Interdisciplinary approach to water management

From the uplands to the coast - Ganges-Brahmaputra-Meghna basin

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The Himalaya *– the upland area, home of the glaciers where the rivers start their journey to the coast. (photo of Annapurna - South, Nepal : Evert Wesker)*

Summary

Many people have stressed the need for a fundamentally new approach to the management of rivers and coastal areas. Water engineering and management need a broadened framework, which includes ecology, social and economic development and integrated institutional arrangements.
This changing perspective provides a very different functional format for developing policies for rivers and coastal areas. These policies should be based on interdisciplinary knowledge of the river from the upland catchment to the coast.
Feasibility studies for large-scale river intervention projects should also take into account the ecological costs of stream-flow diversion, water depletion, and their impact on the ecosystem. Economic analysis and valuation of ecosystem services can support policies for river management especially in trans-boundary cooperation. Such cooperation is important for the survival of people and sustainability of ecosystems in the Ganges-Brahmaputra-Meghna (GBM) river basin. This 1.7 million km² basin will accommodate about 1 billion inhabitants in 2020 and is shared by five riparian countries. Ecologically informed economists can play a new and important facilitating role in such cooperation, through introducing water saving measures such as water markets and providing tools for conflict resolution.

Initial estimates of the likely impacts of climate change at a river basin level are diverse and the STREAM model suggests that the water availability in the Ganges-Brahmaputra-Meghna catchment may decrease. This will effect the growing number of inhabitants and the valuable ecosystems. The overall lack of available water might affect an increasing area, notably in the W – SW of Ganges sub-basin. Upstream diversions and alteration to river discharges may increase salt-water intrusion in the coastal zone, of which indications are already available. This will be further exacerbated by the acceleration of sea level rise and increased flooding by storm surges resulting from the anticipated changing climate. The quality of drinking water, agriculture and natural environment, including the mangrove ecosystems in the Sundarbans may also be affected. This trend is likely to continue if no adaptive measures are undertaken.

Trans-boundary discussions leading to a common and integrated water management policy for the entire river basin is an important adaptive option. Such international cooperation will help conserve water and increase the resilience of the Ganges-Brahmaputra-Meghna basin and its resident population.

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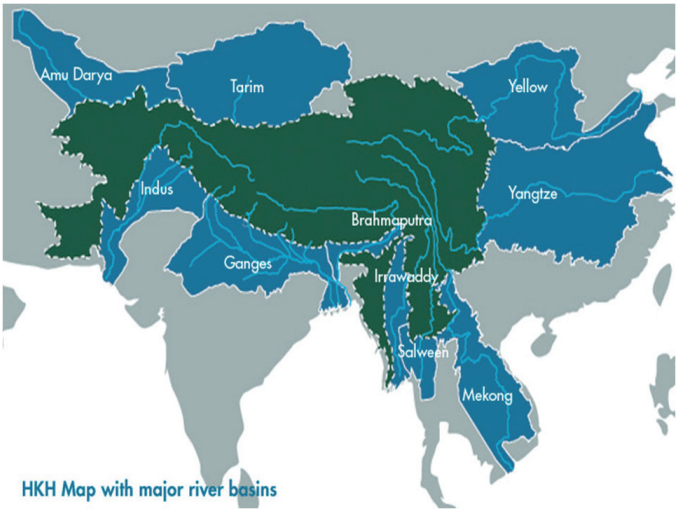
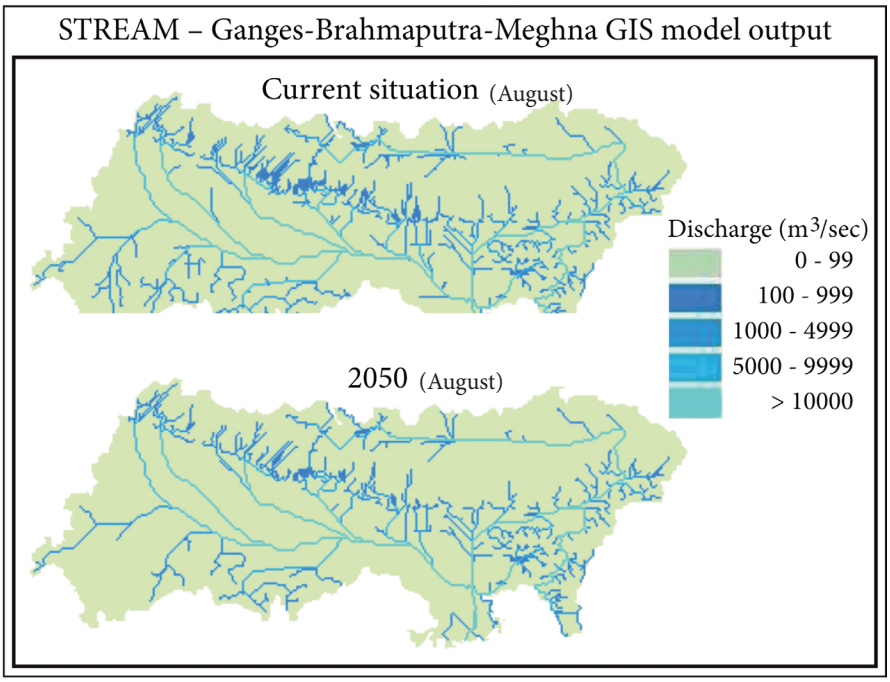


The Ganges – Brahmaputra: *catchment area forms an important part of the Hindu-Kush-Himalya region. (source: ICIMOD, Kathmandu)*

Low lying coastal area of the GBM: *Where the waters and sediments of the Ganges, Brahmaputra and Meghna reach the coast: fertile, densely populated, deltaic plains, intertidal areas, mangrove belt (Sundarban forest) and tidal channels. (photo: NASA)*



STREAM - GIS simulated river pattern and discharge quantities in m³/sec: *this simulation of the effect of climate change on the river discharges for the month of August, may point to a decrease in the foothills of the Himalayas, in the Ganges floodplain and SW part of the basin; the Brahmaputra sub-basin will be less affected.*