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SPACE-BASED TECHNOLOGY FOR IMPROVING FLOOD MONITORING IN INDIA'S  
NORTH-EAST REGION

**Abstract**

The present paper aims to bring to light India's flood-affected northeastern state of Assam, and how the use of Space technology can help us better understand the social and ecological dimensions of floods. Our paper also examines the present challenges and further improvements.

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. In fact, the Brahmaputra system inundates around 10% of Assam's land surface every year, impacting nearly 31 million people. 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.

The authors, hailing from Assam, would like to present how Space technology has helped with flood mitigation, how it can improve flood control measures and address these challenges. Finally, our paper will explain how social factors like migration and settlement patterns are connected to processes of environmental change. Historically, Assamese society adapted to floods by avoiding permanent habitation in flood prone tracts. 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 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. NESAC, located at Shillong, Meghalaya, is a joint initiative of India's Department of Space (DOS) and the North Eastern Council (NEC) to provide developmental support to India's North Eastern Region (NER) using Space science and technology.