide range of vessel types and operating environments, including passenger ferries, tourism crafts, fishing vessels, patrol boats, inland barges and harbour support vessels. Ensuring effective MARPOL compliance in such a setting requires inspection capability and operational awareness that are tailored to riverine, near-shore and tourism-oriented operations.

Targeted capacity-building initiatives may therefore be undertaken for officers and staff associated with ports, jetties, shipyards and inland-waterway management, focusing on practical application of MARPOL provisions relevant to Goa's maritime profile. Key focus areas may include:

- **MARPOL Annexes I, IV, V and VI**, with emphasis on oil pollution prevention, sewage management, garbage and plastic waste control and air-emission norms applicable to passenger and near-shore vessels
- **Waste and sewage management practices** for ferries, tourism vessels and inland crafts operating from riverine jetties
- **Spill-prevention and response preparedness** in estuarine and riverine environments, where containment and recovery present unique challenges
- **Inspection documentation, reporting and coordination**, including linkage with PRFs, authorised vendors and digital compliance platforms

Training may be delivered through short-duration workshops, refresher courses and certification modules in collaboration with recognised maritime training institutes and competent agencies. Strengthening inspection and training capacity in this manner will support consistent, proportionate and tourism-sensitive implementation of MARPOL across Goa's maritime domain.

6.4.1 Shipbuilding, Repair and Dockyard Environmental Management (Goa-specific Opportunity)

Goa hosts a range of shipbuilding, boat-building, repair yards and dockyard facilities supporting inland vessels, barges, fishing crafts and harbour support vessels. These facilities play a vital role in the state's maritime economy but also generate distinct waste and emission streams that require structured environmental oversight.

Opportunities exist to strengthen environmental management across these clusters through:

- **Inclusion within MARPOL and Waste-Management Frameworks:** Extending structured waste-collection, segregation and disposal systems to shipbuilding and repair yards, aligned with MARPOL Annex I, V and VI requirements where applicable.

- **Integration with PRF and Vendor Networks:** Linking dockyards and repair clusters to authorised PRF vendors for reception of oily waste, paint residues, contaminated scrap and hazardous materials, ensuring traceability through digital reporting systems.
- **Air-Emission and Surface-Runoff Controls:** Strengthening controls on emissions from welding, blasting and coating activities and managing contaminated runoff to prevent discharge into adjacent rivers and coastal waters.
- **Inspection and Awareness:** Targeted inspections and awareness programmes for yard operators and workers on pollution prevention, waste handling and emergency response, aligned with national environmental standards and local regulatory requirements.

Integrating shipbuilding and repair activities within Goa's broader maritime environmental governance framework will ensure that sustainability measures extend beyond vessel operations to cover the full lifecycle of maritime activity, reinforcing clean-seas objectives and protecting sensitive riverine and coastal ecosystems.

6.4.2 Digital Integration

Integration of GSPCB emission and effluent datasets with DGS portal will enable real-time compliance visibility, automated analytics and faster corrective responses.

6.4.3 Enhancing Port Reception and Waste Infrastructure

While PRF arrangements are in place across Goa's ports, jetties and inland-waterway facilities, opportunities exist to strengthen coverage, efficiency and digital integration.

6.4.4 Upgradation of Existing PRFs

Existing PRF systems may be upgraded to support a broader range of waste streams, including sewage, plastics, recyclables and fishing-gear waste, with standardised documentation and digital reporting through the Swachh Sagar Portal and periodic third-party audits.

6.4.5 Development of Cluster PRFs

Given the prevalence of smaller jetties and dispersed vessel activity, cluster-based PRF models serving multiple riverine and coastal locations can offer cost-effective and scalable solutions. Modular PRF units may be deployed at strategic aggregation points along major rivers, reducing duplication while ensuring compliance across all operating locations.

6.4.6 Coordination

DGS will continue to provide technical guidance on PRF standards and certification, while state authorities may determine local clustering models, operating arrangements and cost-sharing mechanisms suited to Goa's maritime profile.

6.5 Shore Power (Onshore Power Supply – OPS)

6.5.1 OPS for Inland Waterways and Jetty Operations

Goa's predominance of inland-waterway traffic, passenger ferries, tourism vessels and near-shore crafts presents a strong and immediate case for the adoption of Onshore Power Supply (OPS) at jetties and ferry terminals.

Early implementation of OPS for passenger ferries, patrol boats, tugs and harbour crafts aligns with **Phase I of the Harit Sagar – Green Port Guidelines (2023)** and offers rapid benefits in terms of local air-quality improvement and noise reduction. These benefits are particularly significant in Goa, where berthing locations are often situated close to urban centres, heritage zones and high-footfall tourism areas.

OPS adoption at riverine jetties can therefore serve as a high-impact, low-regret intervention, improving environmental conditions for local communities while enhancing the sustainability profile of inland water transport and tourism-linked maritime services.

6.5.2 Integration with Renewables

OPS systems in Goa can be progressively aligned with clean-energy supply, including grid-connected renewables and distributed energy solutions at jetties and terminals. Such integration supports national decarbonisation objectives while enhancing the sustainability profile of inland and near-shore maritime operations.

6.5.3 Passenger, Cruise Vessels & Tourism Focused

Extending OPS to passenger and tourism-oriented jetties can improve environmental conditions in high-footfall and heritage-sensitive areas, enhance visitor experience and align Goa's maritime tourism offerings with international sustainability expectations.

6.5.4 Investment Models

OPS deployment may be supported through a mix of public investment, PPP arrangements and partnerships with clean-energy providers. DGS will guide technical standards and interoperability requirements, while state authorities may determine phasing, site selection and commercial models based on operational priorities.

6.6 Green Fuels and Clean-Energy Applications

6.6.1 Inland and Near-Shore Green Fuel Use Cases

Goa's maritime activity is dominated by inland-waterway vessels, passenger ferries, tourism crafts, patrol boats and harbour support vessels operating over short distances and frequent duty cycles. This operational profile makes Goa well suited for early adoption of low- and zero-emission fuels and propulsion systems that are optimised for near-shore and riverine use rather than large-scale export-oriented fuel production.

Clean-energy solutions in such applications offer immediate local benefits in terms of air quality, noise reduction and operational efficiency, particularly in densely populated and tourism-sensitive areas.

6.6.2 Biofuels, CNG/LNG and Transitional Fuels

Biofuels and gaseous fuels such as CNG and LNG can serve as pragmatic transitional pathways for decarbonising inland and near-shore vessel operations in Goa. These fuels are compatible with existing vessel technologies and can be progressively introduced for:

- Passenger ferries and tourism vessels
- Harbour crafts and patrol boats
- Support vessels operating from riverine jetties

Such applications align with national clean-fuel initiatives while allowing incremental transition without large-scale infrastructure disruption.

6.6.3 Electric and Hydrogen-Based Solutions for Inland Vessels

Electric propulsion and emerging hydrogen-based technologies offer longer-term decarbonisation pathways for Goa's inland-waterway and near-shore fleet. Short-route ferry services, fixed schedules and predictable duty cycles provide favourable conditions for battery-electric vessels, while hydrogen-based solutions may be explored for higher-power or longer-duration applications.

Integration of these technologies with jetty modernisation, shore power and clean-energy supply systems can enable cohesive clean-mobility ecosystems across inland waterways.

6.6.4 Institutional and Policy Alignment

The Directorate General of Shipping (DGS) and the Ministry of Ports, Shipping and Waterways (MoPSW) will continue to issue national standards and guidance covering fuel safety, certification, bunkering protocols and digital tracking. State authorities may identify suitable locations and vessel categories for phased adoption of clean-fuel solutions, in alignment with operational priorities and environmental objectives.

Partnerships with technology providers, research institutions and pilot programmes under national and international sustainability initiatives can further support demonstration projects, knowledge transfer and capacity building in clean maritime energy systems.

6.7 Environmental Management and Biodiversity Protection

6.7.1 Institutionalising Environment Cells

Ports, jetties and major inland-waterway facilities in Goa **may operate dedicated Environment Cells** to implement requirements under the Harit Sagar – Green Port Guidelines and coordinate environmental compliance, monitoring and annual performance reporting. Such arrangements can support structured engagement with the Goa Pollution Control Board and other relevant authorities.

6.7.2 Digital Environmental Monitoring

Deployment of digital monitoring systems can strengthen transparency and benchmarking of environmental performance. Key data streams may include:

- Continuous Ambient Air Quality Monitoring Systems (CAAQMS)
- Sewage Treatment Plants (STPs) and Effluent Treatment Plants (ETPs)
- Waste-handling and PRF operations

Integration of these datasets with national platforms such as the Green Port Index (GPI) and Swachh Sagar dashboards would enable consistent reporting, comparative assessment and evidence-based oversight.

6.7.3 Biodiversity and Ecological Mapping

Goa's coast and inland waterways host ecologically sensitive environments, including:

- **Mangrove ecosystems** along the Mandovi, Zuari, Chapora and Sal estuaries, providing nursery habitats and shoreline protection
- **Fish breeding and nursery grounds** in estuarine and near-shore waters supporting artisanal fisheries
- **Olive ridley turtle nesting beaches** along select coastal stretches
- **Wetland and estuarine bird habitats**, including migratory and resident species linked to mudflats and river mouths
- **Intertidal and near-shore habitats** sensitive to dredging, sediment alteration and water-quality changes

Spatial mapping of these areas can inform port master planning, jetty development, dredging schedules and vessel-route design, reducing conflicts with fisheries and minimising ecological disturbance. Adoption of the "Working with Nature" approach in dredging, sediment management and shoreline works can further enhance coastal resilience while limiting long-term environmental impacts.

6.7.4 Community Engagement

Sustained community participation is central to effective environmental stewardship. Initiatives such as coastal clean-up drives, school-level awareness programmes and collaborative port–fisheries engagement mechanisms can strengthen participation in marine-litter management, mangrove protection and biodiversity conservation, reinforcing shared ownership of environmental outcomes.

6.8 Ecosystem-Based Management (EBM) and Marine Spatial Planning (MSP)

Goa can advance an ecosystem-based approach to maritime governance that integrates port and jetty development, inland-waterway operations, fisheries protection and biodiversity conservation within a unified planning framework.

Key elements may include:

- **Adoption of EBM Principles:** Integrating cumulative environmental and socio-economic considerations into port and maritime infrastructure planning.
- **Marine Spatial Planning:** Identifying fishing zones, navigational corridors and ecologically sensitive areas to guide siting of jetties, dredging routes and vessel traffic.
- **Institutional Collaboration:** Coordination among maritime authorities, pollution-control agencies, fisheries and forest departments for data sharing and joint decision-making.
- **Data Integration:** Use of EIA outputs, Swachh Sagar data and environmental monitoring systems to update ecological baselines and support adaptive management.
- **Community Participation:** Inclusion of fishing communities and coastal stakeholders in planning processes to promote co-management and social acceptance.

Application of EBM and MSP principles would support balanced maritime development in Goa, aligned with global best practices and India's Blue Economy objectives.

6.9 Institutional Strengthening and Digital Governance

- **Integrated Environmental Monitoring Framework:** Linking maritime authorities, DGS, MoPSW and state environmental systems for unified analytics, compliance tracking and reporting.

- **Capacity Building:** Continuous training on MARPOL compliance, PRF operations, OPS systems and clean-energy applications through maritime training institutions and workshops.
- **Dedicated Sustainability Functions:** Strengthening institutional capacity within state maritime administration to coordinate policy implementation, funding convergence and stakeholder engagement across green-port and green-shipping initiatives.

6.10 Financing and Partnerships

- **Green Finance:** Leverage national instruments such as the Green Port Fund, FSDF and carbon-credit mechanisms to support PRFs, OPS deployment, electric vessels and clean-energy infrastructure at ports and jetties.
- **Global and Multilateral Partnerships:** Collaborate with programmes such as IMO GreenVoyage 2050, Global Maritime Forum, GIZ, World Bank and bilateral partners for technical assistance, pilots and grant support.
- **Academia and R&D:** Partner with maritime and technical institutions to support applied research on green fuels for inland vessels, waste valorisation and low-carbon maritime infrastructure suited to Goa's riverine and tourism-oriented operations.

6.11 Renewable Energy and Energy Efficiency for Green Ports (with reference to Goa)

Objective: Reduce emissions intensity, stabilise energy costs and improve sustainability performance of ports, jetties and inland-waterway facilities through decentralised renewables, storage and electrification.

6.11.1 On-site and Near-site Renewable Generation

- **Rooftop and Shade-Top Solar:** Solar PV on terminal sheds, jetty buildings, parking canopies, administrative facilities and ancillary infrastructure.
- **Ground-Mounted and Floating Solar:** Utilisation of suitable non-operational land parcels, water bodies and reservoirs near ports and jetties, subject to environmental clearance.

- **Grid-Connected Green Power:** Procurement of renewable power through open-access or group-captive arrangements where feasible to supply OPS loads and essential port services.

6.11.2 Storage, Microgrids and Resilience

- **Battery Energy Storage Systems (BESS):** To firm renewable supply for OPS windows, ferry operations and night-time loads.
- **Jetty and Port Microgrids:** Segmented microgrids for critical systems such as navigation aids, communication systems and safety infrastructure, enhancing reliability and resilience.

6.11.3 Electrification and Clean Equipment

- **Vessel and Equipment Electrification:** Progressive adoption of electric or hybrid harbour crafts, ferries and support vessels where operationally viable.
- **OPS–Renewable Synergy:** Align sizing of renewable and storage systems with OPS rollout so shore power supplied to vessels is verifiably clean.
- **Energy-Efficient Buildings:** LED retrofits, efficient HVAC systems, smart meters and demand-side management across port and jetty facilities.

6.11.4 Procurement and Commercial Models

- **Capex (Own-Build):** For quick-win rooftops and pillot BESS installations.
- **OPEX/PPP:** Solar/wind/BESS via RESCO or hybrid PPA with performance-linked tariffs and uptime SLAs.
- **Revenue Streams:** Renewable Energy Certificates (RECs), carbon credits linked to OPS electrification and potential viability-support mechanisms under green-infrastructure schemes.

6.11.5 Measurement, Verification and Digital Reporting

- **Energy KPIs:** kWh from RE (% of total), kWh supplied to OPS from RE, kg CO_2e avoided per berth-hour, specific energy use per TEU/tonne.
- **Digital Integration:** Live metering to **Swachh Sagar**/**GPI** dashboards; API hooks for vendor PPAs, BESS dispatch logs and OPS meters for third-party assurance.

6.11.6 Goa – Suggestive Priority Actions

- **Phase I (Key Jetties and Ferry Terminals):** Deploy rooftop or shade-top solar PV at major ferry terminals and high-footfall jetties, coupled with small-to-medium BESS, aligned with initial OPS deployment for passenger ferries, patrol vessels and harbour crafts.

- **Phase II (Ports and Inland Waterway Nodes):** Expand renewable capacity through grid-connected solar or group-captive arrangements to support electrification of inland vessels, jetty infrastructure and PRF operations; explore floating solar at suitable water bodies, subject to environmental safeguards.
- **Tourism and Passenger Focus:** Establish dedicated green feeders and storage systems for passenger and tourism jetties in urban and heritage-sensitive locations, enabling low-noise, low-emission operations and ESG-grade energy metering for tourism operators.
- **Cluster Approach:** Adopt cluster-based renewable and storage solutions serving multiple nearby jetties, PRFs and allied facilities, improving cost efficiency and supporting resilient energy supply for coastal and riverine communities.

6.11.7 Suggestive Roles and Governance

- **DGS:** Technical guidance on metering, disclosure and OPS–RE interoperability; alignment with forthcoming NGSP and GPI criteria.
- **State Maritime Administration (Goa):** Identify priority locations, determine phasing and adopt suitable procurement models; coordinate with state power utilities, renewable-energy developers and municipal authorities for effective convergence and implementation.

Outcome: Progressive reduction in emissions intensity, improved local air quality and noise environment at ports and jetties, lower energy costs over time and enhanced sustainability credentials of Goa's maritime and tourism infrastructure, reinforcing the state's position as a leader in environmentally responsible coastal and inland-waterway operations.

6.12 Training, Capacity Building and Skill Development for Sustainable Maritime Operations

Building technical expertise and institutional capacity is essential for coastal states to sustain long-term progress under the Harit Sagar – Green Port Guidelines, the forthcoming National Green Shipping Policy (NGSP) and allied green-maritime frameworks.

For Goa, a structured and practice-oriented approach to training and awareness can strengthen compliance, improve operational readiness and support employment generation in emerging green maritime activities linked to ports, jetties and inland waterways.

6.12.1 Institutional Opportunities

- The state maritime administration may explore the development of a **Maritime Sustainability Training Framework for Goa**, in collaboration with the **Directorate**

General of Shipping, the **Ministry of Ports Shipping and Waterways** and recognised maritime and technical institutions.

- Such a framework can progressively build a pool of trained personnel capable of managing environmental systems, PRFs, OPS infrastructure, clean-energy assets and digital compliance platforms.
- Knowledge partnerships with industry and international agencies may be encouraged to support curriculum development, pilot demonstrations and applied learning.

6.12.2 Suggested Training Focus Areas

- **Environmental Management:** MARPOL compliance, environmental monitoring, biodiversity safeguards and mitigation planning.
- **Waste Management and PRFs:** Segregation, documentation, vendor oversight and Swachh Sagar Portal reporting; handling of oily waste, sewage, plastics and hazardous residues.
- **Pollution Prevention and Response:** Preparedness for oil spills, sewage incidents and emergency waste containment in riverine and near-shore environments.
- **Renewable Energy and OPS Systems:** Familiarisation with solar power, battery storage, microgrids and Onshore Power Supply (OPS) operations.
- **Green Fuels and Propulsion:** Safety and certification basics for LNG, biofuels and emerging clean-fuel solutions suited to inland and near-shore vessels.
- **Circular Economy and Resource Recovery:** Recycling, waste valorisation and resource-efficiency models relevant to ports, jetties and fisheries support systems.
- **Digital Environmental Governance:** Use of tools such as the Green Port Index (GPI), environmental audit dashboards and integrated digital reporting systems.

6.12.3 Implementation and Collaboration

- Short-term courses, workshops and simulation-based programmes may be organised for port, jetty and inland-waterway personnel.
- Local technical institutes and universities can be engaged for modular training and research support in areas such as marine ecology, renewable integration and waste recycling.
- Periodic capacity-building programmes may be conducted jointly with DGS, the **Goa Pollution Control Board** and maritime operators to ensure consistent understanding of standards and practices.

6.12.4 Community and Awareness Initiatives

- Ports and jetties may collaborate with educational institutions, fisheries departments and civic organisations to conduct awareness initiatives such as coastal clean-up drives and marine-litter campaigns.
- Engagement of students, self-help groups and coastal communities in activities like mangrove protection, marine-litter monitoring and blue-carbon initiatives can promote inclusive participation and shared ownership of environmental outcomes.

6.12.5 Expected Outcomes

- Enhanced institutional capacity for sustainable maritime operations across ports, jetties and inland waterways.
- Creation of employment opportunities in renewable energy, waste management and environmental services.
- Stronger collaboration between regulators, operators, academia and communities.
- Progressive positioning of Goa as a **model coastal state for sustainable, tourism-aligned and environmentally responsible maritime operations**.

6.13 Way Forward

6.13.1 Institutional and Policy Alignment

- Align initiatives of the state maritime administration with programmes and technical guidance issued by the **Directorate General of Shipping** and the **Ministry of Ports Shipping and Waterways** to ensure cohesive development of waste-management systems, PRFs, OPS and clean-energy applications.
- Formalise coordination among the Captain of Ports Department, the **Goa Pollution Control Board** and municipal authorities for unified governance, MARPOL compliance and environmental oversight.
- Undertake periodic sustainability reviews to track environmental performance, digital integration and alignment with national green-port benchmarks, including the Green Port Index (GPI).

6.13.2 Infrastructure and Technology

- Prioritise pilot initiatives for PRFs, OPS and clean-energy solutions at key ports, ferry terminals and high-traffic jetties.
- Promote cluster-based PRF models and renewable-linked OPS solutions to reduce emissions intensity while maintaining cost efficiency.

- Ensure continued integration of port, jetty and inland-waterway operations with national digital platforms such as Swachh Sagar and GPI dashboards.

6.13.3 Capacity Building

- Launch structured training and capacity-building programmes, in collaboration with DGS and recognised maritime institutions, covering MARPOL compliance, PRF operations, OPS systems and clean-energy applications.
- Certify and continuously upskill officers and operational staff responsible for environmental management, enabling professionalised and consistent sustainability practices across maritime facilities.

6.13.4 Financing and Investment

- Leverage national financing instruments such as the Green Port Fund, FSDF and carbon-credit mechanisms to support green infrastructure deployment.
- Encourage PPP and performance-linked commercial models for OPS, waste-management systems and renewable-energy installations.
- Pursue international climate-finance, technical-assistance and pilot-project partnerships to accelerate adoption of clean maritime technologies.

6.13.5 Community and Environmental Stewardship

- Community participation and environmental stewardship are critical to sustaining Goa's maritime and coastal resilience, particularly given the close interaction between ports, inland waterways, fisheries, tourism and sensitive ecosystems.
- Priority actions may include:
- Expansion of initiatives such as **Sagar Swachhta Saptah**, river and beach clean-up drives, mangrove protection and blue-carbon projects across ecologically sensitive coastal and estuarine stretches
- Active engagement of **fishing communities, tourism operators, local bodies and civil-society organisations** in marine-litter interception, LADFG recovery and awareness programmes
- Promotion of **CSR and ESG participation** by port operators, shipyards, tourism stakeholders and private enterprises in habitat restoration, waste-management infrastructure and environmental education
- Such measures will help maintain a balance between maritime development, tourism growth, fishing livelihoods and biodiversity protection, reinforcing Goa's identity as a clean, people-centric and environmentally responsible coastal state.

6.13.6 Digital Integration and Monitoring

- Progressively operationalise integrated environmental monitoring frameworks linking state authorities with DGS and MoPSW platforms for unified analytics and reporting.
- Institutionalise periodic sustainability audits and transparent disclosure of environmental performance to embed continuous improvement across ports and jetties.

6.14 Conclusion

Goa is well positioned to advance a sustainable and environmentally responsible maritime development pathway, aligned with its distinctive inland-waterway- and tourism-oriented maritime profile.

Through coordinated policy alignment, strengthened waste and emissions governance, targeted infrastructure interventions and continuous capacity building, the state can enhance environmental performance while safeguarding sensitive coastal and riverine ecosystems.

The Directorate General of Shipping will continue to provide national guidance, technical standards and digital-platform support, while state authorities will determine the sequencing and implementation of initiatives in line with local priorities.

A calibrated, inclusive and clean-seas-focused approach will enable Goa to emerge as a **model coastal state for green, tourism-aligned and people-centric maritime operations**, contributing meaningfully to India's broader blue-economy and climate-action objectives.

7. PILLAR VI - Coastal Shipping, Inland Navigation & Multimodal Linkages

7.1 State Profile: Snapshot of Goa's Strategic Initiatives

Goa has emerged as a key player in India's maritime development, leveraging its extensive coastline and strategic location to strengthen coastal shipping, inland navigation, and multimodal connectivity. The state's approach integrates infrastructure development, policy support, and private sector participation to create a future-ready maritime ecosystem.

Goa stands at the forefront of India's maritime transformation, harmonizing its deep blue seas and lush green shores through a sustainable development model. Under the visionary leadership of the Government of Goa and the Ministry of Ports, Shipping and Waterways, the State has been driving forward projects that enhance **trade, tourism, and connectivity** while prioritizing **ecological preservation**.

7.2 Current Infrastructure

The state boasts a robust maritime network comprising:

- One major port: Mormugao Port[1].

Mormugao Port is witnessing steady growth in total cargo throughput, and iron ore volumes are expected to surge with the resumption of mining activities in Goa

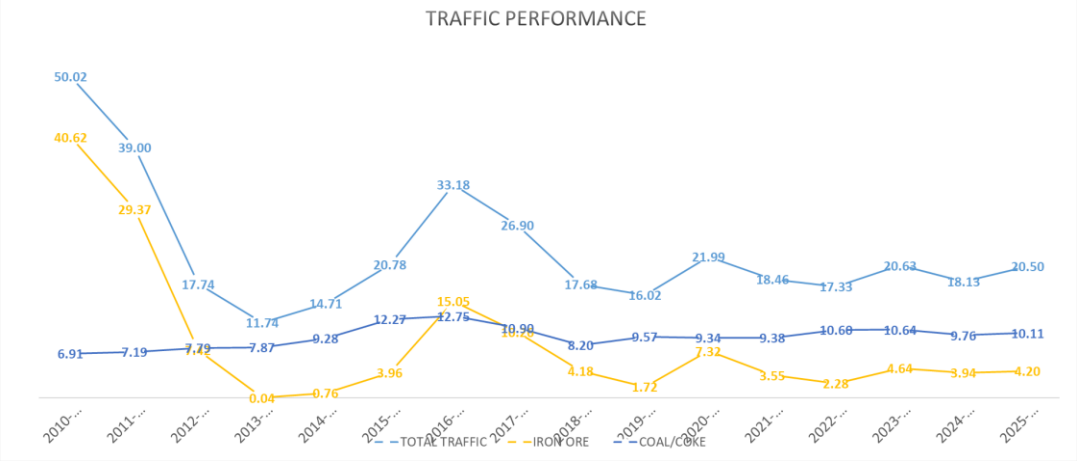


Figure 2. Traffic Performance

Key initiatives at the port include a 200 kW rooftop solar installation, demonstrating Mormugao's commitment to clean energy. A 3 MW solar power plant has been commissioned, with plans to expand capacity to 6 MW.

[1] https://mptgoa.gov.in/

Mormugao Port Authority has become the first Accredited Green Port of India.

- Five non-major ports: Tiracol (non-functional), Chapora (non-functional), Panaji (functional), Betul (non-functional), and Talpona (non-functional).
- Six National Waterways: NW-68, NW-111, NW-27, NW-25, NW-71, and NW-88, covering the Mandovi, Zuari, Chapora, Sal, and other river systems[2]
- Around 255+ km of navigable inland waterways for cargo and tourism.
- Comprehensive multimodal connectivity, including **1.4 lakh km of roads**, a broad rail network, and air connectivity through two operational airports: **Dabolim and Mopa**.

7.2.1 Strategic Initiatives[3]

To enhance maritime efficiency and sustainability, State of Goa has introduced several forward-looking initiatives:

- **Installation of mooring buoys at Miramar, Panaji**: Mooring buoys are proposed at Panaji Port in the deep-sea anchorage. This will improve safety and convenience in navigation, allow larger vessels to be moored, and significantly enhance cargo operations.
- **Inter-state ferry services**: A Mumbai–Goa ferry service is currently under study.
- **Development of islands and submarine tourism:** A study is in progress for the development of islands with high potential for tourism and theme parks. A 32-passenger submarine has been suggested to provide an immersive experience of marine life under the deep sea.
- **Hull superstructure and outfitting**: Construction of a concrete jetty with a highly advanced 200-ton crane at Betim is planned to facilitate the building of vessels with higher air-draft superstructures.
- **Mini harbour jetty at Cortalim** : The state proposes to develop a berth equipped with crane facilities to promote container handling. This mini harbour jetty at Cortalim is well connected to industrial estates in Goa.
- **Marine slipway development at Britona**: New slipways will be developed for ship repair facilities in the Mandovi River. This will support repair services for inland vessels, ensuring efficient upkeep and boosting the local maritime economy
- **River Information System / VTMS:** Advanced systems such as Radar, AIS, VHF, and CCTV equipment are proposed for installation at strategic locations to enhance operational security and control.
- **Bridge Pier Fendering:** Installation of proper fendering systems on bridge piers and pylons is planned to ensure safe vessel operations and structural safety of bridges while allowing safe passage for inland vessels

[2] India Maritime Week
[3] India Maritime Week

- **Dredging across major waterways:** Dredging will ensure safe and efficient navigation for inland vessels and cargo transportation. It will also help prevent flooding during monsoons and allow larger boats with deeper drafts to navigate inland waterways.

7.2.2 Opportunities

The state offers significant growth prospects in the maritime sector:

- Development of 09 coastal jetties in Goa.
- Installation of 26 floating jetties across various rivers.
- Island development projects.
- Implementation of River information system.
- Establishment of Ro-Ro ferries and terminals.
- Establishment of a green shipbuilding and repair cluster.
- Establishment of water taxi services.
- Linking inland industrial zones to ports via waterways and freight corridors.
- Private sector participation in developing terminals, jetties, and cargo handling infrastructure.

7.2.3 Policy & Incentives[4]

Goa has implemented investor-friendly policies to accelerate maritime development:

- Goa has implemented investor-friendly policies to accelerate maritime development:
- Development of 07 coastal community jetties at various locations in the state under the Sagarmala scheme on a 50%-50% sharing basis.
- Installation of 10 concrete floating jetties at rivers Mandovi and Zuari, fully funded by IWAI.
- Implementation of a river information system, 100% funded by IWAI.
- These incentives aim to attract private investment and foster innovation in shipbuilding, marine manufacturing, and sustainable shipping practices.
- The Vision Document positions Goa as a model for sustainable maritime development with emphasis on “Blue Growth with Green Responsibility”.
- State Logistics and Warehousing Incentives Scheme, 2025
- Mormugao Port Authority is the first Indian port to implement a green vessel incentive scheme, rewarding ships with Environment Ship Index (ESI) scores. Discounts on port charges encourage cleaner ship operations and attract global environmentally conscious shipping

7.2.4 State Profile: Maritime and Trade Profile

[4] India Maritime Week

Goa is undertaking an determined expansion of its maritime infrastructure to strengthen its position as a leading trade and logistics hub on India's western coast. The state's development blueprint focuses on creating world-class port facilities, boosting cargo handling capacity, and unlocking the potential of the Blue Economy through strategic investments and policy reforms.

Goa has a strong maritime backbone supporting trade, tourism, fisheries, and inland waterways. Infrastructure is strategically distributed to enable efficient operations, safety, and multi-sectoral growth across the coastline.

This includes 35 government jetties managed by various departments: Captain of Ports (10 jetties: 1 port reception, 7 cruise, 2 fishing), River Navigation Dept. (16 jetties: 1 cruise, 15 community), Fisheries Department (7 jetties: 1 cruise, 6 fishing), and Tourism Department (2 jetties: 2 cruise). Additionally, there are 89 private jetties: 48 concrete for loading/unloading, 6 wooden for cruise, and 35 floating/pontoon/steel for cruise.

Mormugao Port has emerged as a major growth engine, recording steady infrastructure investment in port modernization, renewable energy, connectivity improvements, and sustainable practices.

State Maritime Infrastructure is as shown in fig.2

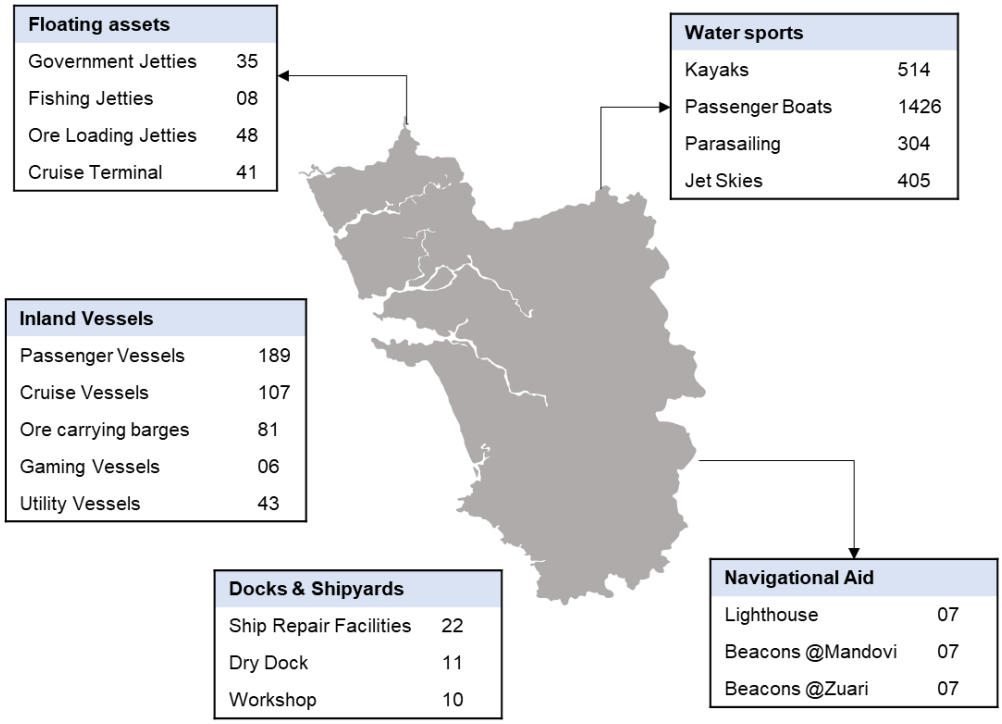


Figure 3. State Maritime Infrastructure

7.3 Key Initiatives/Investment/Infrastructure Plans:

- Over the past five years, projects worth INR 1,016 crore have been completed through Government Budgetary Support, Internal Resources, and Public-Private Partnership (PPP) models.
- Allocation of INR 200 crore for National Waterways projects in Goa by Inland Waterways Authority of India (IWAI).
- An INR 3,500 crore agreement with Atlantic & Pacific LNG Inc. for establishing LNG infrastructure at Mormugao Port Authority.

- The Goa Maritime & Waterways Infrastructure Development Vision Document positions Goa as a model for sustainable maritime development with emphasis on “Blue Growth with Green Responsibility”.
- Inland waterways and green fuel bunkering are emerging as strategic enablers.
- Redevelopment of Goa Institute of Maritime Excellence for training and certification of Seafarers on PPP mode.

7.3.1 Investment Commitments5:

Table 1. Investment Commitments

Sr	Name of MoU	Name of the Stakeholder	Investment (INR Cr)
1	Setting up of LNG Facilities	M/s Atlantic & Pacific LNG	3,500
2	Redevelopment of Berth No.9 on EPC mode.	M/s Gammon Engineers and Contractors Private Limited	1,000
3	Development of Vasco Bay infrastructure includes construction of Fishing harbour, Passenger Jetty,Coastal cargo berth & Berths for Indian Navy and Indian Coast Guard.	M/s.Indian Port Rail & Ropeway Corporation Ltd,	1,000
4	Capital Dredging of Approach Channel and inner Basin for handling of Capesize Vessels at Mormugao Port.	M/s International Seaport Dredging Private Limited (ISDPL)	500
5	Berthing facilities at Finger Jetties 1,2 & 3	M/s Indian Coast Guard	250
6	Development of LPG Facilities	M/s Cisterina	100
7	Development of Berth-3	M/s. Indian Port Rail & Ropeway Corporation Ltd	25
8	Design, Supply, Installation, & Commissioning of 2MWp Solar Power Plant at MgPA	M/s Oriana Power Ltd	20

Figure 4. Export Commodities

7.3.2 Key Initiative for Intermodal infrastructure and connectivity

The state is building a robust intermodal network to enhance maritime efficiency and connectivity. This integrated approach links port, road, rail, and inland waterways, creating a seamless logistics ecosystem that supports trade and industrial growth.

[5] India Maritime Week

- **Port Capacity Enhancement**: Operationalization of Berths 10 & 11 under a 30-year PPP with Delta Ports for container and multi-purpose cargo handling.
- **Road Connectivity**: Completion of the Four Lane flyover to MPA (NH17B) ensures smooth cargo movement and reduces logistics costs.
- **Rail Connectivity:** A new Trunk Railway Agreement with South Western Railway strengthens operational arrangements and facilitates efficient cargo transfer.
- **Inland Waterways (IWT):** Deployment of INR 200 Crore IWAI funding for multimodal terminals with mechanized handling, connecting industrial zones to Mormugao Port Authority.

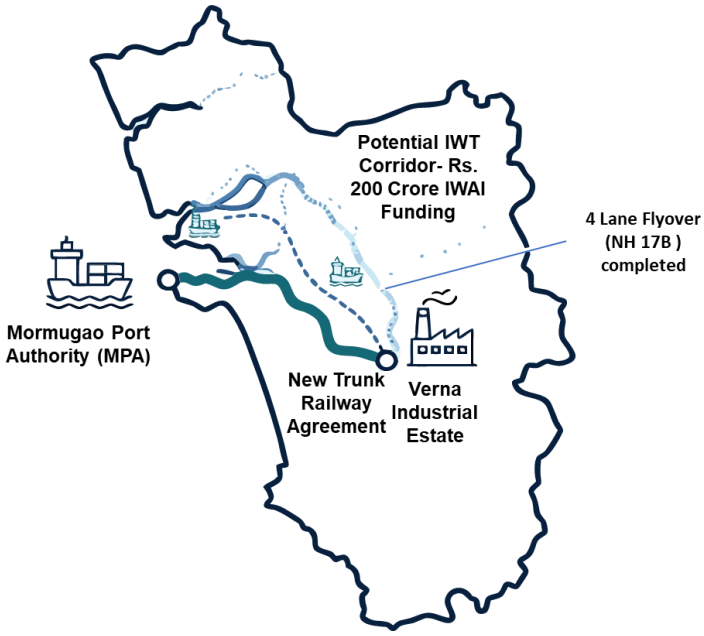
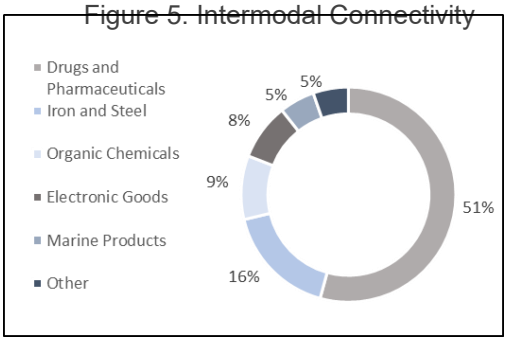


Figure 5. Intermodal Connectivity

Principal Commodities Exports in FY25

Drugs and Pharmaceuticals dominate exports at 51%, followed by Iron and Steel (16%) and Organic Chemicals (9%). Other categories like Marine Products, Electronics, and miscellaneous items contribute smaller shares.



Coastal Cargo:

7.4 Key Enablers to support Coastal Shipping and IWT

To fully realize the potential of coastal shipping and inland waterways, Goa is focusing on a series of operational and policy interventions designed to create a level playing field for all modes of transport and optimize multimodal logistics. These measures aim to reduce costs, improve efficiency, and promote sustainable cargo movement across the state's maritime network.

One of the primary enablers is the promotion of multimodal movement, which involves streamlining operational and policy frameworks to ensure equitable treatment of coastal and IWT modes compared to rail and road.

Currently, freight subsidies are linked to rail distance, creating a disincentive for coastal and IWT modes. Addressing this imbalance, along with resolving delays in subsidy reimbursements and revising the higher GST rate of 12% on multimodal movement, is critical for encouraging modal shift. Movement of imports to port hubs with IWT

connectivity and onward movement by barges, alignment of supply schedules and demand patterns for coastal districts to aggregate and plan for scheduled services via containerized coastal movement, and overall multimodal movement and optimization are key focus areas. These efforts are expected to increase coastal movement share to 7% from the current 0.5%, while IWT movement for east and NE regions could rise to ~2%, driving overall modal optimization.

Another significant intervention is the promotion of standardization through containerization of fertilizers. Containerized movement in coastal shipping can be 20-25% cheaper than bagged, jumbo bag based coastal movement. Policy recommendations for leveling tariffs and promotion of containerized movement are essential. The concept of "Bulk in-Bulk out" movement of fertilizers, and movement through automated (pumping) bulk loading of fertilizers in containers, is a way forward in reducing congestions at ports/plants, increasing turnaround time of ships/rakes, while saving on fertilizer subsidy through reducing port charges, warehouse rent, etc.

Road/Rail connectivity to Ports remains a cornerstone. Connectivity gaps lead to increases in logistics and handling costs, thereby increasing overall transportation costs. Apart from ongoing Sagarmala projects, new 60 road connectivity and 61 rail connectivity projects have been identified after consultations with MOR, MORTH, State Maritime Boards, and Port Authorities. A Comprehensive Port Connectivity Plan prepared by DPIIT will serve as the guiding framework.

7.5 Key Enablers to support Green Shipping

Goa is committed to advancing green shipping practices as part of its broader maritime sustainability agenda. The state recognizes that shifting cargo from road/rail to sea is a critical step toward reducing emissions and logistics costs. This transition not only enhances environmental performance but also improves operational efficiency across the maritime value chain.

A major thrust of the green shipping strategy involves transitioning ships to green fuels and installing Energy Saving Devices (ESDs)—requiring funding support. Policy incentives for cargo movement on vessels meeting green compliance standards are being introduced. 90% long-tenure loans for Hybrid Tugs at major ports will accelerate adoption. Regular provision of green shore power at ports for sustainable operations is prioritized.

Institutional frameworks include the Coastal & Inland Cargo Facilitation Center (CCFC) under IWAI to drive demand via outreach and collaboration with PSUs, trade bodies, private players, and rail/road ministries. The Center for Marine Economy & Connectivity (IPA & RIS) will harmonize coastal shipping agreements with BIMSTEC countries to boost regional waterways movement. The National Center for Excellence for Green Ports & Shipping (with TERI) will develop hydrogen hubs and green coastal vessels.

7.6 Coastal Shipping Act, 2025: Key Provisions and Improvements

The Coastal Shipping Act, 2025 represents a landmark reform aimed at modernizing India's coastal shipping framework and fostering self-reliance in the maritime sector. This

legislation introduces several progressive measures designed to simplify compliance, enhance operational efficiency, and promote sustainable growth.

One of the most significant provisions is simplified licensing, which removes the requirement for Indian-flagged vessels to obtain a general trading license for coastal operations. This change reduces regulatory burdens and encourages greater domestic participation in coastal trade. Complementing this, the Act broadens the definition of coastal trade beyond the traditional carriage of goods and passengers to include services such as exploration, research, and other commercial activities, excluding fishing. This expanded scope opens new avenues for innovation and investment in maritime services.

The Act also emphasizes integration of coastal and inland waterways, creating a seamless multimodal transport network that minimizes transshipment needs and improves overall efficiency. This integration is expected to significantly reduce logistics costs and enhance connectivity between ports and hinterland regions.

To support better decision-making and transparency, the Act mandates the creation of a national database for coastal shipping. This centralized platform will provide real-time information on licenses, routes, and operational metrics, enabling stakeholders to plan and optimize coastal trade effectively.

Strategic planning is another cornerstone of the Act. It calls for the biennial preparation of a National Coastal and Inland Shipping Strategic Plan, which will focus on route optimization, traffic forecasting, and sustainable growth initiatives. Additionally, the Act strengthens environmental compliance by introducing revised penalties and stricter environmental standards, ensuring that coastal shipping aligns with global sustainability norms.

Importantly, the Act promotes the use of Indian-built vessels, reinforcing the domestic shipbuilding and repair industry and advancing India's goal of maritime self-reliance. By combining regulatory simplification, technological integration, and sustainability measures, the Coastal Shipping Act, 2025 sets the stage for a transformative shift in India's coastal shipping landscape.

7.7 Tracking the Coastal Shipping: National Database for Coastal Shipping

The creation of a National Database for Coastal Shipping as per the Coastal Shipping Act,2025 represents a transformative step toward digitizing and streamlining India's coastal trade ecosystem. This initiative aims to address existing inefficiencies, reduce costs, and enable seamless integration of multimodal logistics through advanced digital solutions.

7.7.1 Current State

At present, coastal shipping operations are characterised by segregated, paper-based processes, with documents circulating across multiple portals, leading to delays and inconsistencies. Single source access to critical information such as vessel details,

licenses, and service providers is limited, creating operational bottlenecks and decision inefficiencies.

Outdated regulations further compound these challenges, as they fail to reflect the realities of modern logistics and digital workflows. Additionally, the non-adoption of standardized formats for documentation results in fragmented processes and lack of interoperability.

7.7.2 Interventions

To overcome these limitations, the proposed database will record and digitize the flow of information in coastal trade, enabling real-time information for clearance, licensing, and reporting. By reducing logistics costs and the cost of capital, this initiative will make coastal shipping more competitive and efficient. Aligning laws and regulations with digital practices is a key priority, supported by the development of Digital Standard Operating Procedures (SOPs) to ensure uniformity and compliance across stakeholders.

7.7.3 The Desired State

The ultimate goal is to create a fully automated system that integrates digital clearance, trading, reporting, and KYC processes. This will lead to a widened logistics ecosystem, offering a national and global one-stop-shop service that connects coastal trade with broader supply chains. A robust legal framework will mandate the exclusive use of electronic documentation, ensuring transparency and accountability. Furthermore, interoperability across systems will enable seamless data exchange between different technology platforms and government initiatives, fostering efficiency and reducing redundancies.

By bridging the gap between traditional practices and digital innovation, the National Database for Coastal Shipping will serve as a cornerstone for India's maritime modernization. It will not only enhance operational efficiency but also support strategic planning, policy formulation, and sustainable growth in alignment with the Maritime India Vision 2030.

7.8 National Database for Coastal Shipping: Current Digital Initiatives in the Indian Maritime System

India's maritime sector is undergoing a significant digital transformation, and coastal trade is emerging as the missing link in this modernization journey. Several initiatives have been launched to integrate technology into port operations, streamline processes, and enhance efficiency, sustainability, and regional connectivity.

The Digitalization Push is at the forefront of this effort, focusing on modernizing ports, optimizing cargo handling, reducing congestion, and enabling paperless trade. This initiative aims to create a seamless digital ecosystem that minimizes manual interventions and accelerates operational workflows.

A key enabler of this transformation is the SAGAR SETU Platform, a unified digital system that connects over 80 ports and 40 stakeholders, facilitating EXIM operations and improving ease of doing business. This platform serves as a centralized hub for trade-

related processes, ensuring transparency and efficiency across the maritime value chain.

The establishment of the Digital Centre of Excellence (DCoE) under the Ministry of Ports, Shipping & Waterways (MoPS&W) in partnership with CDAC marks another milestone. The DCoE is driving innovation through advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and blockchain, aligning with the objectives of Maritime India Vision 2030 and Amrit Kaal Vision 2047.

Performance monitoring and transparency are being strengthened through the DRISHTI Framework, which introduces KPI-based evaluation across ports. This system ensures accountability and fosters continuous improvement in operational standards.

To optimize costs and promote uniformity, the Standardized Scale of Rates (SOR) has been implemented, harmonizing port tariffs and enabling digital integration for cost efficiency. Complementing these efforts are Green Initiatives, such as the "Gateway to Green" report, which positions Paradip, JNPA, and DPA as global hubs for green hydrogen, targeting a production capacity of 5 million tonnes by 2030.

The Sagarmala Programme continues to play a pivotal role in port modernization, connectivity enhancement, and the adoption of technologies like blockchain and IoT for improved efficiency and transparency. Additionally, the Innovation Ecosystem, driven by the Sagarmala Startup & Innovation Initiative (S2I2), is fostering maritime technology startups and MSMEs, promoting indigenous solutions and global competitiveness.

Collaboration remains a cornerstone of these initiatives, with partnerships between academia, research institutions, and private sector players aimed at accelerating innovation and building a resilient maritime technology ecosystem.

Collectively, these digital initiatives are transforming India's maritime sector into a technology-driven, sustainable, and globally competitive industry. By integrating coastal trade into this digital framework, India is unlocking new opportunities for efficiency, environmental stewardship, and regional connectivity.

7.9 National Database for Coastal Shipping: Proposed Setup under the Coastal Shipping Act, 2025

The proposed setup for the National Database for Coastal Shipping is designed to create a centralized, transparent, and efficient system for managing coastal trade operations. This framework, mandated under the Coastal Shipping Act, 2025, integrates strategic planning, stakeholder engagement, and digital infrastructure to streamline processes and enhance decision-making.

At the apex of this structure is the Ministry of Ports, Shipping and Waterways, which provides oversight and publishes the strategic plan. The Strategic Plan Preparation Committee, comprising representatives from DG Shipping, IWAI, Port Authorities, and Maritime Boards, is responsible for drafting the strategic plan. This plan will outline route assessments, operational improvements, and policy recommendations aimed at optimizing coastal shipping and inland waterway integration.

Once finalized, the strategic plan will be made publicly accessible through a government web portal, ensuring transparency and stakeholder participation. The system will also incorporate continuous data feeds from industry experts, seafarer and shipowner representatives, and other stakeholders, enabling real-time updates and informed decision-making.

At the operational level, the National Database for Coastal Shipping will feature multiple modules, including:

- License Module for managing permits and compliance.
- Route and Voyage Database to track vessel movements and service schedules.
- Reporting Engine for performance monitoring and analytics.
- Application Tracker to streamline approvals and licensing processes.
- Route/Service Registry for maintaining standardized service information.
- Administrative Management Tools to ensure smooth functioning and governance.

This integrated system aims to deliver a one-stop digital platform that supports automation, interoperability, and transparency across the coastal shipping ecosystem. By consolidating data and processes, the proposed setup will reduce administrative delays, improve operational efficiency, and foster sustainable growth in line with the objectives of the Maritime India Vision 2030.

7.10 National Database for Coastal Shipping: Stakeholder Identification and Data Collection

The initiative focuses on creating a comprehensive National Database for Coastal Shipping, aimed at improving data integration and stakeholder collaboration within the maritime ecosystem. The line of action involves systematic identification of stakeholders and robust data collection strategies to support national objectives.

7.10.1 Key Activities

- **Review of Existing Data Sources and Systems**: A thorough examination of current maritime and coastal shipping data repositories and systems is undertaken to understand existing capabilities and gaps.
- **Stakeholder Identification** : All relevant stakeholders within the maritime ecosystem and coastal trade network are identified and listed to ensure inclusive participation in the database framework.
- **Assessment of Data Availability and Readines :** The initiative evaluates the accessibility and quality of existing data, preparing strategic options for data collection and synthesis to enhance decision-making.
- **Evaluation of Data Usage Across Ecosystem**: Usage patterns and requirements of stakeholders are analyzed to ensure the database meets operational and strategic needs.

- **Baseline Data Collection Framework Finalization**: A standardized framework for data collection is finalized, aligning with the National Coastal Shipping Database and other national digital initiatives for interoperability.

7.10.2 Maritime Ecosystem Stakeholders

The project encompasses a wide range of stakeholders critical to coastal shipping operations, including:

- Government Authorities: Inland Waterways Authority of India, Major Port Authorities (12 ports), State Maritime Boards, Ministry of Ports, Shipping & Waterways, Ministry of Commerce, Ministry of Road Transport & Highways (MoRTH), and Ministry of Electronics & IT (MeitY).
- Industry Participants: Ship Owners, Seafarers, Shipping Corporation of India, CHAs/Freight Forwarders.
- Infrastructure and Logistics: DMICDC, NICDC, Indian Railways, GSTN.
- Regulatory and Customs: Customs Department.

7.11 Integration and Collaboration

The initiative explores opportunities for Memorandums of Understanding (MoUs) and integration with platforms such as NLP-Marine and ULIP, ensuring seamless inclusion of major stakeholders and promoting data-driven maritime operations.

As part of Phase I of the National Database for Coastal Shipping, a structured plan has been developed to integrate critical data points that will enhance transparency and operational efficiency in coastal trade. The database will capture information on applications received for licenses under Section 4 of the Coastal Shipping Bill, along with details of licenses granted under the same section and the terms and conditions associated with these licenses. It will also include comprehensive records of routes, voyages, and services operating within India's coasting trade. Additionally, the system will document requirements for applicants seeking licenses under Section 4, as well as information on expired and revoked licenses under Section 5 of the Bill. Reports submitted to the Director-General under Section 6 will form an essential part of the dataset, ensuring regulatory compliance and oversight. To maintain flexibility and adaptability, the database will also accommodate any other information deemed necessary by the Director-General, thereby creating a robust and dynamic framework for coastal shipping governance.

7.11.1 Tentative Functional Architecture of the Database

The tentative functional architecture of the National Database for Coastal Shipping has been designed to provide a comprehensive and integrated platform for managing coastal shipping operations. The system will feature multiple portals, including a web portal, mobile application, and back-office portal, each serving distinct functions to ensure seamless user experience and administrative control. The web and mobile portals will offer business information services such as license management and route and voyage details, along with digital publications like MOPSW reporting and performance reports. Common services will include data security and compliance, user authentication,

document management, and API gateways, ensuring interoperability and adherence to MeitY and other compliance standards. Business application services will provide e-services for operational licenses, ship tracking, and route planning, as well as extended services for foreign and Indian licenses.

The back-office portal will support administrative functions such as audit trails and configuration management, while also handling workflow control, content management, database management, and compliance reporting. Identity and access management will cover authentication for vessel owners and seafarers. Additionally, DG Shipping will have a dedicated reporting and tracking module, featuring an internal website for asset and license management, and an administrative dashboard for licenses, inspections, enforcement, and compliance reports. The architecture also integrates with multiple external interfaces, including E-Samudra, port authorities, maritime boards, real craft portals, and movement data systems for road and rail, ensuring a fully connected ecosystem. This layered architecture is designed to deliver efficiency, transparency, and regulatory compliance across the coastal shipping sector.

7.12 Tentative roadmap for the implementation & support sought from the State Government/ Captain of Ports, Goa

To enable seamless integration with the National Database for Coastal Shipping (NDCS), stakeholders are expected to undertake several key actions, including but not limited to the following:

- First, a nodal officer and technical contact must be nominated to coordinate and manage the integration process effectively.
- Where necessary, stakeholders should enter into a data-sharing agreement or Memorandum of Understanding (MoU) with the Directorate General (DG) Shipping to formalize collaboration. Compliance with licensing and voyage processes, as outlined in the Coastal Shipping Act, 2025, is essential to ensure regulatory alignment.
- Additionally, stakeholders must provide access to a complete inventory of vessel, license, and voyage data, which will serve as the foundation for accurate and comprehensive reporting.
- Finally, access to existing systems and necessary APIs should be granted to facilitate smooth technical integration and interoperability within the NDCS framework.

8. WAY FORWARD