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Applications of the Morphological Variability in River Management: A Study of West Rapti River

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Abstract : Different geomorphic agents produce a different landforms pattern. Similarly rivers also have a distinct and diverse landforms pattern. And even, within a river course different and distinct assemblage of landforms i.e. morphological variability are seen. These morphological variability are produced by different river processes. Channel and floodplain morphology helps to interpret river processes. Consequently morphological variability can be used as an important tool for assessing river processes, hydrological connectivity and river health, which will help us to draw inference about river processes and therefore, management of river health. The present study is documented on West Rapti river, a trans-boundary river flowing through Nepal and India, from its source to confluence with Ghaghra river in India. The river shows a significant morphological variability throughout its course. The present study tries to find out factors and processes responsible for the morphological variability of the river and in which way it can be applied in river management practices. For this purpose channel and floodplain morphology of West Rapti river was mapped as accurately as possible and then on the basis of process-form interactions, inferences are drawn to understand factors of morphological variability. The study shows that the valley setting of West Rapti river, in the Himalayan region, is confined and somewhere partly confined whereas, channel of the West Rapti river is single thread in most part of Himalayan region and braided in valley region. In the foothill region valley is unconfined and channel is braided, in middle part channel is meandering and valley is unconfined, whereas, channel is anthropogenically altered in the lower part of the course. Due to this the morphology of West Rapti river is highly diverse. These morphological variability are produced by different geomorphic processes. Therefore, for any river management it is essential to sustain these morphological variability so that the river could not cross the geomorphic threshold and environmental flow of the river along with the biodiversity of riparian region is maintained.

Keywords : channel morphology, environmental flow, floodplain morphology, geomorphic threshold
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