Global Disaster Preparedness Center

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 increases the frequency of extreme weather events over the Eastern Arabian Sea, effective early warning early action (EWEA) becomes critical for traditional fishers living and working along the densely populated coasts of southwestern India. This study, conducted in Thiruvananthapuram district, examines how fishers respond to 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:

- Shore-seining (that involves pulling long ropes attached on either end of a long net immersed close to the shore like an arc).

- Raft fishing with nets close to the shore.
- Fishing on 10-meter fiberglass boats with nets or hook and line at the coastal waters 75 km from the shore.
- Ring seining on 12–14-meter mechanized vessels within 200km from the shore.

Research questions

This research addresses the key research question: *Are last mile communities able to take preventative action based on early warning messages?*

Subsequently, it addresses the following sub-questions: i) hazards, ii) inputs for early action (information, procedures, capacity, financing, triggers, roadmap), iii) influencing factors (risk communication, response capability and constraints).

Methodology

The study is based on focus group discussions, interviews, and informal conversations with 50 fishers across five villages, and 10 key informant interviews with experts.

Key Findings

Prevalence and seasonality of hazards that require early action

Risks: The 122 days of southwestern monsoon season from June to September is a dangerous time to fish as the sea turns rough with high wind (over 40 kmph) and waves (over 1.5 meters). Such conditions are risky for small fiberglass boats (10 meters) and even smaller canoes and rafts. Ironically, the monsoon season is also marked by good fish catch, prompting fishers go to fish irrespective of the weather conditions and inherent risks. The coasts are also exposed to destructive swells from distant storms. High wind and waves during the monsoon make launching and landing craft difficult and risky. While most raft fishers and shore seine units took a monsoon holiday, those who go during the season face high waves and wind – and often incidents and accidents.

Storms: Amidst intensifying storms, the North Indian Ocean had its second most active storm season on record in 2023. Their local impact was limited, but there were frequent fishing restrictions.

Information for early action — need, quality and actionability

Forecasts and early warnings: Fishers in the study area are exposed to hazards throughout the year, with the pre-monsoon storm season of March–June, the monsoon involving a rough sea state during of June–September, and the post-monsoon storm season of October–December. Besides, they are exposed to swells

from distant storms in the Southern Ocean, South Indian Ocean and the South Atlantic.

Regular forecast bulletins often include early warnings about hazardous wind, high wave, swells hitting the shores, or a storm passing by, and fishing restrictions thereof. These impacts are felt differentially across the coast of the study area, at different distances from the shore, by fishers on diverse craft engaged in distinct fishing activities.

Dissemination: Fishers get weather information from television, mobile phone services, including applications, and their own private wireless networks comprising boat-mounted or handheld very high frequency (VHF) radio sets with a usual offshore range of 15–20km. The government sends early warning messages through the local self-governance offices and administrative systems, supported by the state police force, the Coastal Police, the Coast Guard, local rescue workers and trained volunteers. The mass media broadcast these warnings.

Localized forecasts: Even with access to multiple sources for weather information, the local fishers are concerned about the accuracy and local relevance of weather services. Still, most of the fishers find forecasts useful.

Traditional and local knowledge: Complementing the scientific weather forecasts, the fishers draw from their traditional and local knowledge to make decisions on when and where to fish and when to call off a fishing trip.

Information needs: All the participants actively sought information regarding weather conditions and the sea state before going to fish each time. At the last mile, the fishers have a nuanced understanding of the risks they are facing. They keep a close eye on the sea state and changes in the weather.

Early action on ground

Procedures: Kerala State Disaster Management Authority (SDMA) issues early warnings and promotes early action, while the India Meteorological Department (IMD) and the Indian National Centre for Ocean Information Services (INCOIS) issue weather and sea state forecasts and alerts. The local self-governance agencies promote last mile reach of the warnings. Still fishers find inadequate financial support for early action, and limited community involvement.

Roadmap: While fishers are evacuated from risk zones and offered assisted relocation options, it is often difficult to acquire alternative place on the coast. Thiruvananthapuram has a density comparable to some of the major world cities – 1,509 inhabitants per square kilometre (Census of India 2011). Coastal areas are crowded.

Conclusions and Recommendations

Improving Forecasts

Raft fishers, shore seiners, and the crews of fiberglass boats and ring seine vessels have distinct information needs. While raft fishers and shore seiners are concerned with sea conditions within 5 km and for the next few hours, boat crews require weather and sea state information for an entire day covering distances up to 75 km and beyond. They also need multi-day forecasts and storm track updates to plan their trips.

Continuing research suggests that forecasts can be improved through the following steps:

I. Enhance forecasts with robust observations and provide weather information across varying lead times—3–4 hours, days, months, sub-seasons, and seasons—along with probability data.
II. Establish feedback loops by linking forecasters with diverse groups of forecast users.
III. Ensure seamless forecasting across different timeframes and spatial scales, aligned with early warning systems and disaster risk reduction efforts.
IV. Align forecasts with EWEA and disaster risk reduction metrics, and offer users a range of response options, including financing.
V. Co-produce weather information with users, incorporating their local knowledge and specific needs.
VI. Integrate forecasts with local safety, adaptation, and sustainability strategies.

Strengthening EWEA Systems

Localized EWEA for coastal areas can help to minimize the impacts of climate hazards by supporting well-planned, locally led early actions before a hazard hits and its impacts are felt. As many of these events are seasonal and frequent, there is merit in taking the EWEA aspects into regular marine weather forecasts, along with early warning messages.

Enhancing Community Involvement

There is a need for stronger and more direct community engagement by forecasters and officials involved in disaster risk reduction and the promotion of community-based and community-led EWEA initiatives in Thiruvananthapuram. While fishers receive risk information from official forecasters, the fisheries department, and disaster management authorities, they also rely on private sources (such as weather apps) and traditional and local knowledge. The complementary nature of these risk knowledge systems should be acknowledged and leveraged to enable more effective early action.

Follow this link to read the full paper.

This work was part of a multi-country research initiative led by the Global Disaster Preparedness Center of the American Red Cross.