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RESEARCH PAPER

The Political Ecology of an Environmental Crisis in the Brahmaputra Valley, Assam

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> The concept of progress is to be grounded in the idea of the catastrophe. That things "just go on" *is* the catastrophe. It is not that which is approaching but that which is.
>
> —Walter Benjamin, *Central Park* (1985 [1939], 50)

Abstract: Political ecology as a framework for studying nature–society relations has come a long way since the 1980s, both in terms of its thematic canvas as well as theoretical robustness. Research in political ecology on hazards on the other hand has not grown as impressively, even though humanity is witnessing increased risks and disasters in the Anthropocene. Indeed, disasters are no longer "extreme events" and have come to be regarded as normal occurrences. This paper delves deeper into the question of the political ecology of hazards and vulnerability by focusing on a case study from Majuli river island in India's northeast. It critically investigates the twin disasters of flooding and riverbank erosion in Majuli by paying attention to the role of the biophysical features of the Brahmaputra river system as well as the political economic forces at play, with a special focus on the role of the state. The paper draws on fieldwork conducted in Majuli over several years. It foregrounds the role of the state in the reproduction of the Majuli hazardscape and calls for a nuanced, disaggregated analysis of the postcolonial disastrous state.

Keywords: Brahmaputra valley, Majuli, Hazardscape, Flood, Riverbank erosion, Disaster, Political ecology, The State.

1. INTRODUCTION

This article presents a political ecological analysis of a disaster in Assam. The relationship between the fields of political ecology and hazards research is deep-rooted, particularly in the anglophone world. Some of the foundational work in political ecology critically engaged with questions of hazards and

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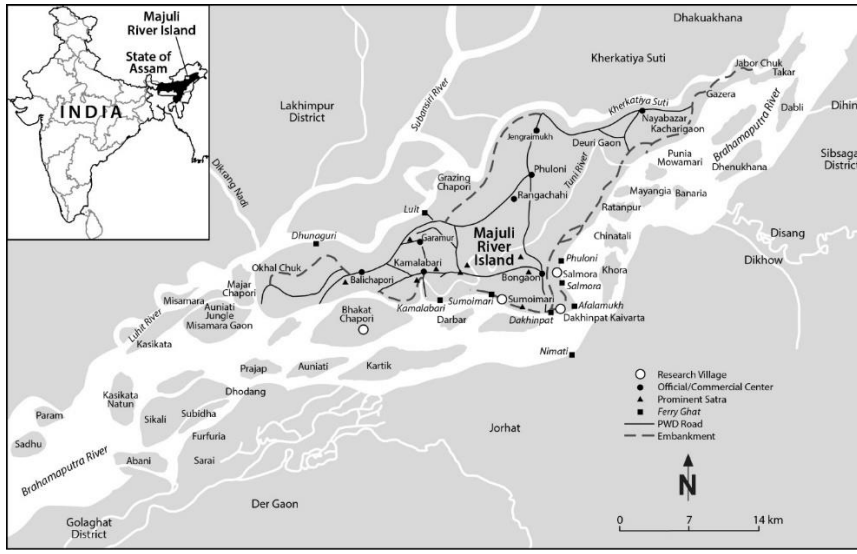
vulnerability (Blaikie 1985; Blaikie and Brookfield 1987; Watts 1983a, 1983b). This body of work showed how far from being "natural", disasters had a social calculus. It located disasters within larger political economic contexts and examined them from a historical materialist perspective. Recent scholarship on hazards has engaged more directly with frameworks of political ecology (Mustafa 2005; Oliver-Smith 2004; Pelling 2012; Sultana 2010, among others). However, the scholarship on hazards and vulnerability remains inadequate, lacking critical perspectives on several important areas, even as the environmental crises grow bigger in the Anthropocene. One such area is the role of the state, and as this article demonstrates, a critical political ecological approach can help us gain deeper insights into the relationships between disasters and the state.

Drawing on ethnographic research conducted in Majuli river island in Assam, this paper critically investigates the role of the state in the reproduction of disaster and vulnerability, and in doing so, it attempts to re-theorize the postcolonial state in the specific context of hazardous geographies. Located in the upper reaches of the Brahmaputra, surrounded by the mighty river on the south and the Subansiri on the north, Majuli is one of the largest river islands in the world. The island is predominantly rural and is home to over 1,60,000 people belonging to diverse ethnic groups. Majuli is also the nerve centre of the *satras*, medieval-era Vaishnavite monasteries, that have significantly influenced the sociocultural and spiritual landscape of Assam.

Historian Arupjyoti Saikia (2019, 25) describes Majuli as "the best illustration of the extreme instability and volatility" of the Brahmaputra river system, characterized by complex geological, geomorphological, and hydrological processes. What is now a river island was once part of the land formation on the southern bank of the Brahmaputra. A series of geological processes and the unique fluvial dynamics of the Brahmaputra river led to the formation of this river island (Saikia 2019). Majuli consists of a large, spindle-shaped landmass and dozens of smaller islands, locally known as *chaporis* or *chars*. The former represents a remnant floodplain—a relic island—that developed due to a process of sudden channel diversion and a branching of the Brahmaputra, triggered by tectonic activities and associated mega flood events that took place in the early part of the eighteenth century (Baruah 2022). The *chaporis* on the other hand are products of the fluvial dynamics of the river. It is important to note that the Brahmaputra is the second largest sediment-laden river in the world, next only to the Yellow River in China (Goswami 1985). Roughly 70% of the sediment carried by the Brahmaputra

is retained in its channel (Goswami 1985),[1] causing the rise of riverbeds and the formation of riverine islands throughout its course (see Figure 1). These *chaporis* are "hybrid environments" (Lahiri-Dutt 2014a; also see Lahiri-Dutt 2014b; Lahiri-Dutt and Samanta 2013) or "fluidscapes" (Mukherjee and Ghosh 2020), part water and part land, and are constantly in a flux—floating, sinking, and reappearing. Such mid-channel landforms are characteristic of the Ganges–Brahmaputra–Meghna system (Lahiri-Dutt and Samanta 2013). In Majuli, these are lived-in geographies, often home to people who were forced out of the main island by flood and erosion. They have worked to develop an agrarian economy in these volatile landscapes, in the middle of the mighty Brahmaputra.

Figure 1: Map of Majuli



Source: Map prepared by Joe Stoll, Syracuse University Cartography Lab, the author in 2015.

Over the years, the island has gone through massive transformations due to the twin processes of flooding and riverbank erosion. From a landmass of roughly 1,255 sq km in 1901, Majuli has reduced to about 421 sq km today (Sarma and Phukan 2004). In the process, over 10,000 families have been rendered homeless within the island, while many families have migrated to other parts of Assam. The volatility of the Brahmaputra, as mentioned above,

[1] This is due to the weight of the sediments as well as the declining velocity of water after it leaves the Himalayan region and flows through the plains of Assam (cf. Lahiri-Dutt and Samanta 2013, 31).

and a highly potent South Asian monsoonal regime are critical factors behind the flooding and erosion in Majuli and the Brahmaputra valley as a whole. The sandy soil along the riverbanks is particularly erosion-prone (Sarma and Phukan 2004). Furthermore, the formation of new islands in the upper reaches of the Brahmaputra in recent years has impacted the flow regime of the river downstream, thereby accelerating processes of erosion in places like Majuli (Lahiri and Sinha 2014). For instance, a roughly 300 sq km island by the name Dibru-Saikhowa has come up between Dibrugarh and Tinsukia upstream, with potentially dangerous implications for Majuli and other places downstream (Lahiri and Sinha 2014). However, as this paper contends, it is the interventions, or the lack thereof, by the state that have rendered the twin processes of flooding and erosion in Assam far more disastrous. The paper undertakes a critical investigation into the role of the state in the reproduction of disaster and vulnerability in Majuli.

The paper is divided into four sections. Section 2 presents an in-depth examination of the Majuli hazardscape. It begins with a historical overview of flood and erosion control approaches in Assam, followed by a discussion on how hydraulic infrastructural elements, such as the embankments, have reproduced vulnerability in the Majuli landscape. Section 3 unpacks the "disastrous state" in Majuli by looking closely at some of the forces behind the specific functioning of the state. This section presents rich ethnographic details to show the nature and logic of the everyday state in action in Majuli. Overall, the paper attempts to enrich the political ecology scholarship on hazards as well as research in state theorizations.

2. THE PRODUCTION OF A HAZARDSCAPE[2]

As we sat on the verandah of Mrigen Kutum's house in Sumoimari village, located barely 100 meters away from the river, all we could see were a fleet of tractors, JCB excavators, dumper trucks, and rollers, deployed by the Brahmaputra Board for the construction of hydraulic infrastructures to check riverbank erosion. We could see boulder spurs, geo-bags, geo-mattresses, and rows of reinforced cement concrete (RCC) porcupines, but not the river. In Kutum's description, the river has been turned into a "heavily bandaged wound" by these infrastructures. Most Sumoimari households are located on the riverside, that is, outside the embankment, while a small section is in the

[2] A hazardscape is an analytical framework that explains hazardous geographies as co-produced by the material processes of vulnerability and discursive formation, that is, how these geographies are "viewed, constructed, and reproduced by the expert/technocratic discourses about them" (Mustafa 2005, 566). Drawing on the idea of "landscape" in cultural geography, this concept further highlights how hazardous geographies are not just sites of vulnerability and suffering, but they also open up spaces for contestations and struggles over wider social justice (Mustafa 2005).

countryside or inside the embankment. It made a huge difference as to which side of the embankment one lived, but I will return to this subject later. For septuagenarian Kutum who has lived all his life in Sumoimari, the village has changed enormously. He attributed most of these transformations to the flood and erosion control measures—not the disasters themselves—that the state has adopted over the years. Kutum was particularly critical of the embankments:

> We had our best time before the *mathauris* (embankment) were built. Everything used to be *ubhainadi* (abundant): food grains, fish, and all other essentials. But ever since the embankments came up, our fields stopped receiving timely water and alluvium. This has destroyed our agriculture. The embankments have also severed our ponds and *beels* from the river, thus depriving them of both freshwater and fish. Moreover, floods now wreak havoc on the island, as they are mostly flash floods occurring due to embankment breaching, which was not the case earlier. Before, the floodwater used to come in gracefully and recede sooner.

Kutum grew up in a Majuli of the pre-embankment era when the Brahmaputra and the Subansiri flowed through the island freely every year during the monsoon, nourishing its agricultural fields and replenishing the wetlands. Back then, the Tuni river, a natural anabranch of the Brahmaputra, also traversed the island vigorously, enriching its biodiversity. Although the embankment that runs through Sumoimari now was constructed in the mid-1990s, the village has witnessed the impacts of embankments since the late 1950s, when the first set were built in Majuli. For Mrigen Kutum, the embankments and the cognate infrastructure were thus more than just a set of infrastructural elements; they were a force, as it were, that reshaped his world in front of his eyes. Hence his strong critique of these interventions, and in it, he was not alone. As I travelled the length and breadth of the island interacting with people from different walks of life, I kept hearing story after story about the devastating impact of embankments, spurs, and other such infrastructural elements on people's lives and local ecologies. Sometimes, people shared wisdom about the river and its intricate ecologies that far surpassed what the sophisticated fields of hydrology and river engineering can tell us. For instance, on one occasion, an elderly person in Sumoimari told me the following:

> *Nadikhon bor komal. Moromere subo lage.* (The river is very delicate. It should be touched with love.).

I was awestruck by the profundity of this seemingly simple statement. Unlike the world of river engineering that considers rivers as entities that can be harnessed, tamed, and altered at will, this remark by the villager reminds us of the living entity that a river is—a delicate being that requires love, not

techno-engineering. How should we really touch a river? It is this question of the touch that I turn to now, first by looking at the flood and erosion control in Assam historically.

2.1 A Brief History of Flood and Erosion Control in the Brahmaputra Valley

In Assam, "flood control" has always been a top-down process. Historically, the Assamese peasantry did not consider a flood a calamity; instead, they welcomed it and relied heavily on annual flooding for their livelihood. The state, on the other hand, has always viewed a flood as a hazard that needs to be controlled. Flood control as a systematic state intervention in Assam dates back to the Ahom period, although centralized management of water resources in general far preceded the Ahoms (Saikia 2019).[3] It was during the reign of Suhungmung (also known as the Dihingia Raja, after the Dihing river) in the sixteenth century that widespread embankments or bunds were built for flood control, and subsequent Ahom rulers expanded this initiative. The embankments allowed the Ahom state to expand wet rice cultivation into the Brahmaputra floodplains (Guha 1967). Flood control, however, gained further momentum during the colonial period.[4] As early as 1827, only a year after the British takeover of Assam from the Burmese,[5] David Scott, the East India Company's first commissioner of Assam, proposed that part of the revenue collected from Assam be allocated for flood control measures, such as embankments (Barooah 1970, 101). Thus, very early on, the Company administration began investing large amounts of money in repairing the Ahom era bunds, which they believed to be highly dilapidated. Work of such scale demanded a considerable labour force, and the Company ensured that through an unprecedented mobilization of the Assamese peasantry who did not have a choice but to follow the instructions. In addition to such large-scale repair work, the Company also undertook the construction of new embankments and the excavation of canals and ditches along the Brahmaputra and its tributaries (see Figure 2).

For the British, it was imperative to have complete control over the Brahmaputra and its tributaries in order to reclaim the floodplains and maximize land revenue. This was seen as crucial to continuing the

[3] The Ahoms, descendents of the Shan branch of the Tai or Thai family of South-East Asia, ruled in Assam for a long period of 600 years, from 1228 to 1826. The legacy of the Ahom period is still prominent in all spheres of Assamese society and culture. For more details about the Ahom dynasty and their contribution to Assam, see Baruah (1985).

[4] This was the case in the country as a whole. See, for instance, D'Souza (2006), Mishra (1997).

[5] As per the terms of the Treaty of Yandabo, signed between the British East India Company and the Burmese on February 24, 1826, the Burmese agreed to cede Assam, along with a few other territories, to the British. This was the beginning of the colonization of Assam.

accumulation cycle of colonial capital. Henry Cotton, the chief commissioner of Assam, was explicit about the need to harness the vast riverine tracts in Assam and put them to "productive" use:

> [T]he millions of acres of culturable land now lying waste represent millions of rupees which might be dug out of the soil but are now allowed to lie useless like the talent wrapped in a napkin (Cotton 1897, cited in Saikia 2013, 11).

Figure 2: Drone Footage of a Section of an Embankment in Salmora, Majuli

Source*:* Ron Bezbaruah and the author

The case of Assam was emblematic of a much deeper phenomenon: the colonial fetishization of flood control. As Rohan D'Souza (2006) has shown, similar processes were already underway in Bengal and the Orissa delta. In its pursuit of endless capital accumulation, the colonial administration had to find ways to secure land revenue from "the river's temperamental depredations" (D'Souza 2006, 101). Hence, "the idea of running protective embankments to separate field from river" became an "administrative fetish" for the colonial state (D'Souza 2006, 101).

It is important to note that up to the late nineteenth century, the Assamese peasantry viewed flooding as largely beneficial, and instances of catastrophic floods were also rare. In fact, the Government of India conducted a detailed inquiry in 1893 on the subject of flooding and embankments in Assam, which established that the demand from the peasantry was overwhelmingly for

localized flood-control measures, such as the restoration of existing natural drainage systems, and not for embankments (Saikia 2019, 268).

For the colonial state, however, the vast riverine tracts of the Brahmaputra valley were extremely suitable for jute cultivation. Thus, within a short period of time, floodplain reclamation for jute cultivation became rampant, and in the process, the valley was radically reconfigured. By the early twentieth century, jute was the highest export earner for the Government of India, and Assam was second only to Bengal in jute production. The massive conversion of the fragile riverine tracts into jute fields led to the reworking of their ecologies, rendering them highly vulnerable to floods and erosion. "Flood" itself acquired a new meaning now since flood-induced damage became much more visible when jute fields were destroyed (Saikia 2013). Hence, embankments gained unprecedented salience in the colonial government's efforts to control floods in the valley in the twentieth century.

Fast forward to the post-independence era. The historic 1950 earthquake with a magnitude of 8.7 on the Richter scale had a catastrophic impact on the Brahmaputra valley landscape. Suddenly, the riverbeds rose significantly, by several metres in some places; some old, iconic channels disappeared and were replaced by new ones; landslides and sedimentation gained unprecedented momentum; and the *chapori* geographies in the belly of the river were drastically altered. It was as if the Brahmaputra riverscape had undergone a complete overhauling all of a sudden. Riverbank erosion, too, attained a different scale after this mega event. Since 1950, Assam has lost over 400,000 hectares of land to riverbank erosion, which amounts to roughly 7.5% of the state's total geographical area.[6] This has also led to significant widening of the Brahmaputra, up to 15 km in some places (Goswami 1985). Such massive reconfiguration of the river changed the nature of flooding and erosion in the valley forever. The mega floods that followed the 1950 earthquake—the 1952 and 1954 floods—wreaked havoc all over Assam. In its desperation to find a solution to the flood crisis the state was facing, the Assam government enacted the Assam Embankment and Drainage Act, 1953, which came into force in 1954, paving the way for the rapid proliferation of embankments throughout the state. Within two decades of the execution of this act, the Assamese state built over 4,500 kms of embankment, the third largest in the country at that time.

Much as in the Brahmaputra valley as a whole, in Majuli, too, the embankments have been at the heart of the state's flood and erosion control measures. As per Assamese chronicles (Tamuli-Phukan 1944), the first

[6] This information was taken from the website of the Ministry of Water Resources, Government of Assam (https://waterresources.assam.gov.in/portlets/flood-management).

embankment in Majuli dates to the Ahom king Pratap Singha (1603–1641), also known as *Burha Raja* or the old king. It was during his reign that an embankment was constructed at Meragarh,[7] near present day Bongaon (see Figure 1), connecting the northern and southern borders of his kingdom (Nath 2009, 255). Remnants of the Meragarh embankment are still present, but this remained the only embankment in Majuli for a long time. It was only after independence that the number of embankments started increasing. Built in 1952–1953, the 34.5-km Haldhibari–Bessamora dyke along the Brahmaputra was the first one on the island in the post-independence era. A series of embankments came up after that, both along the Brahmaputra and the Subansiri, leaving the island with a wide network of these structures (see Figure 3). Today, the island is surrounded by over 115 km of embankment. Although most of them were built within the first three decades of independence, construction and repair work continued throughout the twentieth century. In fact, as recently as 2013, a proposal was submitted by the Majuli Division of the Water Resources Department (WRD) to the Central Water Commission (CWC), New Delhi, for a massive reinforcement of embankments on the northern bank of the island. Thus, there seems to be no stopping the state's fetish for embankments.

The following statement by a high-ranking engineer in the WRD best echoes the state's obsession with embankments:

> I would argue that there are actually two Assams: one before the 1950 earthquake and one after. The post-1950 Assam owes its *sanskriti* and *sabhyata* (culture and civilization) to the embankments, and by extension, the Water Resources Department. Had it not been for the embankments along the Brahmaputra and its tributaries, the post-1950 Assam would have been a miserable landscape—flooded, fragmented, and wild. […] The embankments have been and will be the savior of modern Assam.

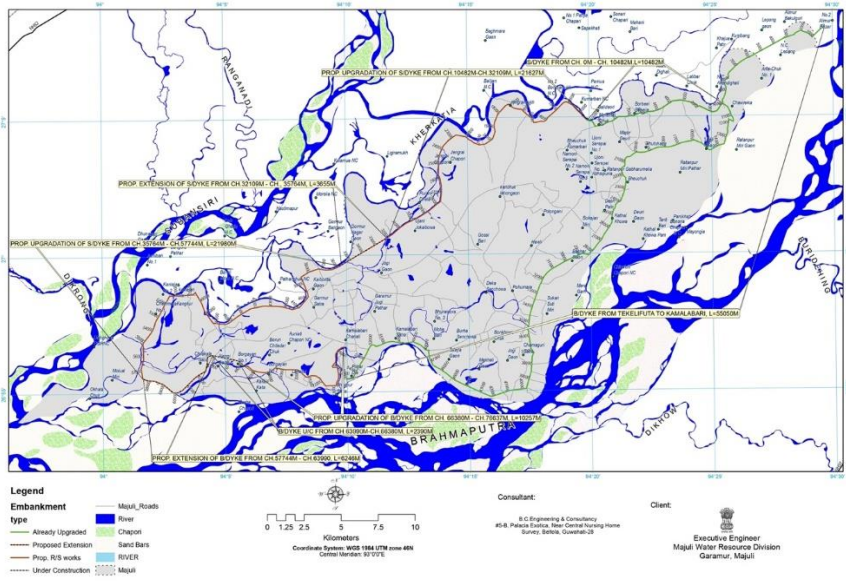
Such a statement may appear bizarre, but the truth is that this is the dominant sentiment within the agency. During my fieldwork, I spoke with WRD officials from different levels—from the chief engineer to the junior engineer (JE) at the field level—and I never came across anyone denouncing the embankments.

Previously, the WRD was responsible for both flood and erosion control in Majuli. However, faced with popular discontent with the agency due to its failure in preventing erosion in the late 1990s, the Assam government was compelled to re-evaluate its capacity to handle the alarming rate of erosion in

[7] The word *garh* means a bund or an embankment. Near Meragarh, one can find more Ahom era relics, such as the iconic Rawnapar pukhuri, a large tank, which is also an important tourist attraction today.

Majuli. In 1999, the government approached the Board, a statutory body under the Ministry of Water Resources, Government of India, to intervene in the protection of Majuli from riverbank erosion. Since then, the Board has been the main agency addressing the crisis of riverbank erosion in Majuli. The Board started implementing its three-phased scheme, *Protection of Majuli Island from Floods and Erosion*, in 2005. What is interesting about this scheme is that the embankments remained one of the key interventions. Even though the Board proposed a range of other measures, such as permeable RCC porcupine screens and dampeners, boulder spurs, and sand-filled geo-bags and geo-mattresses, the raising and strengthening of embankments still remained a dominant intervention. Such a "tech-fix approach" (Wisner *et al.* 2004, 230) has rarely proven to be effective in controlling flood and erosion in Majuli. Rather, it has worsened these disasters, a phenomenon that Wisner *et al.* (2004, 206) described as the "the paradox of flood control".

Figure 3: A Map of Embankments in Majuli



Source*:* The Water Resources Department, Majuli Division (with permission).

2.2 Infrastructures and Vulnerability

When I arrived in Majuli in late 2012 to begin my fieldwork, the island was still recovering from a flood that had caused devastation earlier that year. Behind this catastrophic flooding was one simple factor: the breaching of embankments. They were breached in as many as five different places

throughout the island, catching the rural population off-guard and causing an instant deluge. Sonowal Kachari village, located on the easternmost corner of the island, was one of the worst-affected villages in the whole of Majuli. The embankment breached right in front of this village causing havoc. Several families lost their homes and cattle overnight. Tuniram Sonowal, one of those who suffered losses, said:

> *Ghar to bar jautijugia koi banai loishilu. Eku norol, ratir bhitorot marubhumi hoi gol.* (I had built my house as if it would last forever. But nothing remained, and it all turned into a desert overnight.).

Sonowal seemed to have used the word "desert" both literally and figuratively. As the embankment breached, the river deposited huge loads of sand instantly all over the village, giving it the appearance of a desert. At the same time, "desert" here also symbolizes loss, barrenness. Sonowal went on to tell me how he had built a large house with as many as 75 *poka khutas* (concrete pillars), which got washed away overnight, along with roughly five dozen of his cattle. For rural families like Sonowal's, a loss of this magnitude is irrecoverable. For months following this flood, his family lived in a makeshift tent, and it was only about a year later that they rebuilt their home, which was obviously not comparable to their previous house.

The embankments are built to control floods, but they are prone to breaching, leaking, and toppling. Whenever an embankment is breached, there is total mayhem. Thus, for people living in flood-prone areas, the embankments are a greater cause of worry than the flood itself. Between 1969 and 2012, for instance, the island experienced 13 mega flood events, while low-intensity floods continued to affect the riverside villages every year, sometimes multiple times a year.[8] During this period, the island has also lost huge landmasses to riverbank erosion. The old Ahatguri *mouza* (revenue block) in lower Majuli has almost entirely disappeared, the *chaporis* in the middle of the river are constantly being eroded, and a multitude of families have been rendered homeless on the island. The state's techno-fix approach to disasters, which often finds expression in the form of embankments and cognate infrastructural elements, has been particularly responsible for these devastations on the Majuli landscape (Figures 4).

In Majuli, the embankments have produced a distinct spatiality of risk and vulnerability. They have divided the island into two distinct zones: *countryside* versus *riverside,* also known as the *bhitor anchal* and *bahir anchal*—that is, inside and outside region (see Figure 2). The countryside represents the largest and

[8] This information is based on a household survey that I conducted in 110 households across three villages in Majuli in 2013–2014.

the more prosperous part of the island. It has some of the more productive agricultural lands, particularly suitable for paddy cultivation, and it also has a significant share of the island's wetlands. The countryside is also the business and administrative hub of the island. The riverside area is relatively less prosperous and has poorer infrastructure. It is also densely populated, with a predominance of the missing community. This region also includes the *chaporis*, that is, the more ephemeral parts of Majuli. Far from preventing floods and erosion, the embankments have rendered both these spaces much more vulnerable than before, and in distinct ways.

Figure 4: Riverbank Erosion Ravaging Part of Salmora Village in Majuli

Source*:* Author

Because of the embankments, the countryside does not experience annual flooding anymore, which may have given the population there a sense of security. This is, however, a false sense of security. In fact, the embankments have threatened the safety and security of the countryside in several ways.

First, embankment breaching has become far too common in Majuli, resulting in disastrous floods, whenever they occur. Second, the embankments have blocked the natural inlets and outlets for water on the island. As a result, the countryside now faces a severe crisis of waterlogging post-monsoon every year, which leads to a variety of problems, such as stagnant wetlands with depleted fish stock, drinking water contamination, and the spread of malaria and water-borne diseases. Third, due to the

embankments, the fields in the countryside are now deprived of annual alluvium (*polosh*) that floodwater used to bring in earlier. It is not surprising that the farmers in the countryside are increasingly applying chemical fertilizers and pesticides in their fields, with potentially dangerous implications in the long run.

Figure 5: Flood as an Everyday Phenomenon in Areas Outside Embankments

Source: Author

In the riverside areas, conversely, the embankments have created a condition of permanent flooding (see Figure 5). During the monsoon, the Brahmaputra and its tributaries naturally swell up, more so now as the embankments have narrowed the course of the rivers. Before the embankments were built, this water was distributed throughout the island, but now it cannot enter the countryside unless an embankment is breached. As a result, the riverside remains largely submerged during and long after the monsoon. With farmlands and grazing lands inundated for most of the year, people in the riverside face serious livelihood challenges. The effects of such low-intensity, *everyday flooding* in the riverside areas are many. For instance, tube wells in most riverside villages get submerged, causing an acute shortage of potable water. In addition to the health risks, the potable water crisis puts an extra burden on womenfolk, exposing them to greater risks. Similarly, toilets in many rural households get submerged, which, too, has serious health- and gender-

specific implications (Baruah 2022). Furthermore, the damage caused to the roads and bridges in the island's interior affects people's mobility, thereby rendering day-to-day activities extremely difficult. Yet the state seems to view such conditions as the norm and does not make any effort to address them. The people are largely left to fend for themselves. Hemanta Das, a resident of Dakhinpat Kaibarta village, described the living conditions in the riverside areas as follows:

> We are victims of the embankment in multiple ways. Unlike the bhitor anchal, our areas are flooded every year, and for a longer duration. Being a *nadi-kaxoriya gaon* (riverside village), people in our village own very little land, which, too, is often inundated and not suitable for agriculture. […] Much more upsetting to me is the fact that we now have to live with these huge ponds right in front of our houses, which were dug for the purpose of building and repairing the embankment. In the monsoon, these ponds usually overflow, and the entire area becomes like a drain. At that time, we can't even access the road and it is a particularly dangerous situation for our kids. Basically, we are squeezed between the river and a drain.

Figure 6: A Boulder Spur in Sumoimari Village, Majuli

Source*:* Author

The riverside communities thus have to endure vulnerabilities of many kinds induced by the embankments. As Hemanta's account makes abundantly

clear, life in the riverside zone is miserable irrespective of flood or erosion—they are "squeezed between the river and a drain". For the *chapori* dwellers, it is worse. By confining the courses of such a massively sediment-laden river, the embankments have added to the volatility of the Brahmaputra and its sediment dynamics downstream. In the process, the geographies of the *chaporis* have been rendered much more ephemeral, and life there is highly uncertain. People in these *chaporis* are constantly on the move, in search of a more secure place and a home.

The inventory of hydraulic infrastructure in Majuli is elaborate. A whole range of infrastructural elements—earthen, concrete, metallic, and other mixed—have proliferated in Majuli over the past few decades. Let me at this point briefly highlight the case of two more of these—the boulder spurs and the RCC porcupines (see Figure 6 and Figure 7)—and how they, too, have worsened the crises instead of solving them.

Spurs or groynes are anti-erosion measures constructed transverse to the river flow and extend from the bank into the river. The spurs are meant to keep the flow of the river away from the erosion-prone bank and are supported by a launching apron to prevent scouring under the water and the consequent toppling of the structure.[9] The construction materials and design of a spur can vary depending on whether it is permeable or not. In India, the construction of spurs as a bank revetment measure dates back to the Raj. D'Souza (2006, 124), for instance, talks about a stone spur—the Naraj Spur—constructed along the Mahanadi river in Orissa in 1856–1863, which, "it was hoped, would restore the vitality of the Mahanadi by redirecting the waters back into its main channel". However, as D'Souza (2006, 124) noted, "[Within] a few years of operation, it became evident that the Naraj Spur failed to be the elegant solution. The delta, thus, despite the surgical stab of a spur into its clotted head remained rancorous and in mourning." Later, the Naraj Spur was converted into a barrage. In Majuli, the spurs are a relatively recent intervention. The Board proposed building five boulder spurs in Majuli as part of its scheme. The construction of these spurs began in 2009–2010 under phase II and phase III of its scheme. At the time of this research, the work was still ongoing. Given that they have not been completed yet, it may be too early to write an obituary of these spurs, but there are enough early signs to doubt their efficacy. For instance, during the 2012 flood, spurs no. 1, 2, and 3, located between Salmora and Afalamukh on the southern tip of the island, were partially toppled even as they were under construction. Boulders from these spurs were washed away, causing havoc in the

[9] See the 2012 *Handbook of the Central Water Commission, Government of India*, for more technical details about spurs as well as various other flood-control and anti-erosion measures.

neighbouring villages.[10] Because of these risks, some people in the riverside villages referred to the spurs as "*mrityubaan*" (weapons of death). Not only are the spurs unlikely to protect the island from erosion, but they may also render the downstream areas as well as the riverbanks on the other side much more susceptible to erosion, since the river now hits these places with far greater force.

Figure 7: RCC Porcupines in the River near Dakhinpat Village, Majuli

Source*:* Author

RCC porcupines are another widely used intervention by the Board in Majuli. First introduced in 2004 as part of the Board's "immediate measures" to check erosion, they saw massive scaling up in the next decade. An RCC porcupine is a prismatic-type permeable structure, comprising six RCC columns, joined together with iron nuts and bolts to form a tetrahedral frame. The individual units are connected using wire rope and placed on the ground in such a way that they are able to withstand the force and intensity of flow, especially during the monsoon. The primary function of these structures is to reduce the velocity of the flow along the bank by posing a partial obstruction to the flow and thereby inducing sediment deposition. They are

[10] This information is based on my field observations and interaction with several families, in all three sites, that were affected by the toppling of the spurs.

generally laid in different forms—as screens, spurs, and dampeners. In India, RCC porcupines have been deployed both in the Brahmaputra and the Ganges. Thus far, there have been no systematic studies on the efficacy of these structures. In Majuli, too, one will have to wait to see the outcome of these measures.

According to the Board, it has reclaimed about 18 sq km of land in Majuli between 2004 and 2011, largely due to siltation caused by the RCC porcupines (Government of India 2012, 12). The local communities, however, seemed to have rejected the RCC porcupines entirely. Salmora resident Dulal Bora's song expressed the general mood on the island about RCC porcupines. The song went like this:

> *"Porcupine, porcupine*
> *Kona hahok potan dan…"*
> (Porcupine, porcupine/ Giving fake rice to blind ducks…).[11]

Many people on the island thought the RCC porcupines were a sheer waste of public money, while others complained that these structures obstructed navigation and fishing activities. It was perhaps a sign of the widespread rejection of these structures that nuts and bolts of RCC porcupines were regularly stolen. Sometimes, the entire unit of a porcupine would disappear, with the RCC posts finding their way into the black market.

3. UNPACKING THE DISASTROUS STATE

It is clear from the above discussion that the state has not been successful in protecting Majuli from floods and erosion. Although measures such as embankments and cognate infrastructural elements have proliferated on the island in the past few decades, they have failed to create a sense of security among the riverside communities. The erosion of the island continued unabated, and there has not been any let-up in the flood situation either. The case of Majuli exemplifies the flood and erosion crises that the Brahmaputra valley is facing as a whole. From Rohomoria upstream to south Salmora downstream, via Palasbari, Lahorighat, and many other places, the stories of devastation and loss due to floods and erosion are endless. Why does the state, then, continue to follow the same old colonial approach to tackling floods and erosion? In other words, how do we make sense of a state that is producing more disasters while trying to control them?

3.1 Beyond the Accumulation of Capital

[11] This retired schoolteacher is locally well-known for his songs, poems, and Assamese literary writing in general. His song on the RCC porcupine was a long one, with specific details on how the porcupines were a futile intervention by the government. He had composed a number of songs and parodies, with a humorous take on various interventions by the state in Majuli.

The relations between (colonial) capitalism and river engineering have been a subject of numerous studies globally (Biggs 2012; Colten 2005; Evenden 2004; Swyngedouw 1999). In India, Rohan D'Souza's (2006) *Drowned and Damned: Colonial Capitalism and Flood Control in Eastern India* remains one of the finest historical treatises on flood control during the Raj. Vital to D'Souza's work, focused on the Mahanadi river in Orissa, was locating flood control in Orissa within a capitalist political economy that was uniquely colonial. "The colonial quest for transforming Indian society", D'Souza (2006, 14) argued, "turned significantly on the need and urgency for instituting capitalist property, capitalist social relations, and its production and accumulation imperatives, which then inevitably translated into several scales of environmental change". For a colonial state, too determined to transform and harness nature as part of its drive for capital accumulation, a flood-vulnerable landscape was a necessity that required constant interventions and transformations. Hence, embankments gave way to canals, which in turn gave way to Multi-Purpose River Valley Development (MPRVD), despite repeated catastrophes and popular dissent. Arupjyoti Saikia's (2013, 2019) rich historical account of colonial floodplain management in the Brahmaputra valley also placed *revenue* concerns of the empire at the centre. For the colonial administration, Saikia argued, the "reclamation" of the Brahmaputra floodplains was necessary, as it offered huge potential for cash crop cultivation (of jute and tea, in particular). Flood control enabled this land reclamation.

While Saikia's and D'Souza's works remain invaluable for our understanding of colonial flood control in eastern India, in both these accounts, the conceptualization of the state seems rather simplistic. The state in their analysis appears to be a unitary entity, driven singularly by its accumulation imperative. While this may be true about the colonial state and may also explain the postcolonial state to some extent, as a large body of work now shows, the state is far from being unitary and state–society relations are much more complex and at times arbitrary (Carswell and Neve 2020; Corbridge *et al.* 2005; Ghertner 2017; Glassman and Samatar 1997; Gupta 2012; Sharma and Gupta 2006; Truelove 2021). With reference to the postcolonial state in northeast India, political scientist Sanjib Baruah (2020, 8) has talked about "hybrid political regimes", which meant a "de facto informal partnership" between state and non-state armed actors. In Majuli, where the non-state actors include both armed and unarmed groups, the latter consisting of, among others, contractors, student unions, the satras, and cronies of political leaders, such partnerships are widespread. I have discussed in greater detail elsewhere the nexus between engineers, contractors, and politicians in Majuli and how that affects processes of environmental governance (Baruah 2022).

Let me now present to you an anecdote from the field to explain the arbitrary functioning of the state in Majuli:

> Kai was an influential person in Majuli, a close relative of a political leader at that time. His sprawling house in the village was always busy, functioning like the de facto office of a few government agencies in Majuli. The day I was invited to his home for lunch, the gathering was relatively small—a select group of local contractors, a few bureaucrats and engineers, and a handful of local elites. I sat quietly, listening to their conversation and nodding occasionally with a few words. "The Brahmaputra should be sold to China, they would do a much better job of managing it", said an engineer. "All these public protests are sheer waste of time. They should be banned. Somebody should eliminate X (referring to an activist)", said a contractor. Their conversation touched on a range of topics. Eventually, an elaborate lunch was served—red rice, smoked pork, fish curry, and rice beer.
>
> Post-lunch, the contractors, the engineers, and Kai sat down with files, maps, and other documents in the courtyard. Over the next couple of hours, they made a list of several projects in Majuli for next year, under a particular department, and the names of contractors against each of these projects. In a way, the department's work plan for the island for the next financial year was finalized at this meeting. The contractors present in the lunch/meeting received the lion's share, of course. Although the official sanction of these projects will require various procedures, as one of the contractors told me, they are "formalities". "The real sanction", he added, "is what we are doing here now". A few months later, a protest broke out in a village on the easternmost corner of the island over a WRD project. This riverside village was devastated by the 2012 flood, as the embankment was breached and partially washed away right in front of this village. The protest concerned a "retirement bund" on this embankment. As it turned out, this was one of the projects that featured in the discussion at Kai's lunch. Given the urgency and the scale of the work, it had been allotted to a group of contractors instead of a single contractor. However, the work was progressing extremely slowly, and its quality so compromised that the village community was worried about another catastrophe in the upcoming monsoon. Hence, they took to the streets. In response, high-ranking bureaucrats from the WRD headquarters visited the site immediately, and the contractors were assigned stricter deadlines to complete the project. But most of the contractors were based in Guwahati (Assam's capital city), busy implementing much larger projects elsewhere, and the retirement bund in Majuli was the least of their priorities. So, some of them washed their hands off quickly by "sub-contracting" the project to other contractors who were locally based. As I later found out, this process of sub-contracting made a few more rounds. Each time the work was sub-contracted, its quality suffered, as the new contractor lacked resources and experience. Three years later, this embankment was breached once again, and a similar saga of

> devastation began in several riverside villages all over again. (Baruah 2022: 78–79)

This episode gives us a closer look at the functioning of the everyday state in Majuli. As we have noticed, the government agency in question did not follow due procedure in finalizing its annual work plan. Instead, plans were drawn up in an informal, arbitrary manner at the residence of a political leader, in the presence of a group of well-connected contractors. Projects were allotted arbitrarily to this select group of contractors. So, when it came to implementing these projects, the contractors managed to circumvent the state easily.

A second example may help illustrate the hybrid political regime at work in Majuli. The non-state actor in this case is an armed group—the United Liberation Front of Assam (ULFA). Founded in 1979 with the goal of liberating Assam from the Union of India, ULFA was a hugely popular force in Assam in its early stages.[12] In Majuli, the group had a strong popular base in the 1980s through the mid-1990s. The swampy, inaccessible geography of the island made it the militants' most preferred base. However, the tragic incident of the murder of social activist Sanjoy Ghose in 1997 proved to be ULFA's undoing in Majuli. A well-regarded development professional and human rights activist in the country by that point, Ghose came to Majuli in 1996 as part of the Association of Voluntary Agencies for Rural Development, North East (AVARD-NE).[13] AVARD-NE initiated a variety of developmental activities in Majuli, and Ghose soon became a household name on the island. ULFA, however, suspected Ghose of being a spy for the Indian government, and on July 4, 1997, he was abducted in broad daylight from a village not too far from the administrative headquarter of Majuli and was subsequently killed—his body was never recovered.

Ghose's murder had a lasting impact on Majuli. The news of his death was picked up by national and international media instantly, and AVARD-NE quit Majuli shortly after. This incident gave Majuli such adverse publicity that the island remained a prohibited place for NGOs and activists for a long time. Thus, the chances of any alternative engagement with the island's myriad challenges, including floods and erosion, seemed to have been nipped in the bud. This marked the beginning of ULFA's loss of popularity on the

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[12] For a more in-depth understanding of ULFA, see Bhattacharya (2014), Das (1994), and Mahanta (2013), among others. Parag Das's rich body of work, both fiction and non-fiction, provide us a critical understanding of the early stage of ULFA and the Assamese society of that time. Notable among Das's work include *Sanglot Fenla,* roughly translated as *Revolution's Army* (1993), *Swadhinatar Prastab* (Proposal for Independence), 1993, and *Rastrodrohir Dinalipi* (A Seditioner's Diary), 1992.

[13] See Ghose (1998) for a collection of some of Ghose's writings on Assam.

island. Combined with this incident was the increased state repression of the outfit, which not only broke its back, but also took a toll on its popularity, as the local population was too terrified to extend support to the militant group. It was perhaps under such circumstances, I argue, that ULFA had to change its ways of functioning drastically. A force that was once dreaded by corrupt officials, politicians, and contractors now started protecting them as long as it received a share. Put simply, rampant corruption within government agencies—there are innumerable allegations of corruption against both the WRD and the Board—has a lot to do with the nature of relations between these agencies and various non-state actors. To understand how the state has addressed the flood and erosion crises in the valley and why one must pay attention to the corrupt nexus between the state and non-state actors and how the postcolonial state has been renegotiated and reconfigured through these nexuses.

Furthermore, the island geography of Majuli has also had a role in shaping the relations between the state and non-state actors. As an island, employment opportunities within Majuli are limited, more so given the constraints on people's everyday commute to the mainland for work. This has made the local population highly dependent on the state. The "islandness" (Baldacchino 2006) of Majuli has also resulted in strong social ties between different sections of the people as well as between government officials and the people, thereby affecting the functioning of the state (for more on this, see Baruah (2022)). Such mutual interdependence has made it generally very difficult for communities to dissent against the state. In a nutshell, unpacking the disastrous state in Majuli requires paying attention to both the questions of the accumulation imperative of the capitalist state as well as the everyday state and its complex relations with various non-state actors.

4. CONCLUSION

Drawing on the case study of Majuli, this article presented a political ecological analysis of disaster and vulnerability in the Brahmaputra valley. It showed how the twin processes of flooding and riverbank erosion have reshaped the Majuli landscape, causing tremendous damage to local ecologies and livelihoods. In explaining the crises in Majuli, the article paid attention to the unique biophysical characteristics of the Brahmaputra river system as well as political and economic forces, with a special focus on the role of the state.

At the heart of the Indian state's flood and erosion control measures in Assam have been the embankments and the cognate hydraulic infrastructure. Such an approach first adopted by the colonial state, was carried on by the postcolonial state with even greater fervour. Unfortunately, the outcomes

have been anything but positive. Majuli, for instance, has continued to shrink, and flood events, too, remained a recurring phenomenon, thereby increasing the vulnerability of the local population. The article shed light on the question of what may have been some of the forces driving the state to pursue measures that have clearly failed in protecting Majuli, and the Brahmaputra valley as a whole. In doing so, the article presented new ways of understanding the postcolonial state in disastrous geographies. It showed that the idea of capital accumulation alone is inadequate to make sense of the postcolonial state. Instead, the capitalist state also needs to be situated within the postcolonial specificities of bureaucratic arbitrariness; corruption; everyday functioning of government officials, which is sometimes driven by communal ties rather than the idea of a "rational" state; and, above all, the role of various non-state actors.

Ethics Statement: I hereby confirm that this study complies with requirements of ethical approvals from the institutional ethics committee for the conduct of this research.

Data Availability Statement: The data used to support this research is available in a repository and the hyperlinks and persistent identifiers (e.g. DOI or accession number) are stated in the paper.

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