

Title: Assessment of riverbank erosion and its prediction using geospatial and machine learning techniques

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Abstract: The Jamuna River is of significant importance in Bangladesh, playing essential roles in irrigation, fishing, transportation, and as a source of [drinking water](#). This chapter evaluates the erosion of the Jamuna River and its potential future changes within the Ulipur Upazila, Kurigram, Bangladesh. The research employs supervised and [unsupervised classification](#) methods to extract patterns of erosion and accretion. Furthermore, to project future erosion trends, an [artificial neural network](#) model is utilized. Key findings of the study reveal a rapid increase in riverbank erosion over the past two decades. Specifically, the area affected by erosion expanded to cover 3101 ha between 2003 and 2013, and this trend continued, encompassing 4232 ha from 2013 to 2022. Despite this, there is a notable overall reduction in erosion of 3820 ha during the entire period from 2003 to 2022, compared to the changes in each previous decade. Likewise, the prediction outcomes suggest a substantial decline in both erosion and accretion. Notably, by the year 2042, erosion is projected to affect a significantly smaller area of 132 ha. Hydrometeorological and [anthropogenic factors](#) could play a pivotal role in reducing the vulnerability to erosion and accretion in the area.

Keywords: Jamuna River, riverbank erosion, Ulipur Upazila, supervised classification, unsupervised classification, artificial neural network (ANN), erosion prediction, hydrometeorological factors.

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