

## **A decision support framework for flood risk assessment: an application to the Brahmaputra River in Bangladesh**

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**Abstract** Early warning is a key element for disaster risk reduction. However, the advances in generating hazard risk information have not yet been incorporated into operational forecast systems and consequently, operational forecasts have not been integrated into decision making processes in order to reduce disaster risks. This article aims to design location-specific user-need based flood forecast products on different time scales for reducing flood risks. Using 1–10 days multiple weather ensemble (EPS) forecasts of the European Center for Medium Range Forecasts (ECMWF), integrating hydrological models, and combining these with GIS and local user needs, the decision support system (DSS) is designed to interpret, translate, and communicate science-based risk information into user-friendly early warning information products to assist emergency managers and decision makers. The DSS interface allows users to interactively specify the objectives and criteria that are relevant to a particular situation, and obtain the management options (strategies) that are possible, and the exogenous influences (scenarios) that should be taken into account before policy planning and decision making. The proposed framework is applied to a pilot area in the Brahmaputra River basin in Bangladesh for the agricultural sector.

**Key words** ensembles probabilistic forecasts; flood risk; decision support system; community response