Brahmatwinn

Twinning European and South Asian River Basins to enhance capacity and implement adaptive management approaches

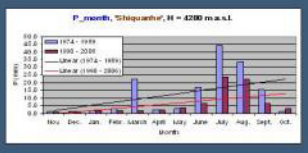
www.brahmatwinn.uni-jena.de

Rationale

Climate Change as a consistent global challenge has a significant impact on the high mountain environment: snow, glaciers and permafrost are especially sensitive to changes in atmospheric conditions.

To get an idea about the atmospheric changes (precipitation and temperature) two different approaches have been used:

Climate Assessment from timeseries

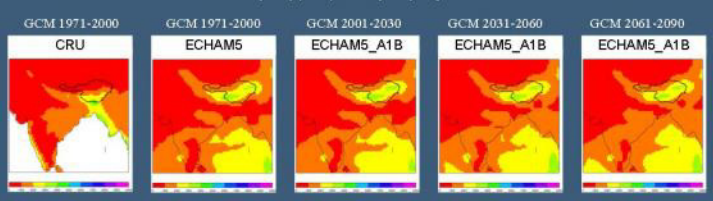


The first approach uses measured data (monthly) from 15 stations in the region. As a result of the time series analysis three regions with different climatic conditions could be identified:

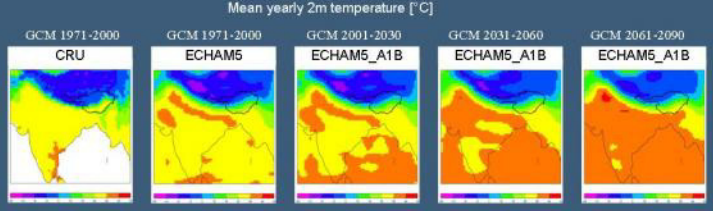
1. Assam with increasing precipitation and temperature,
2. The middle part of the basin with nearly stable atmospheric conditions, and
3. The North West where temperature is increasing and the amount of precipitation is decreasing.

Climate Assessment from GCM´s

Mean yearly precipitation [mm/year]

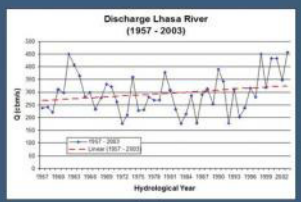


Mean yearly 2m temperature [°C]

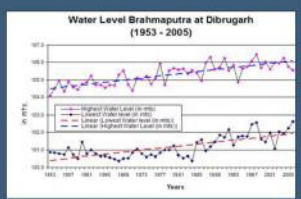


The second approach used modeled data from 4 different Global Circulation Models. The results are downscaled to a 44 km² resolution. The figures above show an estimation of the increase of temperature during the next 80 years (ECHAM5 scenario) and the change of precipitation during this period for the asian area. The figures demonstrate that the temperature simulation follows the trend of the time series whereas the rainfall simulated by ECHAM5 (Szenario A1B) for the Brahmaputra Basin will be similar in the periods 1971-2000, 2001-2030, 2031-2060 and 2061-2090.

Impact on Runoff

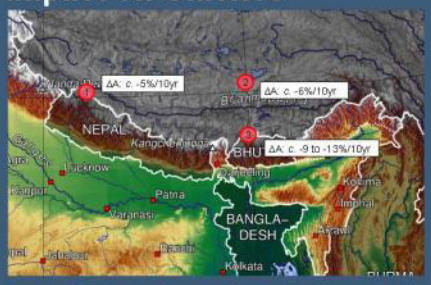


Photos right:
Dibrugargh low flow (top) - high flow (bottom)



Both, the discharge at Lhasa and the water level at Dibrugarh illustrate a positive trend during the last 50 years. Since the 1980´s the trend increases intensively. Consequences: loss of arable land due to bank erosion, higher sediment load and sedimentation rate causing problems for navigation

Impact on Glaciers



Since 1960 the glaciers in the Northwest-Himalaya have lost approx. 17 % of their area and up to 19 % of their volume. For an interval of 10 years these changes range between 5 % and 13 %.

Photos glacier retreat – glacier AxD10 (Shorong Himal, Nepal) from 1978 till 1996

Source: WWF Nepal Program 2005, p. 17

Conclusion

1. **IWRM** in alpine mountain regions is affected by **GCC** in different ways and requires an ***holistic systems approach***.
2. **BRAHMATWINN** provides an integrated system assessment to analyse scale depended ***systems heterogeneity*** and ***response dynamics***.
3. ***IWRM scenarios*** must be based on **GCM and RCM** modelling approaches, but their quality strongly depends on the quality of the data time series used for their validation.
4. ***IWRM*** will remain a vision as long as governments and their agencies refuse to agree on common understanding in respect to information sharing and cooperation.
5. ***Policies*** related to **GCC** lack effective initiatives to provide the data and information required to analyse adaptive mitigation initiatives with respect to **IWRM**.

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