Disseminating marine weather forecasts and gathering feedback from artisanal fishers in south India

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ABSTRACT

Despite recent advances, uptake of climate and weather services is limited for many groups that need forecasts for safe and sustainable livelihoods such as artisanal fishers. On the Arabian Sea coast of southwestern India, for instance, they often fish in foul weather, and risk accidents during the monsoon season marked by high wind and waves. To make forecasts more easily accessible, we tested and deployed a low-cost, web-based, knowledge co-production system called *Radio Monsoon.* The website offers wind speed and wave height forecasts in graphics and local-language text with multiple interfaces – social media, WhatsApp, and a free phone service using voice over internet protocol. Focus groups and conversations connect the fishers with forecasters in a feedback loop. This paper examines how *Radio Monsoon* addresses challenges in knowledge co-production by looking at its technology deployment and societal impact.

CCS CONCEPTS

Applied computing~Physical sciences and engineering~Earth and atmospheric sciences~Environmental sciences
Human-centered computing~Collaborative and social computing~Collaborative and social computing design and evaluation methods~Ethnographic studies

KEYWORDS

Marine weather; forecast; dissemination; community radio; FM; co-production; safe fishing; sustainable development.

1 Introduction

Recent advances in climate and weather modelling and science-society interface promise better production and use of science and weather information for a wide spectrum of decision-makers still remains a challenge. That is because there are gaps between the science produced to inform decision-making and the actual use of that knowledge. In this context, 'boundary organisations' promote and streamline such interfaces by co-producing scientific knowledge [1]. We argue that knowledge co-produced and shared through affordable information and communication technologies (ICTs) can be very useful for communities depended on natural resources [2].

Amidst climate change impacts, artisanal fishers who pursue precarious livelihoods face more risks. In the North Indian Ocean region, the monsoon season involves strong wind and large waves, and fishers face frequent accidents. Our research in Thiruvananthapuram district of south India looks at ways to reduce this risk by deploying an affordable technology to co-produce weather knowledge. In this paper, we explain the *Radio Monsoon* method of co-production and its technology deployment, and highlight its societal impact.

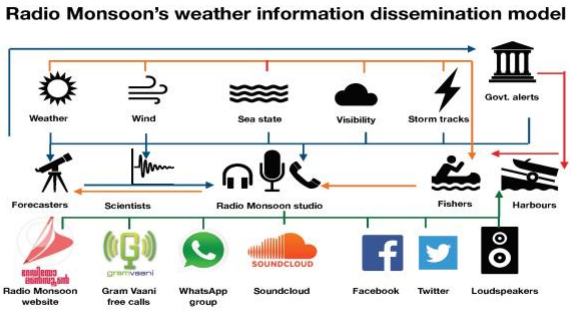

Figure 1: Fishers receive forecasts through multiple media, and give feedback based on their own observations

2 ICT for co-producing weather knowledge

Radio Monsoon was initiated as a small technology experiment to test how marine weather forecasts could be simplified and made accessible through different media to artisanal fishers of

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Thiruvananthapuram. The concept – called Feedback in Centre in 2013. A field worker – trained as a media professional – recorded the bulletins and uploaded them on a server accessible by a free phone call. A snowball sample of 10 fishermen listened to the forecasts and offered their feedback that was reported to the forecast agency, the Indian National Centre for Ocean Information Services (INCOIS). As the fishermen requested, the services continued for two years on local resources. After a gap, in 2017 a University of Sussex team started research using the *Radio Monsoon* system for their study on risks faced by artisanal fishers and risk communication options.

From February 2018, we looked at hazard risks faced by artisanal fishers, the decision-making process involved in fishing and ways to co-produce and disseminate marine weather forecasts. The research deployed ethnography, a comparison of forecasts with satellite observations, logs of small fishing boats, and a set of weather knowledge co-production workshops [3].

Radio Monsoon now collates daily weather, wind and wave forecasts from the national forecasters, namely the India Meteorological Department (IMD) and INCOIS. Based on these forecasts, weather newscasters compile bulletins in the local language, Malayalam. These bulletins are disseminated over an Internet platform with multiple interfaces – primarily automated, recorded phone calls offered by the tech company Gram Vaani, streaming over social media, including SoundCloud, Facebook, a WhatsApp group, and through the Radio Monsoon website that publishes daily updates and biweekly features and interviews. The fishers offer feedback on the forecasts – over phone calls and focus groups with weather newscasters and forecasters. These tools reduce the gap between science production and use through co-production in line with local needs [4]. This iterative and interactive process enhances the usefulness and usability of weather knowledge through collaborative product-development by scientists, forecasters and stakeholders [5].

3. Insights and outcomes

A key learning from focus groups and conversations during the first phase of research was the fishers' need for better access to marine weather forecasts, especially during the monsoon season. During the follow up research, the fishers said they looked for windows of safety when the waves and wind are low, and limited their fishing operation to parts of the sea – usually close to the shore – where the sea is relatively calm and landing is easy. Therefore, they need more precise forecasts in time and space well in advance so that they can optimise crew size, gear, duration of fishing and identify the right place for launching and landing. As a fisherman said: "If the forecasts are more accurate, we can listen to them and plan well in advance to go to sea and return." Besides, the fishers preferred to get timely information on distant weather systems, their trajectory and speed. Another fisherman explained: "Changes happening in the atmosphere, such as formation of low pressure areas that they (the forecasters) talk about cause changes in the monsoon (and wind and waves). It will be nice if they give us forecasts well in advance." In response, the forecasters have acknowledged that they have started more streamlined and easily understandable forecasts, including the tracks of offshore low pressure systems and direction and speed of ocean currents. Another key outcome was a rise the number of Radio Monsoon listeners (from around 50 a week till 2018 to over 2000 now for biweekly steaming services). The fishers have also acknowledged that the process of co-production had impact on their risk-taking behaviour. It appears that risk taking is not entirely dependent on weather conditions, but rather on a cost-benefit analysis.

The study gave three insights: First, there is a need to make forecasts more precise, and more relevant to specific groups of fishers (engaged in different kinds of fishing at different distances from the shore). Second, weather information dissemination needs multiple media – mobile phones, social media, FM radio and two-way wireless sets. Third, forecasters and fishers need to share their knowledge, concerns and the challenges they face as part of their work, and build trust.

4 Conclusion

Radio Monsoon has successfully tested co-production of weather information. Feedback provided by the fishers was useful and insights from this process have helped forecasters improve their products and increase the user base. *Radio Monsoon* is now emerging as a boundary organisation with more research inputs.

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