

Drought Characterisation Using Ground and Remote Sensing Data

Sudipta Kumar Hore (1,2), Micha Werner (1,3), and Shreedhar Maskey (1)

(1) UNESCO-IHE Institute of Water Education, Water Engineering, Delft, The Netherlands (m.werner@unesco-ihe.org), (2) Center for Environmental and Geographic Information Services (CEGIS), Dhaka, Bangladesh, (3) Deltares, Delft, The Netherlands

The North-West of Bangladesh is frequently affected by drought, which may have profound impacts to different water related sectors. The characterisation and identification of drought is, however, challenging. Despite several standard drought indices being available it is important that indicators proposed in support of an effective drought management are related to the impacts drought may have.

In this study we present the characterisation of drought in the districts of Rajshahi and Rangpur in North-Western Bangladesh. Drought indicators were developed using available temperature, precipitation, river discharge and groundwater level data, as well as from remotely sensed NDVI data. We compare these indicators to records of drought impacts to agriculture, fisheries and migration collected from relevant organisations, as well as through interviews with key stakeholders, key informants, and community leaders.

The analysis shows that droughts occur frequently, with nine occurrences in the last 42 years, as found using common meteorological drought indicators. NDVI data corroborated these events, despite being only available from 2001. The agricultural sector was adversely impacted in all events, with impacts correlated to drought severity. Impacts to the fisheries sector were, however, reported only three times, though impacts to fisheries are less well recorded. Interestingly, the good relationship between meteorological drought indicators and agricultural impacts weakens in the last decade. This appears to be due to the intensification of irrigation using groundwater, with the declining groundwater levels found in Rajshahi district suggesting overexploitation of the resource, and the increasing importance of groundwater drought indicators.

The study reveals the drought indicators that are important to the agriculture and fisheries sectors, and also tentative threshold values at which drought start to impact these sectors. Such sector relevant drought indicators, as well as appropriate thresholds, can be useful in drought identification and management.