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Natural environment assessment and vegetation indicators for IWRM scenarios in the Upper Brahmaputra River Basin

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The Brahmaputra River originates in the highest mountain massif of the world, the Western Himalaya. Fed by ice-melt, snow and also monsoon rain from the northern slope of the Himalaya Range in its reach in Tibet develops into a braided river with many channels in a wide valley, where it receives important tributaries like the Lhasa River, before entering the constrained reach of the Great Brahmaputra Gorge. Downstream of the Gorge the river enters even more diverse landscapes in intensively cultivated Assam, where the braided river bed reaches its greatest lateral expansion. Monsoon related flooding causes the most severe effects in this densely populated reach on the south-eastern rim of the Himalaya Range, but intense flooding is also a great threat at upper parts of the river and in populated areas of some tributaries.
IWRM plays an important role with regard to mitigating climate change effects, whether too much or too little water is available for human uses. The assessment of the natural environment in a multi-scale approach leads to the identification of essential indicators, which are the basis for modelling scenarios of future development as the spatio-temporal processes vary within scale and along the course of this Large River. In our assessment it was necessary to aggregate local vegetation structures for a generalised description at larger scales to bridge the gap between the hydrological modelling scale and respective ecosystem services resulting from the existing vegetation types. These indicators can be used to evaluate the influence of different ecosystem types on related IWRM activities and policies. Aside from more general wetland ecosystem services like flood retention of support of livelihood for the neighbouring population a focus was also set on wetland and water body ecotones where detectable by high-resolution RS techniques to evaluate vulnerability and biodiversity aspects.