From Sea Voices to Science Systems – India's National Marine Risk Intelligence Brief 2026

Introduction

- This feedback consolidation summarises what marine fisherfolk, students/researchers, and organised fisher representatives shared during February 2026 consultations, released at WOSC 2026 (Goa).
- The purpose was to capture ground realities of marine risk, how advisories are accessed and used, and what research and system upgrades are required to strengthen India's marine safety and livelihood resilience.
- The structured evidence base includes Marine Fisher Folk (n=339) across 9 coastal states (Tamil Nadu, Maharashtra, Gujarat, Odisha, Karnataka, Andhra Pradesh, West Bengal, Kerala, Goa) and Students/Researchers (n=254) from multiple fisheries and marine institutions with broad coastal representation.
- Outcomes are organised in the report as national risk signals, delivery constraints, research gaps, missing validation datasets, and priority directions for advisory redesign (voice-first, corridor-sensitive, and validation-linked systems).
- A separate qualitative institutional layer captures Sagari Seema Manch (SSM) discussion insights from Maharashtra and Goa, reflecting organised traditional fisher perspectives beyond the structured survey dataset.

Table 1
Marine Fisher Folk Feedback (n=339) — Risk, Advisory Access and Coastal Experience

General Theme	Simple Category	Simple Explanation with Examples	Evidence (n, %)
Sea Conditions	Sudden Weather Changes	Many fishers said the sea changes very quickly. Calm mornings become rough within hours. Wind direction shifts and wave height increases suddenly after departure.	Weather unpredictability 231 (68.1%)

Major Hazards	Cyclones and Strong Storms	Cyclones remain a major fear. Eastern coast fishers reported frequent cyclone exposure. Gujarat fishers reported high storm intensity and combined risk conditions.	Cyclone/storm risk 199 (58.7%)
Fishing Uncertainty	Uncertain Catch	Fishers sometimes travel long distances but do not get expected catch. This affects fuel cost and trip planning.	Fish uncertainty 182 (53.7%)
Communication Gaps	No Mobile Network at Sea	Network disappears offshore. During bad weather, communication becomes difficult, increasing emergency risk.	Connectivity loss 78 (23.0%)
Advisory Delivery	Delayed or Unclear Messages	Some advisories arrive late or do not clearly distinguish between normal updates and urgent warnings.	Delay 104 (30.7%)
Trust Issues	Doubts on Forecast Accuracy	A section of fishers felt forecast accuracy does not always match ground experience, affecting confidence.	Trust concern 45 (13.3%)
Language Access	Language Difficulty	In some areas, advisories are not in the most comfortable local language, slowing understanding.	Language barrier 41 (12.1%)
Preferred Communication	Voice Over Text	Most fishers prefer voice calls or IVR. Reading long text during rough sea is unsafe. Listening is easier while operating nets or steering boats.	Voice/IVR 183 (54.0%); WhatsApp voice 73 (21.5%); App 69 (20.4%)

Coastal Difference	East–West Risk Variation	Eastern coast highlighted cyclone-linked sudden changes. Western coast highlighted monsoon variation and harbour congestion. Gujarat showed high combined risk and network issues.	Eastern 177; Western 125; Gujarat 37
Harbour Safety	Risk During Return	Final harbour entry during rough sea is highly risky, especially when many boats return at the same time.	Reflected within cyclone and weather responses
Pollution	Plastic and Dirty Water	Plastic waste floating in sea was widely reported. Fishers also mentioned sewage discharge, oil leakage near ports, and industrial waste.	Plastic 267 (78.8%); Sewage 144 (42.5%); Industrial 129 (38.1%); Oil 112 (33.0%)
Nearshore Pressure	More Boats and Construction	Increased vessels in fishing areas, dredging near coast, port expansion, and restricted zones affecting traditional routes.	More vessels 177 (52.2%); Dredging 146 (43.1%); Restricted zones 136 (40.1%)

Table 2

Students and Researchers Feedback (n=254) — Research and System Strengthening

General Theme	Simple Category	Simple Explanation with Examples	Evidence (n, %)
Governance Study	Compliance and Regulation Gaps	Need to scientifically study illegal fishing, boundary violations, and enforcement challenges.	132 (52.0%)
Connectivity Research	Sea Network Mapping	Create offshore connectivity maps to identify communication failure zones.	115 (45.3%)

Cyclone Analysis	Storm Impact on Fisheries	Link cyclone data with fishing effort and economic loss modelling.	111 (43.7%)
Harbour Modelling	Local Harbour Risk Systems	Develop harbour-specific models for wave height, congestion, and safe-entry timing.	81 (31.9%)
Ocean Data Integration	Multi-Source Data Use	Combine sea surface temperature, chlorophyll, wind and current data for better advisories.	141 (55.5%)
Validation Data	Trip and Catch Records	Lack of structured trip logs, catch data, and fuel records limits advisory evaluation.	143 (56.3%)
Safety Records	Incident and Accident Data	Absence of structured accident and near-miss records affects safety modelling.	95 (37.4%)
Advanced Technology	AI, GIS and Remote Sensing	Strong readiness to use AI, machine learning, GIS, remote sensing, and GeoAI.	AI/ML 190 (74.8%); Remote sensing 164 (64.6%); GIS 161 (63.4%); GeoAI 148 (58.3%)
Delivery Innovation	Low-Bandwidth Systems	Develop advisory systems that function in weak network areas.	50 (19.7%)

Table 3

Sagari Seema Manch (SSM) Discussion Insights — Maharashtra and Goa (Western Coast Experience)

Theme	Detailed Feedback from Western Coast Experience
Illegal Fishing	Frequent entry of LED fishing vessels, speed trawlers and purse seine boats into traditional fishing zones. Fishers felt enforcement is inconsistent and coordination between neighbouring states needs strengthening.

Harbour Infrastructure	Congestion during peak return time increases collision risk. Small khadi landing areas lack proper breakwaters, making landing unsafe in rough sea. Unequal jetty access affects small-scale fishers.
Economic Pressure	Rising diesel cost influences departure decisions. Declining catch affects income stability. Need updated fisheries census reflecting real traditional fisher population.
Scheme Access	Complex documentation and delayed approvals under schemes such as PMMSY. Smaller fishers struggle with compliance and licensing processes.
Safety Devices	Willingness to adopt Distress Alert Transmitters and GPS tracking, but need structured training, awareness programmes and coordinated rollout.
Coastal Pollution	Plastic accumulation near harbours, oil leakage risk near ports, mangrove destruction affecting breeding grounds, and need for structured coastal clean-up coordination between fisher groups and local authorities.

Table 4

Integrated Marine Risk Intelligence — Research, Policy and System Direction (Based on Marine Fisher Folk (n=339), Students/Researchers (n=254), and Western Coast SSM Discussions)

Broad Theme	Research & Development Direction	Policy / System Strengthening Direction	Practical Example
Precision Marine Forecasting	Develop corridor-level and harbour-level sea condition models instead of only general state forecasts	Institutionalise harbour-based early warning systems integrated with district fisheries and disaster control rooms	Harbour-specific alert showing safe departure and safe return window
Harbour-Level Risk Systems	Build congestion, wave surge and safe-entry prediction tools for major and small harbours	Upgrade breakwaters, landing channels and equitable jetty access, especially in vulnerable khadi areas	Digital harbour board displaying real-time entry advisory

Connectivity Resilience	Map offshore network reliability and design low-bandwidth advisory delivery systems	Coordinate with telecom agencies to strengthen coastal and offshore signal coverage	Connectivity heat map identifying communication blackout zones
Advisory Validation Framework	Develop structured trip logs, catch records and continuous ground-truth validation systems	Mandate simplified digital reporting and institutionalise advisory review meetings with fisher representatives	Monthly comparison of forecast data with actual trip outcomes
Cyclone–Livelihood Linkage	Model economic loss linked to cyclone days, trip cancellations and catch reduction	Introduce cyclone-triggered livelihood compensation mechanisms	Relief activation when fishing days lost cross defined threshold
Enforcement and Compliance	GIS-based vessel tracking research and illegal fishing pattern analysis	Strengthen inter-state maritime enforcement coordination, particularly along western coast corridors	Joint Maharashtra–Goa monitoring dashboard
Ecosystem and Pollution Monitoring	Study impact of plastic waste, oil leakage, dredging and mangrove loss on fish breeding zones	Establish structured fisher–authority coastal monitoring committees	Community reporting system for harbour plastic accumulation
Trust and Feedback Integration	Integrate structured fisher feedback loops within advisory platforms	Institutionalise periodic validation and consultation platforms between scientists and organised fisher bodies	Quarterly advisory consultation with fisher leaders
Advanced Marine Technologies	Expand AI, GIS, remote sensing and GeoAI-based predictive advisory systems	Fund collaborative marine digital research programmes involving institutions and fisheries departments	AI-based fish forecasting integrating SST and chlorophyll data

Safety Technology Integration	Develop integrated emergency alert ecosystem combining DAT, GPS tracking and voice advisories	Conduct structured harbour-level safety training and simulation drills	Annual distress alert and evacuation drill
Scheme Inclusion and Access	Study documentation, digital literacy and compliance barriers	Simplify scheme application processes for small traditional fishers	Single-window harbour facilitation desk
Economic Sustainability	Develop bio-economic models linking fuel cost, catch variability and market price trends	Strengthen market information systems and review fuel support mechanisms	Voice-based daily fish market price updates
Integrated Institutional Approach	Design Marine Risk Intelligence architecture combining science, connectivity, validation and governance	Ensure coordinated functioning of research institutions, fisheries departments, telecom agencies and organised fisher platforms	Unified national Marine Risk Intelligence dashboard