Food and Agriculture Organization of the United Nations

Planning an extended climate and weather forecasting system for hazard preparedness in agriculture, Bangladesh

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Summary

In Bangladesh, both in flood years and in dry years, rice crop is under growing risks of yield loss due to disasters. The three-tier weather forecasting scheme provides information on the coming weather and allows to plan agricultural activities accordingly, following the ordinary cropping pattern in case of early or timely rains, or changing it in the event of late arrival of rainfall.

Description

In Bangladesh, agricultural crops are grown in the course of three distinct crop seasons: kharif-I (March 15 to June 30), kharif-II (July to September/October) and rabi (November to February).

Rice is the main staple food crop and is cultivated on about 10 million hectares. In flood years, the crop suffers from inundation during vegetative (early flood), flowering (mid-flood) and maturity (late flood) stages. In dry years, rice suffers from high yield reduction due to inadequate rainfall (drought) during transplanting period as well as during critical growing period.

Crop intensification in general has increased disaster risks. To manage growing risks of yield loss due to disasters, a three-tier climate forecasting system was introduced, providing information that may be used locally.

User needs of local communities were assessed, and decision calendars prepared to facilitate pro-active decision making at the field level by farmers.

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1. Implementation of the technology

Seasonal climate forecasts can provide general expectation of the rainy season. Agricultural activities are determined by the length of the growing period and by actual arrival of adequate rainfall. The beginning of the rainy season is critical and provides the first indication of what the season is going to be like.

An analysis of the timing of the beginning of the rainy season and of temporal and spatial variations may

highlight areas of early, timely or late onset of growing season rains. Early or timely beginning of rains will indicate planting of normal crops, while late arrival of rain must lead to a change in the cropping pattern.

A user need assessment is a preliminary step for weather and climate forecast applications, because it helps to address the localized timely forecasts that may help farmers to change their management practices in advance and to make pro-active management decisions at farm level aimed at risk/opportunity management.

1.1 Information to help farmers manage their food production systems

- Starting date of the rainy season in order to facilitate species selection, identify zones at risk.
- End date of the rains in order to make decisions concerning storage and drying of crops.
- Forecasts on flooding (early, mid or late floods).
- Forecasts on droughts during crop development.
- Distribution of expected precipitation by decade, month, and season.
- Storm intensity that causes soil erosion.

2. Application of climate and flood forecast information

Multi-disciplinary working groups need to be established for the elaboration of agricultural strategies. They require a good understanding of climatology and an understanding of spatial and temporal climate variability.

For the diffusion of information products, climate information must be provided to agriculturists, food security specialists and decision makers in a simple, easily comprehensible format.

The effective use of climate and flood forecasts in food production systems requires, in the first place, that the right audience receive and correctly interpret the right information at the right time. Furthermore, information needs to be relevant to hazard preparedness in agriculture. Lastly, forecast information should be supplemented jointly with impact outlooks and a disaster management plan.

The criteria for effective communication of climate and flood forecasts is that:

- the forecast products contain relevant information that is important to the user community (local extension officers and farmers); and
- they inform about the possible impact of disasters and potential loss/gain of disaster preparedness measures. The development of a “user metric” can help translate probabilistic forecasts into an assessment of aggregate risk contextual to the use of forecasts.

2.1 User metric

User metric is a method by which the value of the probable outcome following the application of forecasts can be quantified.

The components of User metric are probabilistic forecasts, impacts of a climate related event (e.g. flood) in agriculture), and aggregate risk analysis for each outcome

2.2 The end-to-end forecast generation

User metric with the above components constitutes a way to apply climate and flood forecasts to disaster preparedness in agriculture. However, a challenge remains in interpreting and transmitting climate information from meteorological agencies to end users. An end-to-end framework of the forecast application can address the issue of household food security.

2.2.1 Steps of the end-to-end forecast generation, dissemination and feedback

- Providing climate outlooks.
- Interpreting global climate outlook for local outlook.
- Translating local climate outlook into impact scenarios.
- Preparing locally relevant management plans to manage the anticipated impacts.
- Communicating climate information to farmers and receiving responses and feedback.

3. Validation of the practice

This practice was applied in Bangladesh.

4. Further reading

- Selvaraju, R. and George, D., 2002. India workshop kit for workshops on capturing the benefits of seasonal climate forecasts in agricultural management. DPI&F, Toowoomba, Australia.
- FAO, Asian Disaster Preparedness Centre. 2005. Training modules for climate and flood forecast applications in agriculture, by Selvaraju Ramasamy, Arjunapermal Subbiah, Bangkok.

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5. Agro-ecological zones

- Tropics, warm

6. Objectives fulfilled by the project

6.1 Resource use efficiency

This technology, by providing information on the coming weather, allows for improved use of resource efficiency by planning agricultural activities accordingly.