A Fishers' Forecaster

Action research by the University of Sussex is bringing fishermen and scientists together to track wind, and waves and save lives

Seen from the air, Thiruvananthapuram, the capital city of Kerala state in south India, looks like a magic carpet – a long strip of golden sand separating a vast green canopy of coconut palms and the turquoise shimmer of the Arabian Sea. These sandy shores are home to the largest concentration of artisanal marine fishers in this part of the world – 42 villages spread along a 48-mile coastline. Many of these fishers are poor.

Marine fishing in the tropical seas off Thiruvananthapuram (8° 31' N 76° 56' E) is an adventurous affair, especially during the monsoon season that begins on 1 June and lasts till September. During these months, fishers brave high waves, buffeting winds, swift ocean currents, thunderstorms and low visibility, but even today, they have no easy access to regular marine weather forecasts.

The research here by the University of Sussex seeks ways to make marine weather forecasts more accurate, accessible and actionable in line with the risk culture of the fishers. We work in collaboration with state officials and forecasters – mainly our research partners, the State Disaster Management Authority (SDMA) and the Indian National Centre for Ocean Information Services (INCOIS). Our team, led by Professor Filippo Osella, an anthropologist, comprises another senior anthropologist, an integration design expert and two of us geographers. We design model forecasts and weather alerts with the local fishers, and help them disseminate these bulletins over many channels such as mobile phones, radio and loudspeakers. It is a trial-and-error process and we call it, "Co-production of knowledge and communication tools for safe and sustainable artisanal fishing."

We focus on two fishing villages. The first is Anchuthengu in the north of the district and part of a barrier island, where the British East India Company built one of its first forts in 1695. It is a thin strip of land between the Arabian Sea and a lagoon. It is losing part of its seaward edge, especially after the groynes laid for a fishing harbour built on a nearby estuary has changed wave and current patterns and worsened coastal erosion. In bad weather, fishers find it risky to enter and exit the sea mouth as high waves overturn their small craft or hurl them against the granite structures. People have died in such accidents and the fishers consider it the biggest risk they face.

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Visual communication

In our risk communication workshops, Anchuthengu fishers preferred to address the harbour-related risks first. So they focused on visual communication, designing a set of signals marking safe channels for navigation to the harbour. While the fishers negotiate with the district authorities to install this signal system, they have also requested the SDMA

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to provide another set of signals to give rough weather alerts. Experts of the Kerala State Institute of Design in nearby Kollam district are helping the fishers in the process. As I write this article, the fishers are looking for brighter light-emitting diode (LED) lamps to replace a set they had installed on their own as part of a test signal system. Anchuthengu fishers are also exploring better ways to share marine weather forecasts – through mobile phone calls, social media and loudspeaker announcements.

A small group in the nearby Puthukurichy village called Radio Monsoon is offering marine weather bulletins in Malayalam over phone lines and WhatsApp, based on an INCOIS service. The fishers like to hear it over small loudspeakers, along with other useful information such as availability of fish and market trends. On 13 June, we tested a set of public address systems to disseminate these messages at places where the fishers dock their boats. The fishers said the bulletins, based on INCOIS and Indian Meteorological Department (IMD) forecasts, were accurate most of the time. They are now trying to set up a small studio to record audio programmes.

Our other field study site is Poonthura, close to the city and 20 miles south of Anchuthengu. The two villages are connected by a canal built in the early 19th century by a queen of the erstwhile Travancore kingdom. The canal, once a trunk route, is now in disuse, but fishers frequently move between the two villages by road and sea, and find partners in business and life. Poonthura was one of the villages worst hit by Cyclone Ockhi, which led to many fishers dying or going missing at sea. The storm system had formed in the southern Bay of Bengal and caused damage in Sri Lanka on 29 November, only to intensify the next day off the coasts of Thiruvananthapuram and Kanyakumari district of Tamil Nadu, sinking dozens of boats. Fishers were already out at sea when the storm rapidly gained strength, and were unable to access forecasts. The event itself was not classified as a cyclonic storm (wind speeds greater than 39 miles per hour) till 30 November.

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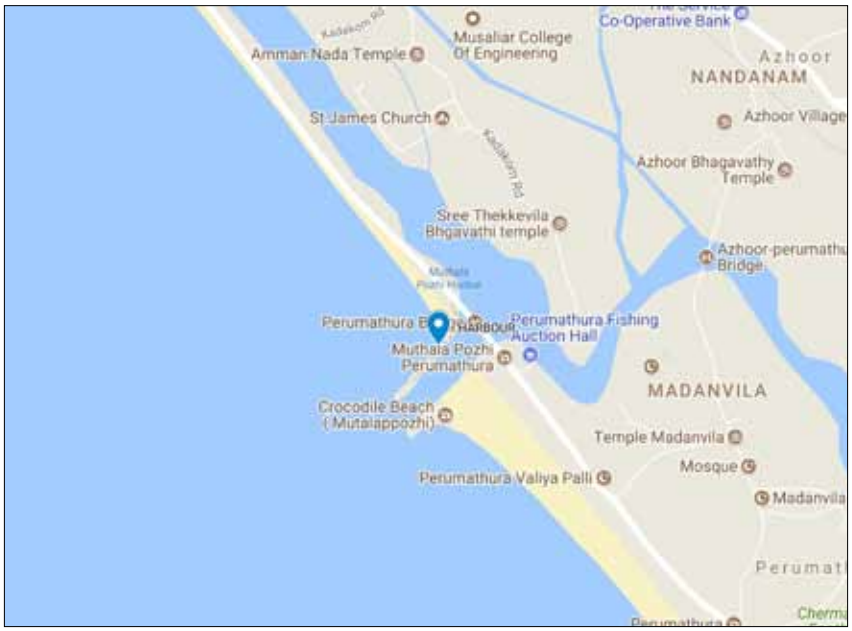

Muthalappozhi harbour, three miles south of Anchuthengu village in Kerala and connected through a lagoon, is hazard-prone in rough weather

Faced with weather-related risks at sea, the local fishers of Poonthura are demanding two interventions. First, they need a clear forecast dissemination system accessible on the sandy seashore and a local estuary where they launch their boats. They prefer loudspeaker announcements and voice calls over currently available text messages that INCOIS provides. Second, they want a system that is reliable when they are fishing offshore. Fishers here often go 25 nautical miles and beyond, moving north or south, where the wind patterns can be dramatically different from what they experience closer to home. Younger fishers already share weather, fish and navigation information over their own informal networks of mobile phones (range of up to 10 nautical miles offshore) and wireless sets. What they want is a wireless base station that can give round-the-clock weather information and a way to connect it with formal weather forecast systems. Another idea is to set up their own community frequency modulation (FM) radio station, which can beam forecasts, songs and talk shows. The radio station is taking time to materialize amidst deliberations about who should own and run it.

Meanwhile, we join the discussions amongst fishers, technologists and

regulators as part of our research, looking at the feasibility of various locally owned risk communication options. In our workshops, the fishers said that marine weather forecasts need to be more local, accurate and timely, and must have a clear focus on conditions offshore. The weather bulletins currently available over radio and television are largely land-based. Offshore wind patterns are of particular interest to the fishers. However, they have no access to services such as Global Maritime Distress and Safety System (GMDSS) that informs the maritime industry over specialized equipment and the Internet. Ongoing experiments such as Radio Monsoon include GMDSS information.

At the same time, the government agencies are listening to the fishers and offering support to some of their local, last-mile communication initiatives. In March, when a storm system gained strength off the Kerala coast, the IMD issued warnings which were relayed over loudspeakers by the SDMA, which also banned fishing activities for a few days. Fishers welcome such alerts, though they are concerned that fishing restrictions cover a large swathe of the sea, and false alerts adversely affect their livelihoods. They demand more precision in terms of time and space. Such concerns about accuracy, accessibility and actionability of the forecasts became the focus of a research meeting we hosted in Thiruvananthapuram on 11 June, for our stakeholders and a group of scientists and experts who collaborate with us.

As the fishers and forecasters continue their debate and dialogue, they have already started taking precautions in anticipation of the rough sea conditions during the monsoon season. For our part, we are conducting more 'co-production' workshops and field trials of various modes of risk communication. We are tracking small fishing vessels and mapping their forays with the aid of global positioning system (GPS) devices, which several fishers carry on board, and then comparing these tracks with potential fishing grounds shown in satellite images. Once they return, we share notes on the accuracy of the forecasts at different points. The idea is to look for novel and better ways of risk communication for safe and sustainable fishing. We share this data with the forecasters, contributing to better models and future research. Our in-house philosophy remains: "Save one life and it will be worth it."

KEVIN JULIUS

Sorting fish at Anchuthengu, Kerala, India. In our risk communication workshops, Anchuthengu fishers preferred to address the harbour-related risks first

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