INTEGRATIVE SCIENCES

Assessing the geomorphic response and sensitivity of a Himalayan river to climate change and anthropogenic pressures

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Introduction

• River corridors are central to human settlement and activities. These are now facing degradation from urbanization, land-use change, and climatedriven shifts in hydrology including floods, sediment transport, and channel morphodynamics (Ward, 1978; Pielou, 1998; Konapala et al., 2020).

Despite future climatic and hydrological projections (Mishra et al., 2016), limited studies exist on its application to understand future change in river processes and geomorphic sensitivity.

• These interlinked human pressures and climatic stress on river systems demand integrated assessment to understand their combined impact on river morphodynamics.

Objectives



To asses geomorphic response and sensitivity of a Himalayan river in response to anthropogenic stresses and changing climate scenarios.

Study Area



Fig.4 Geomorphic Parameters variability from Mountain Front to Vrindavan



Elevation map of Yamuna basin

Fig.1 Elevation Map of Yamuna Basin





Fig.6 Geomorphic Parameters variability upstream and downstream of dam



Fig.7 Geomorphic Parameters variability upstream and downstream of Delhi Megacity



Fig.3 Dataset Availability Graph: Each bar indicate number of years of satellite data used for each DGO. Here, 460 km river channel reach is divided into 92 DGOs of equal length.

Conclusion

- The study highlights the need for sustainable, reach-specific strategies to address compounded stressors.
- An interdisciplinary, reach-scale approach is essential to enhance ecological resilience and ensure the long-term health of rivers.

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