

Concept, Aims, Progress and Plans

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Floods occur each year in Bangladesh as a regular property of the summer monsoon season. Occasionally, the floods have devastating effects lasting for length periods and severely disrupting agriculture, commerce and transportation. Even lesser amplitude floods, which may have an important role in replenishing the land, occur inconveniently at different times of the year and in different parts of the delta.

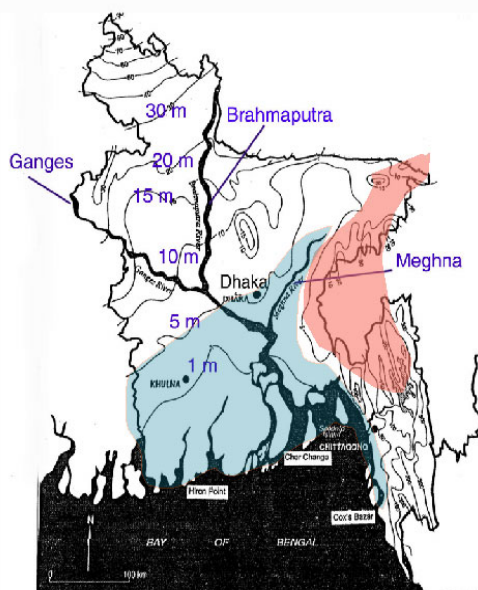


Figure 1: Topography of Bangladesh and the inflow points of the Ganges and the Brahmaputra and the Bay of Bengal.

Large-scale floods occur through excessive discharge into the Bangladesh delta, through retardation of outflow into the Bay of Bengal by high sea levels, and by excessive precipitation over the delta (Figure 1). Of these factors, the major

source of floods is through discharge from the Ganges and Brahmaputra. Thus, to first order, the forecasting of river discharge into Bangladesh beyond 1-2 days reduces to the forecasting of rainfall over the catchment basins, the flow of water through the Ganges and Brahmaputra and the variability of sea level in the Bay (Figure 2).

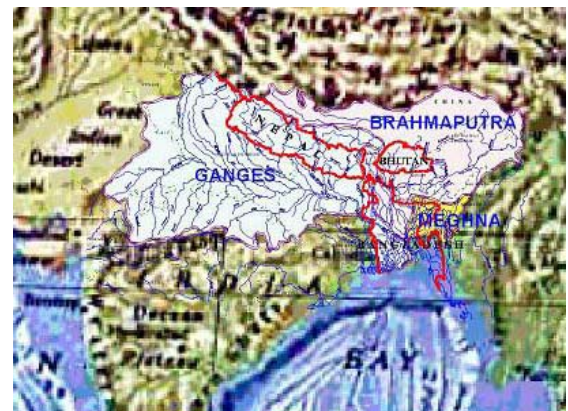


Figure 2: The catchment areas of the Ganges and Brahmaputra river systems.

The catchment basins of the Ganges and Brahmaputra are extremely large extending over 1,073 and 589 km² and annual discharges of 490 and 630 km³/year, respectively. Furthermore, the basins extend over a number of countries a fact that complicates the collection of data necessary for forecasting.

The Climate Forecast Applications in Bangladesh project (CFAB) was instigated to derive methods of forecasting the discharge of water into Bangladesh and its retardation by sea-level elevation in the Bay. CFAB is a consortium of Bangladeshi and

international organizations with very specific aims. Specifically:

- Develop forecasting schemes for Bangladesh floods that add predictive skill to current prediction efforts within Bangladesh:
- Develop resilient schemes that will be able to take advantage of improvements in data availability, predictive modeling, data assimilation and etc., as they occur in the future:
- Promote international collaborative efforts that will provide data and tools necessary for the prediction schemes.
- Develop forecasting methods that are readily adaptable to the technology that exists within Bangladesh:
- Work actively with partners in Bangladesh to facilitate a rapid technological transfer, and:
- Develop an infrastructure within Bangladesh that will make use of the forecasts provided under the auspices of CFAB and that will eventually inherit the prediction schemes.

We have decided to concentrate on forecasts for three main time scales for the Ganges and Brahmaputra discharge into Bangladesh:

- **Short period (1-6 days):** This will enable the current Bangladesh forecasts to be extended to 8 days.
- **Medium range (20-25 days):** Forecasts at these time scales will enable significant agricultural adjustment and disaster mitigation programs to be enacted.
- **Long range (1-6 months):** Such forecasts will provide sufficient lead-time for long term planning to be enacted.

To date, we have developed schemes for forecasting at all of these time scales. In separate reports, the method of forecasting and the degree of success will be discussed. However, each scheme shows significant skill at the time scales indicated. Furthermore, we have developed schemes that are transferable in the near term. Significantly, the technological requirements for these forecasts already exist within Bangladesh government institutions at this time. To accompany the forecasts, we have developed a tool which combines the probabilistic forecast with information the user community provides in order to accomplish a risk analysis. This tool is referred to as the “user metric”.

The development of the schemes and their subsequent testing has been accomplished in partnership between Bangladesh institutions (Flood Forecasting and Warning Center, Surface Water Modelling Center, Bangladesh Meteorological Department, Department of Agricultural Extension, IGES), the Asian Disaster Preparedness Center and the Georgia Institute of Technology. Majority funding for CFAB has been made through the USAID Office of Foreign Disaster Assistance (OFDA) and the US National Science Foundation. The European Centre for Medium Range Weather Forecasts (ECMWF), Government of Bangladesh institutions and Non-government organizations. Have provided data for the project

Highlights for the coming year are as follows:

- **CFAB National Consultancy Workshop:** (January 20-21, 2003, Dhaka). At this meeting we expect over 75 people attending. The main discussion points will be: Discussion of the forecast schemes. Plans for the experimental prediction for the summer of 2003. Plans for the application of the experimental forecasts.
- **CFAB Summer Forecast Workshop:** (May, 2003, Dhaka): Workshop to discuss the seasonal outlook for floods, organize the production of, and access to, the short-term and medium term forecasts. Discussion of training programs for Bangladesh scientists and technicians. Determination of forecast dissemination policy. Discuss prospects for funding beyond 2003.
- **CFAB Evaluation Workshop:** (September, 2003): Retrospective on the experimental forecasts. How well did we do? How useful were the forecasts? What changes should we make?
- **CFAB Technology Transfer Conference:** (December 2003): Make available the forecast modules for the three time-scales of forecasts. Determine methods of their implementation in out years.

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