

EXECUTIVE SUMMARY

Fishers on the first mile: early warning early action by traditional fishers of southwestern India

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Background

As climate change intensifies tropical storms and makes extreme weather events more frequent over the Eastern Arabian Sea, effective early warning early action becomes necessary for traditional fishers on its densely populated coasts. This study in Thiruvananthapuram district of southwestern India probes how fishers act on early warnings in their work environment.

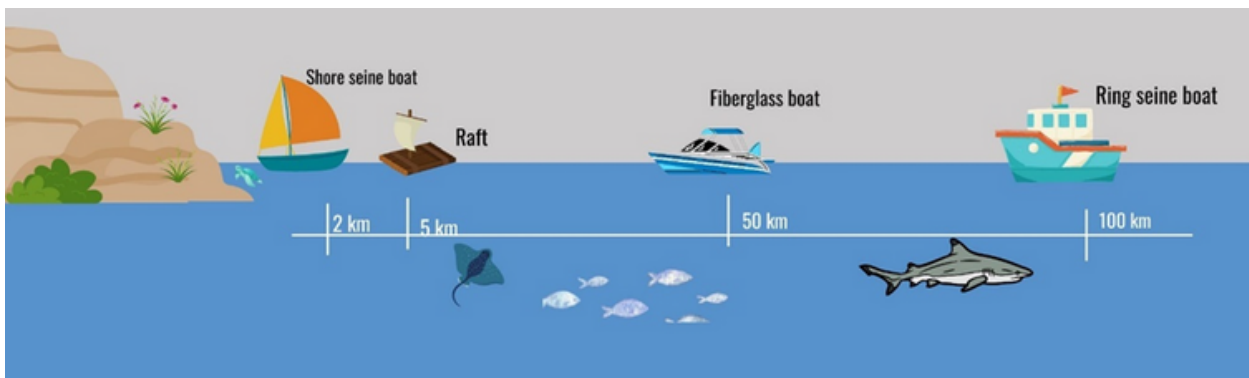
Over 50,000 seagoing fishers here engage in diverse modes of fishing on artisanal craft. This field-based qualitative study looks at the following fishing activities: i) shore-seining (that involves pulling long ropes attached on either end of a long net immersed close to the shore like an arc; ii) raft fishing with nets close to the shore; iii) fishing on 10-meter fiberglass boats with nets or hook and line at the coastal waters 75 km from the shore and iv) ring seining on 12–14-meter mechanized vessels within 200km from the shore.

Objectives and methodology

This study investigates whether last-mile communities can take preventive action based on early warnings, addressing three key aspects:

- i) Hazard identification
- ii) Inputs for early action – information, procedures, capacity, financing, triggers, and roadmaps
- iii) Influencing factors – risk communication, response capacity, and constraints

The study includes focus group discussions, interviews, and informal conversations with 50 fishers across five villages, as well as 10 key informant interviews with experts.



Distance from the shore where traditional craft operate (not to scale). Graphic by Roshni Rajagopal

Key findings

Prevalence and Seasonality of Hazards that Require Early Action: The southwestern monsoon (June to September) poses significant risks for fishing due to high winds (over 40 km/h) and rough seas (waves over 1.5 meters), especially for small fiberglass boats and artisanal craft. Despite the dangers, the monsoon season coincides with a high fish catch, prompting many fishers to continue fishing. Swells from distant storms further complicate boat launching and landing. While most raft fishers and shore-seine units take a break, those who continue often face incidents and accidents.

Impact of Intensifying Storms: The 2023 North Indian Ocean storm season was one of the most active on record. Although the local impact was limited, frequent fishing restrictions were imposed as a precautionary measure. These restrictions, while necessary for safety, add pressure on the fishers' livelihoods, especially during periods when fish catches are high but conditions remain hazardous.

Information for Early Action — Need, Quality, and Actionability:

- **Forecasts and Early Warnings:** Fishers in the study area face year-round hazards, including the pre-monsoon storm season (March–June), the monsoon season (June–September), and the post-monsoon storm season (October–December). They are also exposed to swells from distant storms in the Southern Ocean, South Indian Ocean, and South Atlantic. Regular forecast bulletins provide early warnings of hazardous wind, high waves, swells, and nearby storms, which often lead to fishing restrictions.
- **Dissemination of Warnings:** Fishers receive weather information from multiple sources, including television, mobile apps, and private wireless networks using boat-mounted or handheld VHF radios with a range of 15–20 km offshore. The government also sends early warning messages through local self-governance offices, supported by the police, Coastal Police, Coast Guard, local rescue workers, and trained volunteers. These warnings are broadcast through mass media channels. Despite this multi-channel system, fishers often express concerns about the accuracy and timeliness of forecasts, particularly regarding their local relevance.
- **Traditional and Local Knowledge:** Alongside scientific forecasts, fishers rely on traditional and local knowledge to guide their decisions about when and where to fish. They closely monitor the sea state and weather patterns, often drawing on generational knowledge passed down through the community. This combination of formal forecasts and traditional knowledge helps them make more informed decisions.
- **Information Needs:** Fishers actively seek detailed weather information before each fishing trip. They have a nuanced understanding of the risks they face at sea and continuously monitor changes in sea conditions. While they value weather forecasts, they also emphasize the need for more precise, localized information tailored to their specific fishing activities.

Early Action on the Ground — Procedures and Gaps:

- **Governance and Procedures:** The Kerala State Disaster Management Authority (SDMA) issues early warnings, while the India Meteorological Department (IMD) and the Indian National Centre for Ocean Information Services (INCOIS) provide weather forecasts. Local agencies work to ensure these warnings reach the last mile. However, fishers report insufficient financial support for early action and limited community involvement in planning and implementing early warning systems.
- **Evacuation and Relocation Challenges:** Fishers are evacuated from risk zones and offered relocation options, but finding alternative safe locations

along the coast is difficult due to high population density. In Thiruvananthapuram, the population density is 1,509 inhabitants per square kilometer (Census of India, 2011), making coastal areas extremely crowded. This complicates the implementation of early action measures, as suitable evacuation areas are often in short supply.

Recommendations

Improved Forecasts: Raft fishers, shore seiners, and crews of fiberglass boats and ring seine vessels have distinct information needs. Raft fishers and shore seiners require short-term forecasts within a 5 km radius for up to four hours, while boat crews need full-day weather and sea state information for up to 75 km offshore and beyond, along with multi-day forecasts for planning. This research highlights **several ways to enhance forecasts:**

- Improve forecasts with robust observations and data across different lead times—3-4 hours, days, months, and seasons—and include probability information.
- Establish a feedback loop between forecasters and diverse forecast users.
- Ensure forecasts seamlessly cover different time and spatial scales to align with early warning and disaster risk reduction systems.
- Integrate forecast data with Early Warning Early Action (EWEA) and disaster risk reduction metrics, providing users with actionable options, including financial support.
- Co-produce weather information with forecast users, incorporating their local needs and knowledge.
- Align forecasts with local safety, adaptation, and sustainability requirements.

Better Early Warning and Early Action (EWEA): Localized EWEA systems for coastal areas can reduce the impact of climate hazards by enabling timely, well-planned actions before a disaster strikes. Given the seasonal and frequent nature of these events, incorporating EWEA measures into regular marine weather forecasts and early warning messages is essential.

Enhanced Community Involvement: There is potential for stronger community engagement from forecasters and disaster management officials to support community-based and locally led EWEA initiatives in Thiruvananthapuram. Fishers blend risk information from official forecasts, the fisheries department, disaster authorities, private sources (such as weather apps), and traditional knowledge. This complementary approach should be recognized and leveraged to improve early action responses.

Follow [this link](#) to read the full paper.