

POLICY BRIEF

Traditional and local knowledge to disaster risk reduction

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Indigenous knowledge and weather forecasting: A weapon to predict extreme weather events

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SUMMARY

Indigenous knowledge and weather forecasting have played a crucial role in helping coastal communities in Bangladesh predict and prepare for extreme weather events. This knowledge, passed down through generations, has proven to be a valuable weapon against the devastating impact of cyclones, floods, and other weather-related disasters in this vulnerable region. Combining this wisdom with modern meteorological science can enhance the region's resilience in the face of climate change and its associated challenges.

Background

Indigenous knowledge plays a crucial role in predicting extreme weather events in coastal Bangladesh and many other regions around the world. Coastal communities in Bangladesh have a long history of observing and understanding their local environment, which includes the weather patterns and natural indicators (e.g., wind speed and direction, animal behaviour, sky cloud condition etc.) that signal impending extreme weather events. The local community can predict extreme weather conditions based on indigenous knowledge, nevertheless, they are facing several challenges such as limited demonstration, lack of standardization, uncertainties, lack of validation and verification etc. Despite these challenges, integrating indigenous knowledge into weather forecasting in coastal Bangladesh can offer several benefits. Firstly, indigenous knowledge can provide valuable insights into localized weather patterns and impacts, enhancing the accuracy of forecasts for specific regions. Empowering indigenous communities to actively participate in weather forecasting can enhance their resilience to extreme weather events by providing them with early warnings and adaptive strategies. Secondly, combining indigenous knowledge with modern meteorological techniques can create a more comprehensive and reliable forecasting system. This policy brief specifically emphasizes the importance of indigenous

knowledge of weather forecasting systems along with the challenges involved in field-level implementation.

How the indigenous knowledge help in weather forecasting?

The people usually predict weather and climate variation based on different indigenous knowledge such as the observation of diverse bio-physical entities including livestock, insects, birds, trees and wildlife. The community people predict weather mainly based on four different observations, such as ant movement, wind speed and direction, sky condition and animal behaviour. They observe the way the ants go (Fig 1). Variation in the nature of the wind has been used by traditional societies as an indicator of weather change since time immemorial (Jiri et al. 2016). The people observe the direction, strength, force and duration of winds that blow at different seasons and use these as sources of information for predicting weather. The sky condition describes the predominant/average sky cover based on the per cent of the sky covered by opaque (not transparent) clouds (Fig 2). Animals have been known to exhibit unusual behaviour before a storm. This could be due to their keen sense of smell and hearing, along with sensitive instincts. Dogs may also sense the change in barometric pressure that comes with storms, causing them to bark, cuddle, or hide in an attempt to seek shelter.

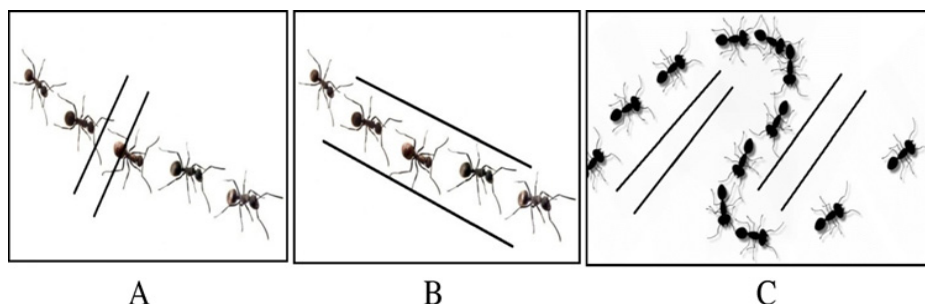


Figure 1: Scenarios in the ant-rout experiment. Three scenarios of the 'ant-rout' experiment for predicting rains (parallel lines are artificially constructed ditches). A) Ants cross ditches, indicating the coming of drought. B) Ants go through ditches, indicating there will be good rain. C) Ants going in roundabouts or zigzags to avoid ditches, indicating it will be rainy. (Adopted from Balehegn et al. 2019)

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Figure 2. Cloudy sky indicating the occurrence of heavy rainfall and storm

Challenges

Predicting extreme weather events in coastal Bangladesh using Indigenous knowledge presents several challenges and opportunities. Indigenous knowledge, often passed down through generations, can offer valuable insights into weather patterns and environmental changes. However, integrating it into modern weather forecasting systems requires addressing several hurdles:

1. Indigenous knowledge is primarily based on observations and experiences, lacking the scientific rigour and data-driven approach of modern meteorology. Validating this knowledge scientifically can be challenging but is necessary for its integration.
2. The local communities may need training and education to enhance their understanding of meteorology and modern forecasting techniques, enabling them to contribute more effectively.
3. The local government and weather stations are not considering the indigenous knowledge-based forecasting system, which makes the indigenous knowledge less important to the coming generation.
4. Indigenous knowledge is not well documented at the community level. To be useful for forecasting, this knowledge needs to be systematically recorded and organized.
5. Developing policies and governance structures that recognize and value Indigenous knowledge in weather forecasting is essential. These policies should ensure that Indigenous communities have a say in decision-making processes.

Policy Recommendations:

To successfully integrate Indigenous knowledge into weather forecasting in coastal Bangladesh, collaboration between meteorological agencies, researchers, and indigenous communities is vital. This collaboration should prioritize respectful engagement, data sharing, capacity building, and the development of hybrid forecasting models that harness the

strengths of both traditional and modern approaches. While indigenous knowledge is invaluable for weather forecasting, it's essential to recognize that it should complement, rather than replace, modern scientific methods of weather prediction. Collaborative efforts between indigenous knowledge holders and meteorological agencies can help integrate this valuable local knowledge into formal forecasting systems. This integration can lead to more accurate and timely predictions of extreme weather events, allowing communities to better prepare and mitigate the impacts of disasters in coastal Bangladesh and similar vulnerable regions. We recommend the following changes required at policy level for integrating indigenous knowledge in weather forecasting:

1. The government should work in close collaboration with the local community, local government and NGOs for effective use of indigenous knowledge in weather forecasting.
2. The local weather station should provide support and train the local young community groups for effective and valid weather forecasting.
3. It is recommended that the use of such knowledge be enhanced by documenting these knowledge systems and identifying ways of weather and climate knowledge co-production with the formal weather and climate information system.

References

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About Us

This policy brief is part of a project titled “*Enhancing ecosystem-based adaptation to disaster risk reduction in the Himalayan river basin: Integrating traditional and local knowledge in disaster management plan in Nepal, India and Bangladesh*” which is funded by Asia Pacific Network for Global Change Research under grant number CRRP2021-04MY-Paudel. More information about the project can be found on the [APN](#) and [KIAS](#) websites.

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