

Traditional Fishing Knowledge with Climate Change: An Outlook

Manickavasagam S¹, Ponmani M¹, Mariselvammurugan A², Mariappan S¹, Anbarasan M³ and Santhosh Kumar M⁴

¹ Tamil Nadu Dr.J.Jayalalithaa Fisheries University (TNJFU), Nagapattinam, Tamil Nadu

² M.F.Sc Fish Nutrition and Feed Technology Research Scholar, Kerala University of Fisheries and Ocean Studies, Panangad, Kerala

³ M.F.Sc Division of Aquatic Animal Health Management Research Scholar, SKUAST-K, Faculty of Fisheries, Rangil, Jammu and Kashmir

⁴ M.F.Sc Research Scholar, Central Institute of Fisheries Education, Panch Marg, Off. Yari Road, Versova, Andheri (West), Mumbai, Maharashtra

SUMMARY

Fishers' local knowledge and their perceptions of climate change are increasingly recognized by researchers and international institutions. However, in India, limited regional studies are available to understand the fishers' local knowledge, and a crucial question which largely remained unaddressed has been how fishers perceive the relevance of their local knowledge systems in the face of climate change. Provided this background, this paper aims to explore the fishermen's local knowledge and their climate perceptions in the face of climate change.

INTRODUCTION

Across the world, small-scale fishers are largely relied on their local ecological knowledge for their fishery livelihoods. Hence, there is a strong need to recognize the scope of fishers' expertise in fisheries management, mainly from the developing nations' point of view as fisheries management literature is biased primarily to western science and ideas. Climate change impacts mix with the existing stressors of marine ecosystems, and thereby, it makes the marine resource-dependent communities further vulnerable and it exacerbates the marine systems which were already under stress due to various pressures. Marine fishing communities are the immediate sufferers to the broader impacts of climate change. The impoverished populations of the less developed nations are the most sufferers to climate change impacts.

Study background:

The vulnerabilities of the eastern coastal districts of India due to climate change impacts and emphasized that climate change has had various adverse effects on poverty-reduction initiatives, physical and social infrastructures of the coastal communities. Recent studies discussed how climate change impacts exacerbate the livelihoods vulnerability of coastal fishers across India. Tamil Nadu is one of the prominent coastal states in India, which has the coastal length of 1076 km. Coasts of Tamil Nadu have a long history of vulnerability to climate change and disasters. This paper has addressed such research gaps, and additionally, it suggested recommendations to the policymakers. The key objectives of this paper are the following: (1) to briefly document the community lingo of small-scale fishermen that are related to oceanographic factors and climate, and to explore the local observations, perceptions and personal experiences of fishermen on climate change impacts in the context of their local knowledge, (2) to discuss how fishermen perceive the contemporary relevance of their local knowledge in the face of climate change. This paper does not intend to quantify the social phenomena of fishers' local knowledge and their perceptions of climate change. Instead, it intends to enrich the existing literature by providing a better qualitative understanding of the fishers' perceptions of local knowledge in the face of climate change.

A few selected questions/schedule that guided the data collection:

1. Share the different traditional names (community lingo) of the sea currents, wind patterns and seasons
2. How do you find out the timings, directions and fish shoals when you are in the sea?
3. What is the significance of wind patterns in detecting the fish shoals and determining the fish caught in the typical fishing day?
4. How do the currents influence the fish catch and safely navigating the boats?

5. How do you predict the impending rainfalls, cyclones and floods by local traditional knowledge?
6. What are the signs and indicators of the heavy rains, cyclones and floods? Explain
7. How does the lunar cycle influence the fish catch?
8. Explain the relationship between the changes in the climate patterns and fish catch
9. What are the climate variables that affect the fish availability and catch? List and rank the variables according to its influence
10. Explain the effects of the climate events that occurred for over the past three to four decades and point out how it has changed the fish catching patterns over the years.
11. Sources of weather-related updates and early disaster warning and its efficiency—Fishermen's opinions and narratives
12. What are your views on the relevance of local traditional knowledge in the face of climate change? Is it helpful to face and to reduce the weather-related challenges and to earn sufficient income for your family?

Illustration of fishermen's local traditional knowledge:

Signs of high and low fish catch/fish shoals:

- During the new moon period (Amavasai: in Tamil), more fish catches are obtained. During the full period (Pournami: in Tamil), fewer fish catches are obtained
- Flocks of birds hover on the seawater indicate the fish shoals
- Coastal upwelling is an indication of good fish catch
- Dark blue patches, the presence of frequent bubbles and ripples on the sea water indicate the fish shoals
- The presence of fishy odour at sea denotes substantial fish catch, whereas the bad odour at sea denotes the less concentration of fish in the particular fishing ground
- The presence of muddy water indicates the substantial concentration of fish shoals, whereas the clear white water suggests the less fish availability at the fishing grounds

Signs of weather extremes including heavy rainfalls/cyclones:

- Sea water remains very calm
- Dark clouds are seen in the horizon
- Sudden increase/upsurge of the speed and intensity of sea currents
- Abnormal behaviour of the animals (mainly dogs) and birds
- Foaming of water at the sea shore is an indication of the impending cyclone

Environmental precursors that signal less fish catch and weather extremes: Fishermen's local ecological knowledge

Senior fishermen observe the movements of clouds to predict the onset of heavy rainfalls. They say “mappu” to indicate the weathers' cloudiness and to denote the upcoming rain. In general, fishermen prefer to go fishing during the summer season (except April, May and June, which is the fish ban period) rather than the rough season (October to December). Across the research region, it was noted that the fishermen avoid navigating their boats more than around twenty nautical miles during the rough season. Further, during the rough seasons, their fishing trips depend on both the early warning information (science) and their local knowledge systems. The senior fishermen usually observe and analyse the cloud movements and predict whether it would rain or not before venturing the sea for fishing and advice the local fishermen. According to fishermen who participated in the study, if the colour of the clouds is dark, and it assembles in the particular place, it gives the sign for the onset of rains, whereas the colour of the cloud appears white and it moves with fast dispersion, they consider it is the sign of less or no showers.

CONCLUSION

Environmental change impacts influence the intensity of poverty, and it has multiple adverse effects on small-scale fisheries systems. Traditional knowledge and indigenous narratives contribute to an adequate understanding of global warming. Integrating such indigenous narratives with the scientific knowledge exemplifies a valuable approach to assess climate change impacts and to recognize climate adaptation efforts. After summarizing the local knowledge of fishermen on oceanographic factors and climate, this paper has elaborately presented the perspectives of small-scale fishermen on the changing weather and climate patterns for over the last three to four decades. Then, it discusses the contemporary relevance of fishers' local knowledge in

the face of climate change. The results of this paper provide further scope to research the perspectives of marine fishers of India on climate change impacts. In the context of India, we need more researches to understand the climate perceptions of both fishermen and fisherwomen in the face of climate change.

REFERENCES

- Geetha, R., Vivekanandan, E., Kizhakudan, J. K., Kizhakudan, S. J., Chandrasekar, S., Raja, S., et al. (2015). Indigenous Technical Knowledge (ITK) of coastal fisherfolk on climate change—A case study in Chennai, south-east coast of India. *Indian Journal of Fisheries*, 62(1), 144–148.
- Government of Tamil Nadu. (2014). Coastal districts profile of Tamil Nadu. ENVIS Centre, Department of Environment Government of Tamil Nadu. Accessed 14 August 2015 from http://tnevis.nic.in/tnevis_old/Coastal%20district%20profile.pdf.
- Government of Tamil Nadu. (2018). Fisheries department—Policy note, 2017–2018. Accessed 3 March 2018 from http://cms.tn.gov.in/sites/default/files/documents/fisheries_e_pn_2017_18.pdf.
- Government of Tamil Nadu. (n.d). Tsunami relief in the state of Tamil Nadu—India (Focus on Nagapattinam experience). Accessed 19 May 2016 from http://www.tn.gov.in/tsunami/digitalibrary/ebook_sweb/37%20Focus_on_NGT_tsunami_%20relief.pdf.
- INCOIS. (2014). Impact of INCOIS scientific forecast services towards improving the lives and livelihoods of fishing communities across Tamil Nadu and Puducherry. Accessed 10 March 2017 from http://www.incois.gov.in/documents/scientific_ForecastServices.pdf
- IPCC. (2014). Summary for policymakers. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability, Part A: Global and sectoral aspects. Contribution of working group II to the 5th assessment report of the intergovernmental panel on climate change* (pp. 1–32). Cambridge: Cambridge University Press.