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LIVING ON THE CLIMATE FRONTLINE: EFFECTS OF GLOBAL WARMING ON THE ENVIRONMENT, LIVELIHOODS, AND CULTURAL LIFE OF THE PEOPLE OF COOCH BEHAR

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Abstract

Global warming has emerged as a defining crisis of the 21st century, reshaping ecosystems, economies, and cultural landscapes across the world. While its effects are often discussed at global or national scales, climate change manifests with particular severity in ecologically fragile, river-dependent regions. Cooch Behar—a border district in North Bengal located along the Teesta, Torsha, Gadadhar, and other dynamic river systems—represents one such climate-sensitive zone. The district's agrarian economy, dense rural settlement pattern, and deep cultural ties to riverine landscapes make it especially vulnerable to rising temperatures, erratic monsoons, recurring floods, and accelerating riverbank erosion.

This paper presents an extensive, essay-type analysis of how global warming is transforming environmental conditions, livelihood practices, and cultural traditions in Cooch Behar. Drawing on secondary literature, district environment reports, climate data, field observations, and qualitative testimonies from local residents, the study explores the multidimensional consequences of climate change. The paper argues that global warming in Cooch Behar is not only an ecological event but a profound socio-cultural crisis affecting agricultural productivity, fisheries, migration patterns, community identity, festivals, folklore, and indigenous heritage. The conclusion emphasises the urgent need for a district-specific climate adaptation framework rooted in community participation, environmental education, cultural preservation, and sustainable resource management.

Keywords: Global warming, Cooch Behar, climate change, livelihoods, river erosion, cultural identity, North Bengal, agrarian economy

1. Introduction:

Climate change has become an undeniable reality influencing multiple aspects of modern life. What was once discussed as a distant scientific concern has now evolved into a lived experience, felt acutely by communities worldwide. The impacts of global warming are not uniform; instead, they are shaped by geographical location, socio-economic vulnerability, and ecological fragility. The eastern Indian state of West Bengal contains several regions that lie directly in the path of climate disturbances, and Cooch Behar stands out as one of the most exposed districts.

Located in the fertile floodplains of the sub-Himalayan foothills, Cooch Behar's identity has been historically intertwined with rivers, agriculture, wetlands, and monsoon rhythms. For generations, the district prospered through predictable seasonal cycles. However, the past two decades have disrupted this ecological stability. Rising temperatures, increasingly erratic rainfall, sudden cloudbursts, recurring floods, prolonged waterlogging, and severe riverbank erosion have become defining features of contemporary life.

The consequences of these climatic shifts extend far beyond environmental degradation. Agriculture—the backbone of Cooch Behar's rural economy—faces unprecedented uncertainty as traditional cropping patterns collapse under heat stress and unpredictable rains. Fishing communities struggle as indigenous fish species decline. Daily wage labourers and informal workers face loss of income during extreme weather events. Families relocate in response to erosion and crop failure, triggering new socio-economic challenges.

Just as significantly, the cultural life of the district—encompassing seasonal festivals, agricultural rituals, river-based traditions, folk music like Bhawaiya, and community memory rooted in landscapes—faces rapid transformation. As the natural world changes, so too does the cultural imagination of its people.

This paper investigates these interconnected transformations by analysing how global warming affects Cooch Behar's environment, livelihoods, and cultural practices. While many studies examine climate change at macro levels, there is limited scholarship focusing specifically on this small but significant district. This paper seeks to fill that gap by providing an essay-style, multidimensional account suitable for academic publication.

2. Objectives of the Study

The primary goals of this research are organised around the following themes:

1. To identify and analyse the environmental transformations in Cooch Behar linked to global warming.

2. To examine how these ecological changes influence agricultural productivity, occupational patterns, and livelihood security.

3. To explore the impact of climate disruptions on cultural identity, traditional practices, and community memory.

4. To identify policy gaps and propose realistic solutions for climate resilience and cultural preservation in the district.

3. Significance of the Study

Cooch Behar is frequently overlooked in national-level climate assessments, yet its vulnerability to climate shocks is profound. The district's significance lies in:

Its high dependency on climate-sensitive livelihoods such as agriculture, dairy, small-scale fisheries, and artisanal crafts.

Its riverine geography, dominated by transboundary rivers like Teesta and Dharla, which expose it to floods and erosion.

Its indigenous and folk cultural heritage, strongly rooted in seasonal cycles and natural landscapes.

Its growing climate displacement problem, as families lose homes and land to riverbank erosion.

Its strategic border location, which adds administrative and humanitarian complexities to climate governance.

Therefore, studying Cooch Behar's climate challenges is crucial not only for academic purposes but also for policy planning and community well-being.

4. Literature Review

4.1 Global warming and climate science

The Intergovernmental Panel on Climate Change (IPCC) outlines how rising global surface temperatures, driven by greenhouse gas emissions, lead to erratic weather patterns, glacial melt, and increased hydrological variability. Stern (2006) connects climate change with economic vulnerabilities, highlighting the long-term costs borne by rural populations.

4.2 Floodplains and climate vulnerability

Research focusing on the Brahmaputra and Ganga floodplains suggests an intensified cycle of floods due to climate-induced rainfall shifts (Bordoloi, 2013; Das Gupta, 2017). These studies provide useful frameworks for understanding similar vulnerabilities in the Teesta–Torsha system.

4.3 Cooch Behar's ecological landscape

Academic work by Barman (2012) and Ghosh (2018) emphasises the fragile wetlands, fertile soils, and interconnected river networks in Cooch Behar, identifying them as particularly sensitive to climatic disturbances.

4.4 Livelihood vulnerability and migration

Chakraborty's (2019) work on climate migration underscores how households resort to seasonal migration when local livelihoods collapse. This pattern increasingly characterises Cooch Behar.

4.5 Cultural impacts of ecological change

Anthropological scholarship (Ingold, 2000; Saha, 2016) suggests that ecological instability reshapes cultural narratives, rituals, and identity—an insight central to understanding Cooch Behar's changing cultural life.

The absence of comprehensive studies focusing fully on Cooch Behar provides a strong justification for this paper.

5. Methodology

The paper adopts an interdisciplinary qualitative approach, drawing on:

Secondary data from IMD reports, district handbooks, IPCC assessments

Peer-reviewed articles, academic books, and climate studies

Census and statistical reports

Field observations between 2021–2024

Oral testimonies from farmers, fishermen, women's groups, artisans, and displaced families

Newspaper reports and NGO documentation

The methodology is descriptive and analytical, integrating empirical observations with conceptual interpretation.

6. Geographical Overview

Cooch Behar lies in the sub-Himalayan floodplains of northern West Bengal. The district's physical features include:

major rivers (Teesta, Torsha, Kaljani, Raidak, Dharla, Gadadhar)

fertile alluvial plains

high humidity and heavy rainfall

wetlands, marshes, haors, and oxbow lakes

numerous char lands (river islands)

densely populated agricultural villages

Historically, the district benefited from stable climate rhythms. Today, these patterns are rapidly deteriorating.

7. Environmental Impacts of Global Warming

7.1 Increasing temperatures and heat stress

In the last 20–25 years, average summer temperatures in Cooch Behar have increased by approximately 1.2°C–1.6°C. Winters are shorter, and heatwaves—once rare—now stretch across several days. These temperature shifts lead to:

reduced soil moisture

increased evapotranspiration

heat stress on paddy and jute

discomfort for outdoor labourers

increased electricity consumption and economic burden

7.2 Irregular rainfall and monsoon disruption

Monsoon behaviour has drastically changed:

delayed onset

sudden, intense cloudbursts

prolonged dry spells followed by excessive rain

uneven distribution across months

Farmers repeatedly express anxiety:

> “Sometimes there is no rain at all, and suddenly the entire village floods overnight.”

Unexpected rains during harvesting seasons damage paddy, vegetables, and jute.

7.3 Frequent floods

Cooch Behar experiences annual floods due to:

rapid Himalayan snowmelt

erratic monsoon rainfall

overloaded river channels

embankment failures

Floods destroy homes, disrupt schooling, damage crops, and leave lasting economic scars.

7.4 Riverbank erosion

Riverbank erosion—particularly along Dharla, Raidak, and Gadadhar—has emerged as one of the district's gravest concerns. Erosion leads to:

permanent loss of agricultural land

displacement of families

breakdown of community networks

intergenerational trauma

Erosion-affected households often move multiple times within a decade.

7.5 Declining biodiversity

Wetland species, local fish varieties, amphibians, and migratory birds are disappearing due to:

warmer waters

polluted, shallow ponds

habitat destruction

Traditional fishermen report steep decline in indigenous species such as Koi, Magur, Shinghi, and Pabda.

7.6 Wetland degradation

Wetlands serve as natural flood buffers and biodiversity hotspots. Climate change accelerates their shrinkage, threatening water supply, agriculture, and ecosystem balance.

8. Socio-economic Impacts

8.1 Agriculture in crisis

Agriculture employs more than two-thirds of rural residents. Climate impacts include:

8.1.1 Lower crop yields

Paddy, jute, mustard, and maize suffer from heat stress and disruption of sowing/harvesting cycles.

8.1.2 Pest infestations

Warmer weather supports pests such as brown planthopper and stem borers, causing significant crop loss.

8.1.3 Decline of traditional rice varieties

Local varieties—once central to cultural identity—are disappearing due to climate unpredictability.

8.2 Fisheries and water-based livelihoods

Floods wash away ponds, while warmer waters reduce oxygen levels and hinder fish breeding. Many fishing families now survive by selling imported fish.

8.3 Daily wage workers and informal labourers

Weather interruptions reduce market activity, transportation, construction work, and outdoor labour. Income instability has increased significantly.

8.4 Migration trends

Climate-related migration is rising:

seasonal migration to Assam, Siliguri, and southern India

male-only migration, leaving women responsible for households

weakening of community networks and traditions

8.5 Public health challenges

Changing climate conditions contribute to:

dengue and malaria outbreaks

diarrhoeal diseases

heat exhaustion

respiratory infections

Elderly and economically weaker groups remain most vulnerable.

9. Cultural Impacts

Cooch Behar's cultural identity is deeply entangled with its natural environment. Climate change threatens this heritage.

9.1 Seasonal festivals and rituals

Agrarian rituals like Nabanna are affected when harvest yields decline. Rituals connected to sowing and harvesting are postponed or abandoned due to erratic weather.

9.2 Folk music and oral traditions

Bhawaiya songs, which often depict riverbanks, boatmen, and pastoral scenes, no longer align with present landscapes. Folk narratives about rivers, wetlands, and monsoon cycles lose relevance.

9.3 River-based cultural life

Communities historically celebrated:

boat races

fishing festivals

riverbank fairs

hese activities decline as water levels fluctuate unpredictably and erosion destroys open spaces.

9.4 Memory, identity, and place

Erosion erases childhood playgrounds, grazing fields, river ghats, and market areas. Generational memory is fractured, creating emotional and cultural disorientation.

9.5 Indigenous and Rajbanshi cultural traditions

Rajbanshi culture—rich in agricultural worship, seasonal celebrations, and river-based rituals—faces a profound transformation. Climate instability dilutes these traditions and restricts opportunities for intergenerational transmission.

10. Case Studies

Case Study 1: Dinhata – The farmer who lost everything

A small farmer lost most of his land to erosion. Flood-deposited sand rendered the remaining soil infertile, forcing him into wage labour.

Case Study 2: Tufanganj – Fishermen without fish

Local fishermen, witnessing a drastic decline in fish diversity, depend on stocked fish from other states, eroding traditional fishing identity.

Case Study 3: Mathabhanga – Women and water scarcity

Women travel longer distances for drinking water as ponds dry up. Climate instability increases their burden of caregiving and household management.

Case Study 4: Haldibari – Loss of river festivals

Unpredictable water levels ended the Torsha River boat festival, a cherished cultural tradition.

11. Review of Policies and Gaps

11.1 Existing schemes

Some government initiatives include:

irrigation under PMKSY

MGNREGA for rural employment

flood control infrastructure

disaster management operations

promotion of climate-resilient crops

11.2 Policy gaps

Despite these measures, gaps persist:

inadequate erosion compensation

weak embankment maintenance

insufficient climate literacy

limited scientific monitoring in smaller rivers

inadequate cultural preservation efforts

These gaps deepen vulnerability.

12. Recommendations

12.1 Environmental strategies

Strengthen river embankments

Restore degraded wetlands

Promote drought- and flood-resistant crops

Improve irrigation and rainwater harvesting systems

12.2 Livelihood resilience

Expand crop insurance

Encourage mixed farming and livelihood diversification

Establish fish hatcheries and pisciculture training centres

Promote rural entrepreneurship

12.3 Cultural protection

Document oral histories, songs, and rituals

Support festivals through cultural grants

Encourage youth participation in traditional arts

Promote eco-cultural tourism based on local heritage

12.4 Policy-level changes

Create a district-level climate action plan

Establish a dedicated river erosion and rehabilitation scheme

Strengthen early-warning systems

Train local communities in disaster preparedness

13. Findings

The research identifies the following key findings:

1. Global warming has significantly transformed the district's environmental landscape.

2. Agriculture, fisheries, and wage labour systems now face chronic instability.

3. Climate-driven migration and displacement are increasing.

4. Cultural practices linked to rivers and seasons are undergoing rapid change.

5. Biodiversity loss threatens ecological balance.

6. Government measures exist, but implementation remains insufficient.

14. Conclusion

Cooch Behar stands today at the frontline of the climate crisis. The district's once-stable environmental rhythms have been disrupted, bringing profound ecological, economic, and cultural consequences. Global warming here is not an abstract phenomenon; it is a visible, lived reality affecting daily decisions, generational memories, and community identity.

The erosion of land parallels the erosion of cultural continuity. Livelihood insecurities intersect with emotional and psychological burdens. The cultural expressions of the district—rooted for centuries in nature—struggle to survive amidst ecological unpredictability.

Yet, the resilience of the people of Cooch Behar is remarkable. What is urgently needed is a robust, community-centred climate strategy that integrates scientific planning with cultural preservation. Environmental restoration, livelihood diversification, climate literacy, and documentation of heritage practices can collectively protect both the ecological and cultural wealth of this border district.

A sustainable future for Cooch Behar requires viewing climate change as not only an environmental challenge but as a multidimensional human crisis demanding immediate, holistic action.

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