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Recurring Floods and Riverbank Erosion in Assam: A District-Level Statistical Analysis of Dhubri

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***Abstract*-- Assam experiences recurrent floods and riverbank erosion primarily due to the Brahmaputra River system, affecting millions of people and causing severe socio-economic disruption. This study examines the causes, impacts, and mitigation measures associated with floods and erosion, with a district-level focus on Dhubri—one of the most flood- and erosion-prone districts in the state. Using secondary data from government reports, disaster management authorities, and media sources, the paper presents a statistical analysis of population displacement, land loss, and agricultural damage for the period 2022–2024. The findings indicate that relief-centric interventions remain inadequate to address long-term vulnerability, highlighting the urgent need for integrated river-basin management, climate-resilient agriculture, and sustainable policy frameworks to enhance district-level resilience.**

***Keywords*—Assam floods, Brahmaputra, climate adaptation, disaster management, Dhubri district, river bank erosion**

I. Introduction

Assam, located in northeastern India, is traversed by the Brahmaputra River and its numerous tributaries, making it one of the most flood-prone regions in the country. Nearly 40 percent of the state's geographical area is susceptible to flooding, with annual flood events affecting millions of people. These natural hazards are further intensified by climate variability, deforestation, high sediment load, and inadequate river management infrastructure.

Floods in Assam cause extensive damage to property, agriculture, and public infrastructure, while riverbank erosion leads to permanent loss of fertile land. Riverine islands, locally known as char areas, are particularly vulnerable and are inhabited largely by marginalized communities. Recurrent displacement and loss of livelihoods have transformed floods and erosion from seasonal natural events into chronic socio-economic challenges.

This paper focuses on Dhubri district, which represents a high-risk zone for both flooding and riverbank erosion. By presenting district-level statistical evidence, the study aims to contribute to more targeted and sustainable flood management strategies.

II. Literature Review

Existing literature on floods in Assam highlights both hydrological and socio-economic dimensions of the problem. Researchers emphasize that flooding in the Brahmaputra basin is influenced by intense monsoonal rainfall, upstream catchment characteristics, and heavy sediment transport. Riverbank erosion has been identified as a persistent issue resulting from channel migration, embankment failures, and unstable alluvial soils.

Policy-oriented studies point out that disaster management in Assam has traditionally been relief-focused, concentrating on short-term measures such as embankments, evacuation, and temporary shelters. While these interventions provide immediate assistance, they fail to ensure long-term resilience, particularly in the context of climate change. This study builds upon earlier work by integrating district-level statistical analysis to strengthen evidence-based policy formulation.

III. Objectives Of The Study

The specific objectives of the study are:

1. To analyze the major causes of floods and riverbank erosion in Assam.
2. To examine the socio-economic impacts of floods and erosion with special reference to Dhubri district.
3. To conduct a district-level statistical analysis of population displacement and land loss.
4. To suggest policy measures for sustainable flood and erosion management.

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IV. Methodology

The study adopts a descriptive and analytical research design based on secondary data. Data sources include reports of the Assam State Disaster Management Authority, government publications, and reputed media reports. Statistical tools such as percentages, trend analysis, and tabular presentation have been used to analyze flood-affected population, land loss due to erosion, and agricultural damage in Dhubri district for the period 2022–2024.

V. Causes Of Floods And Riverbank Erosion

A. Natural Factors Flooding in Assam is primarily caused by heavy monsoonal rainfall leading to rapid swelling of rivers. The Brahmaputra carries a high sediment load, which contributes to riverbed aggradation and bank instability. The low-lying alluvial plains of the state further impede drainage, resulting in prolonged inundation.

B. Anthropogenic Factors Human-induced factors significantly aggravate flood and erosion intensity. Deforestation in the catchment areas increases surface runoff and soil erosion. Many embankments in Assam are aging and prone to breaches, while encroachment on floodplains restricts the natural flow of rivers, increasing flood risk.

VI. Socio-Economic Impacts

A. Population Displacement Dhubri district witnesses large-scale population displacement during flood seasons. Thousands of families are forced to take shelter in relief camps every year. Repeated displacement disrupts social life, education, and health, and also creates psychological stress among affected communities.

B. Agricultural and Economic Losses Floods submerge vast tracts of agricultural land, delay sowing, and reduce crop yields. Riverbank erosion permanently removes fertile land, particularly in char areas. Major crops such as paddy and jute are severely affected, resulting in income loss and rising indebtedness among farmers.

C. Infrastructure Damage Floods frequently damage roads, bridges, schools, and health facilities. Recurrent repair and reconstruction increase public expenditure and hinder overall economic development in the region.

VII. Case Study: Dhubri District

A. Flood-Affected Population Table I presents the trend of flood-affected population in Dhubri district from 2022 to 2024. The data indicate a steady increase in the proportion of the population affected by floods, reaching nearly 50 percent of the district population in 2024.

Table I
FLOOD-AFFECTED POPULATION IN DHUBRI DISTRICT

Year	Population Affected (Lakhs)	% of District Population	Villages Affected	Relief Camps
2022	6.5	45%	240	140
2023	7.2	48%	250	150
2024	7.98	50%	260	160

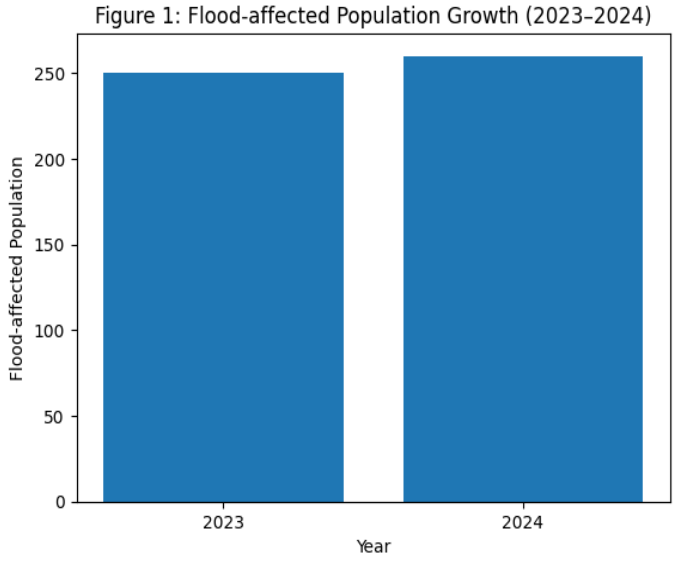

Figure 1: Bar chart showing flood-affected population growth (2022–2024)

B. Riverbank Erosion Riverbank erosion has resulted in increasing land loss and displacement. Table II shows a rising trend in land lost due to erosion and the number of people displaced during the study period.

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Table II
LAND LOSS DUE TO RIVERBANK EROSION IN DHUBRI DISTRICT

Year	Land Lost (Hectares)	People Displaced	Villages Affected
2022	26.4	580	9
2023	29.7	610	10
2024	33.22	638	10

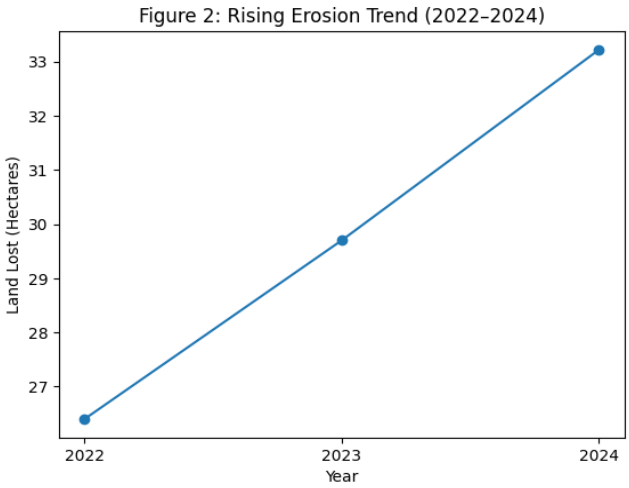

Figure 2: Line chart showing rising erosion trend (2022–2024)

C. Agricultural Impact Floods and erosion have caused extensive crop damage in Dhubri district. Large areas of paddy and jute cultivation are submerged annually, leading to reduced productivity, delayed agricultural operations, and increased vulnerability of farming households.

VIII. Discussion

The district-level analysis reveals that Dhubri exhibits high exposure, high vulnerability, and low adaptive capacity to floods and erosion.

Nearly half of the population is affected every year, while erosion results in permanent land loss and livelihood insecurity. The continued reliance on relief-based measures underscores the absence of long-term planning and integrated river-basin management.

IX. Recommendations

Based on the findings of the study, the following measures are suggested:

1. Adoption of integrated river-basin management for the Brahmaputra and its tributaries.
2. Promotion of climate-resilient agriculture through flood-tolerant and short-duration crops.
3. Scientific design and maintenance of embankments using hydrological and climate models.
4. Strengthening of community-based early warning and preparedness systems.
5. Provision of permanent rehabilitation and land security for erosion-displaced populations.

X. Conclusion

Floods and riverbank erosion continue to pose serious challenges to socio-economic development in Assam, particularly in Dhubri district. Statistical evidence from 2022–2024 confirms increasing trends in population exposure and land loss. The study concludes that relief-centric approaches are insufficient and emphasizes the need for long-term, climate-adaptive strategies to enhance resilience and reduce vulnerability.

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