

Geovisualisation and change detection along Ganga River in the context of Plastic pollution

Ekta Sharma^{1, *}, Heather Koldewey², Ruchi Badola³

¹ Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun – 248001, Email- Sharma.ekta2510@gmail.com

² Department of Marine Science, Zoological Society of London, London NW1 4RY, Email- heather.koldewey@zsl.org

³ Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun – 248001, Email- ruchi@wii.gov.in

Keywords: Ganga River, Urbanisation, Geospatial analysis, environment monitoring, prioritised area mapping

Abstract

The Ganga River, one of India's major freshwater systems, is facing an escalating problem of plastic pollution, which threatens its ecological integrity and the health of the surrounding communities. This study employs geo-visualization and change detection techniques to quantify plastic waste accumulation along the riverine corridor and to understand its environmental impact. Using Esri ArcGIS software, researchers conducted a comprehensive analysis of historical data (1995-2022) from all districts bordering the Ganga River.

This examination incorporated various land use and land cover classes, including agriculture, urban development, water bodies, and forested areas. In addition, population density was categorized into high, medium, and low levels, providing a detailed demographic context. Additional parameters such as drainage density, flood proneness, expansive flood plains, slope distance to roads, and proximity to water bodies were integrated into the GIS layer to offer a holistic perspective of the environmental landscape.

Through the application of advanced visualization techniques, the study identified and prioritized the top ten districts most affected by urbanisation and population growth, revealing the most significant sources and areas of plastic pollution. These findings highlight the urgency of addressing plastic pollution in these key regions, as they are disproportionately contributing to the degradation of the river's ecosystem.

The results of this study provide valuable insights into the extent and severity of plastic pollution along the Ganga River. They serve as a basis for informed decision-making regarding targeted interventions and policies aimed at reducing plastic waste and preserving the river's health. Such measures are critical for ensuring this vital water resource's sustainable management and safeguarding the well-being of local populations and biodiversity. The study's approach demonstrates the potential of geospatial technologies in environmental monitoring and management. By identifying high-priority areas for action, this research supports efforts to mitigate plastic pollution and promote sustainable development in the Ganga River basin.

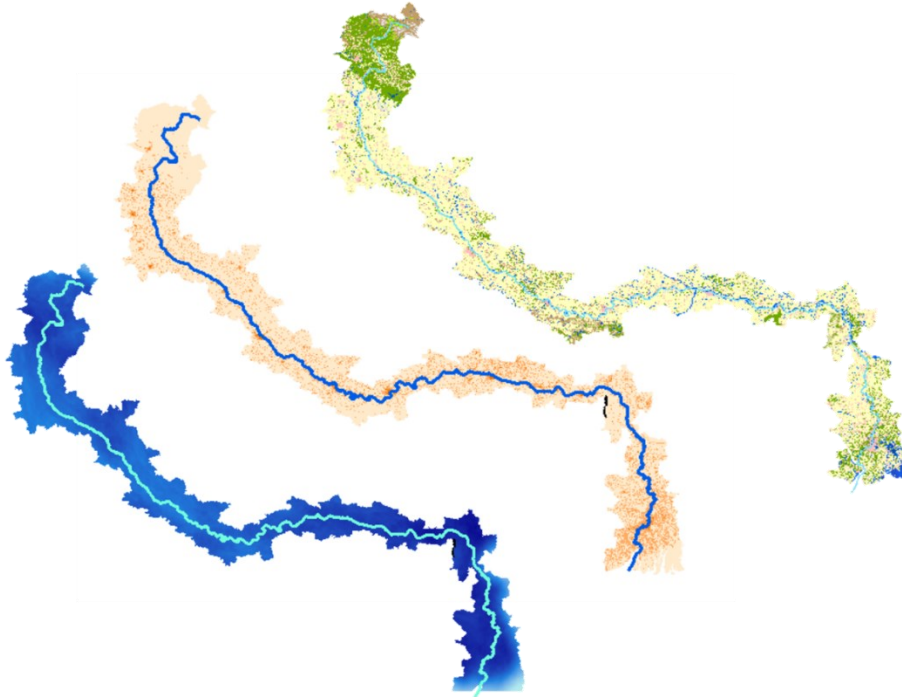


Figure 1. Representing the GIS layers of Drainage, Population and Landuse and Landcover of the districts along the Ganga River