

Title: Determination of riverbank Erosion & Accretion Rate: A Case Study of Jamuna River

Abstract

The Jamuna River (JM) of the lower Brahmaputra is one of the largest braided rivers in the world and regularly experiences significant erosion, leading to significant bankline migration, displacing thousands of families, and losing a sizable amount of land every year. For example, the dynamic nature of the Jamuna causes great suffering to the people living along its course and on its islands. Therefore, getting a deeper understanding of the river's behavior ought to help lessen these sufferings as well as the likelihood that the river may harm public infrastructure. This study intends to determine the rate of erosion and accretion that has occurred along the Jamuna river between the years 1980 and 2021, and it also charts the movement of the river's river bank. This study uses remote sensing and geographic information system (GIS) expertise to identify river bank shifting, erosion, and depositional features. In this investigation, a LANDSAT multispectral (MSS) image from a satellite was used. Using ArcGIS, different land cover types and changes have been detected using supervised and unsupervised classification approaches. Investigated were JM's riverbank migration patterns and island dynamics brought on by accretion and erosion processes over a 40-year period. Of all the rivers in Bangladesh, this one has the highest yearly erosion rate. The erosion rate along this river varies over time and space, though. Riverbank erosion has been trending downward in recent years, according to history. Between 1980 and 2000, the Jamuna's erosion rate was roughly 41797 ha, whereas its accretion rate was 47588 ha. However, between 2010 to 2021, the rate was roughly 5644.92 ha, whereas the accretion was 34.38 ha. There could be some reasons for the current erosion tendency, which is what this study aims to discover. River widening, settlement displacement, and bank line moving are all results of erosion and deposition. A lack of sanitation and drinking water infrastructure, loss of land and livelihood, increasing poverty, food insecurity, and displacement have caused suffering for hundreds of individuals. The analysis of multiple Landsat images over time gives this study new and accurate information about how JM's riverbank is moving.