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REMOTE-SENSING TECHNOLOGIES TOWARDS FLOOD MITIGATION IN INDIA'S NORTHEAST
REGION: A CASE-STUDY

Abstract

The present paper aims to bring to light India's flood-affected northeastern state of Assam, as part of an ongoing study on how space technologies, especially remote-sensing techniques, have benefited Assam towards flood mitigation and has further helped understand the social and ecological dimensions of floods. The paper also presents how the research was applied in benefit of society towards grass-root level development of an educated "space workforce" in the local region.

Context: Assam has a complex fluvial system of rivers, with two major river valleys namely Brahmaputra and Barak, flowing into the Bay of Bengal. Originating from the Himalayan glacier of Bhagirath at 4,590m, the Brahmaputra is the second highest sediment carrying river in the world, after the Yangtze in China, and also one of the largest water carrying rivers in the world, discharging about 19830 cubic meters of water per second. Due to massive sediment flow from the upper catchment areas and subsequent lack of carrying capacity of the river channels, the Assam valley is subject to periodic severe flooding every year during the peak monsoon season, causing extensive damage to life and property. As flood mitigation, over 4000 kilometers of embankments have been constructed as the primary means to control floods. However they have led to several environmental challenges like rise in river bed levels, flash floods due to frequent breaches in embankments, soil erosion and water logging. Importantly, these hazards have their worst impact on the poorest and most marginalized population of Assam. Historically, Assamese society has adapted to floods by avoiding permanent habitation in flood prone tracts. However, migration into Assam and population growth in the last century has resulted in extensive settlements along flood prone riverine tracts, consequently leading to massive internal displacements during floods.

The paper is written in collaboration with the Karman Commitment Project and ISRO's North Eastern-Space Applications Centre (NESAC), and discusses the successful Flood Early Warning System (FLEWS) project as well as how intelligent AI-based Geographic Information System (GIS) can be valuable for improving monitoring and decision-making. It further presents the outcome of a social experiment, with the aim of examining the present societal challenges and further improvements, by conducted by engaging one village in Assam, by educating the locals on how Space technology helps with flood mitigation as well as how social factors like migration and settlement patterns are connected to processes of environmental change.