INTERANNUAL FLOW VARIABILITY IN THE SURMA RIVER, BANGLADESH: TELECONNECTION WITH SST AND PROSPECT FOR FLOOD FORECAST

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Growth in population and extensive encroachment of floodplains in the recent years have changed the flood risk in Bangladesh and made the country more vulnerable to major losses during large floods. Sever floods have a major impact on economic infrastructure, but even under average conditions, considerable damages are caused to agriculture and livelihood. Large investments to build physical infrastructure against flood protection stand as a witness to the desperate efforts by man to control this natural variability of water resources. But most of the time these structural infrastructures have been proved inadequate to hedge against major flood events. Also increase in realization of the environmental hazards associated with those structures has made engineering works less popular. Consequently the choice of non-structural measures in this country is becoming popular and flood forecasting is one of those effective options. This research intends to identify the nature and strength of possible teleconnection between the Surma River flow and Sea Surface Temperature (SST) in the tropical Pacific Ocean, and to develop a model which can capture, at least in part, the natural variability of flow, as well as to provide a large forecasting lead time. A key advantage of this model is that it does not require rainfall and Stream flow information from upstream areas and countries. It only needs SST forecast data, previous stream flow and corresponding SST records. As since 1980's significant improvement has been made in SST forecast, so use of SST forecast data has now become more logical. A discriminant prediction approach, also known as "Categoric Prediction" has been used here for the assessment of long range flood forecasting possibilities. This approach forecasts the categoric probabilities of the predictand (River flow) according to the categories that the predictors (SST) fall into. In order to easily judge the forecast skill, a synoptic parameter, the Forecasting Index (FI) has also been used. From the analysis it has been found that the Surma river flow is negatively correlated with Sea Surface Temperature (SST) in the Pacific Ocean (Nino 4 region). During El Nino years, the flow in the river is less than the average while in La Nina years the flow in this river exceeds the average. It is also found that the wet season (July-August-September) flow of this river is highly correlated with the SST of May-June-July (MJJ) SST of that year. So a correct forecast of MJJ SST of any year may lead to a correct anticipation of wet season flow in that year. This type of approach has previously been

used by Eltahir (1996) for Nile flood anticipation, Simpson et al. (1993) for prediction of annual discharge in South-eastern Australia.

This long lead forecast model will provide sufficient time for flood preparedness and flood protection and such seasonal forecasts are invaluable to the management of land and water resources, particularly in Bangladesh, where floods can be more severe and water resources system yields are smaller than most parts of the world. And this forecasting lead time is expected to have a far reaching economic ramification.

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