Koshi Basin Programme

Hydrological Assessment of the Transboundary Koshi River Basin

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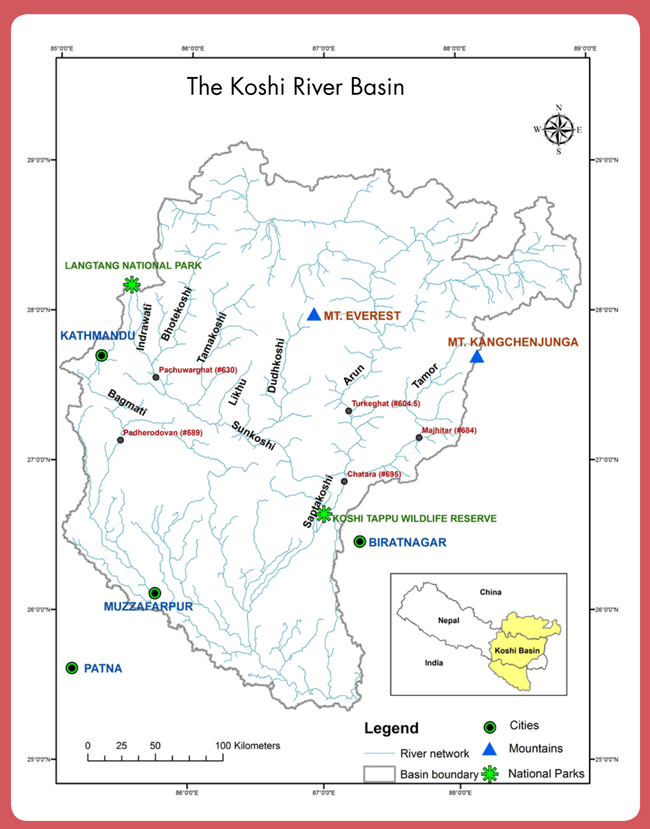
Introduction

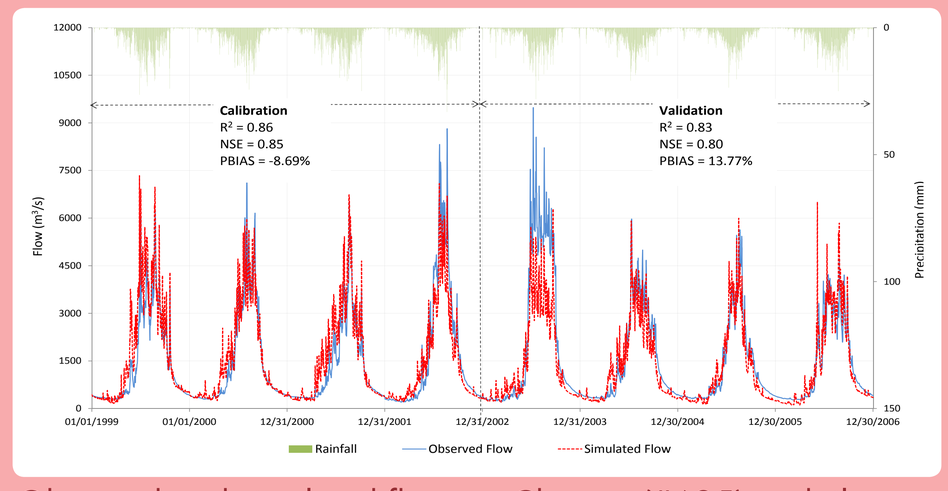
ICIMOD's Koshi Basin Programme (KBP) is contributing to inclusive poverty reduction in the basin by evaluating the range of possible water-related development pathways considering climate change, hazards risks and freshwater ecosystems sustainability. The KBP is collaborating with International Water Management Institute (IWMI) to assess water resource availability and demand trends, and water resource development scenarios.

This poster presents early results of the hydrological regime in the basin (about 87,500 km^2) in terms of water balance and will form the basis for water availability-demand analysis.



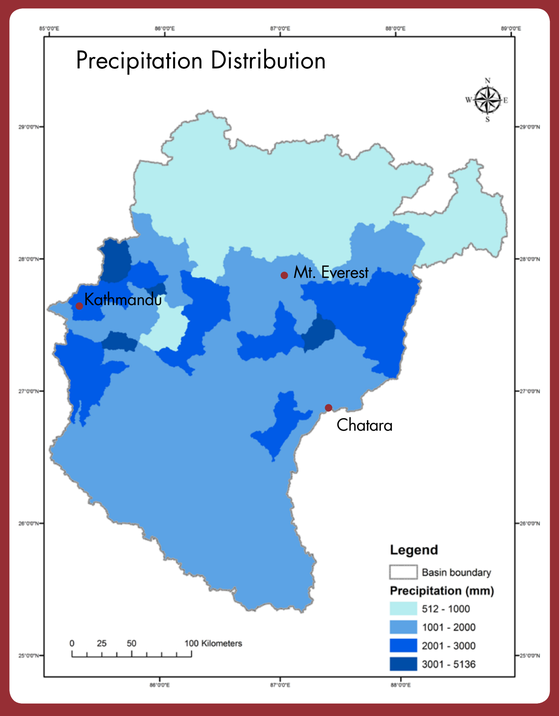
The Koshi Basin Hydrological Model

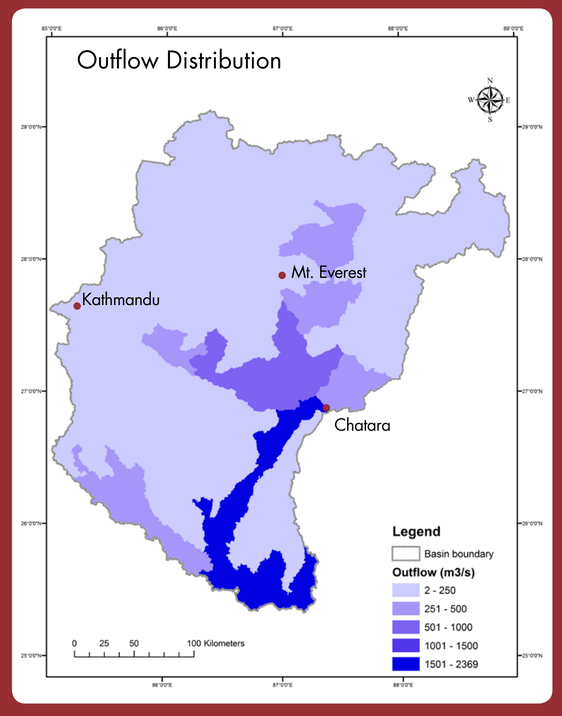
- The model is based on the Soil Water Assessment Tool (SWAT).
- The model is calibrated using daily flow data from 1999 to 2002 and validated for 2003 to 2006, for the Arun River, Tamor River, Sunkoshi River, Bagmati River, and Saptakoshi River at the Turkeghat, Majhitar, Pachuwarghat, Padherodovan and Chatara gauging stations.
- Calibration of the model is carried out in three steps, namely, sensitivity analysis, auto-calibration, and manual calibration.

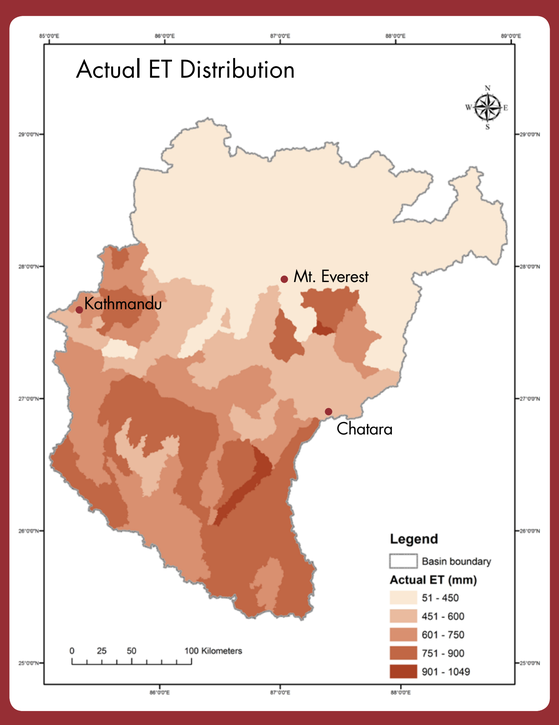


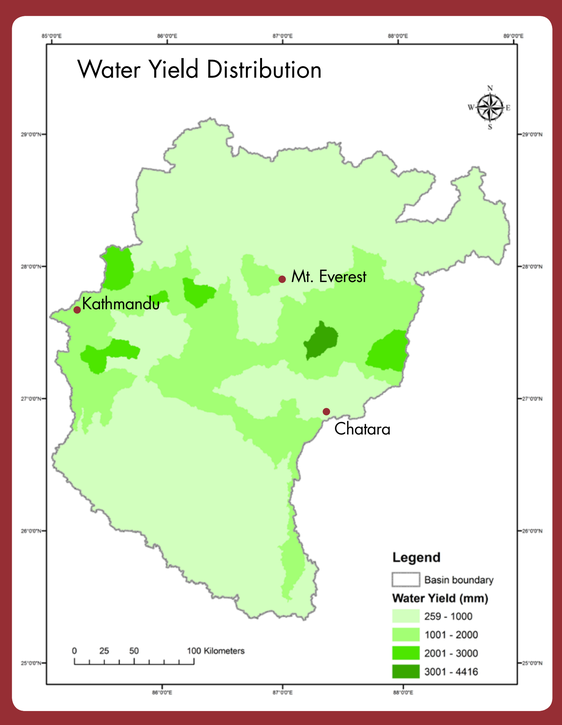
Observed and simulated flows at Chatara (#695) at daily time step

Water Balance and Flow Assessment



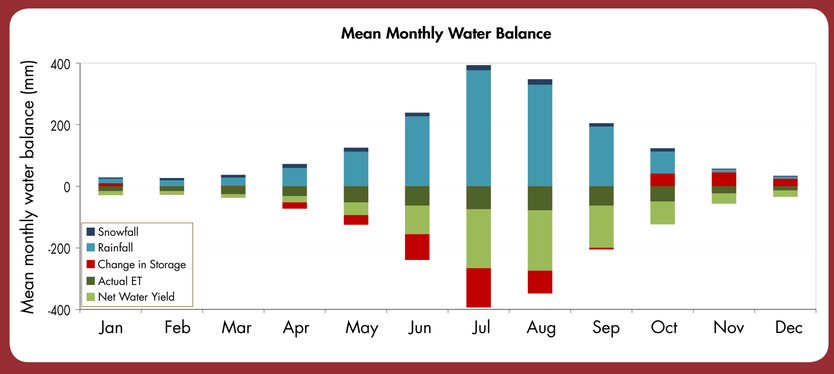


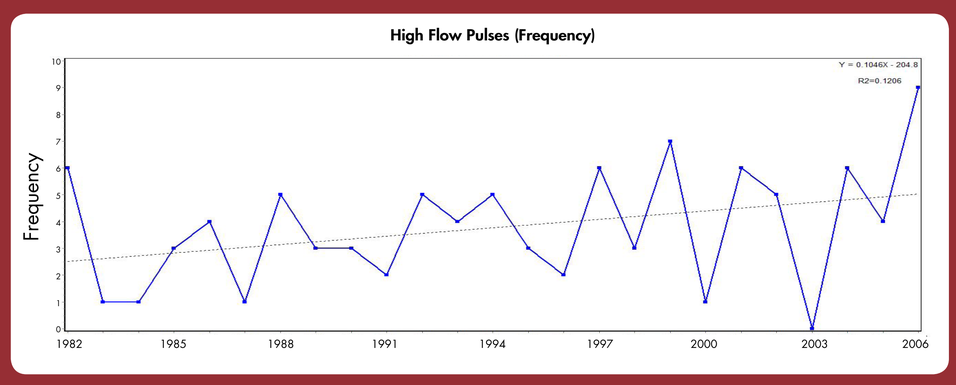




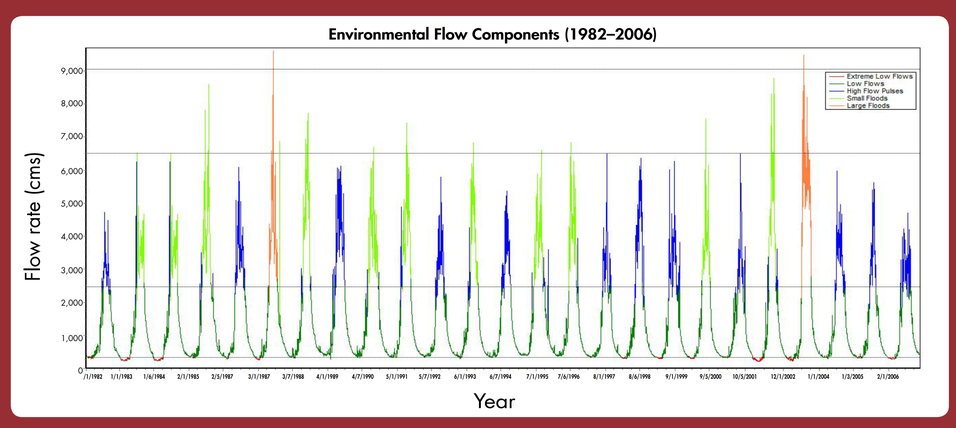
Annual average precipitation, actual ET, and net water yield for the entire basin for the simulation period of 11 years were 1,567 mm, 506 mm, and 838 mm, respectively. However, the spatial variation of these components within the basin is large.

Large temporal variation in the water balance components is observed. The monsoon **(Jun–Sep)** is the main hydrological driver. Groundwater recharge attributes to the large changes in storage during the monsoon.





There is an increasing trend in the frequency of high-flow pulses from 1982–2006



Two large high-flow events occurred between 1982-2006

Further Work

- The model will be used to assess the impact of climate change on basin hydrology.
- Current water use and future water demand will be estimated and evaluated against water availability simulated by the hydrological model.
- Options of potential basin water development and management strategies will be made available.

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