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‘Staying’ as a potential climate change adaptation strategy and its impact on the rural population of the Indian Sundarbans

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Abstract

The research paper explores the process of ‘staying’ as a possible adaptation strategy to the impacts of climate change in the Indian Sundarbans. As an effect of the crises caused by climate change, much of the recent research has revolved around the perspective of migration. Nonetheless, there is a rising academic interest in examining the lived experiences of persons affected by climate change who essentially choose to stay put rather than relocate. In line with this latter orientation, this research paper centres on the perspectives and capacities of the most marginalised and vulnerable populations living in the Indian Sundarbans. The paper places their experiences in context whilst exploring the idea of ‘staying’ as a strategy for adaptation. The methodological approach utilized draws on qualitative field research conducted with the Adivasi, Scheduled Castes, and Scheduled Tribes in the climate-sensitive district of the South 24 Parganas in the Sundarbans, West Bengal. A combination of unstructured interviews with fifteen islanders and participatory techniques was used. We ask: what makes communities remain where they are despite hazardous changes in their surroundings? The conceptual tools used to explore this question are drawn from theories situated within political economy, feminist political ecology, and agrarian studies. The findings bring to light the changing attitudes of the local populace in their struggle against climate change and its occurrences. The overwhelming majority preferred ‘staying’ as a tactic for climate adaptation and temporarily adopting seasonal movement, allowing them to diversify their income and maintain ties with their native places. Since there has been limited study on ‘staying’ or environmental non-migration, this paper makes a case for a more contextually grounded methodology considering the social, political, economic, and cultural variables underpinning the Sundarbans’ inhabitants.

Keywords

Climate change, marginalisation, Sundarbans, vulnerability, staying

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List of Acronyms

CSR	Corporate Social Responsibility
FAO	Food and Agriculture Organization
IMD	India Meteorological Department
ISDR	International Strategy for Disaster Reduction
IUCN	International Union for Conservation of Nature
NGO	Non-Governmental Organization
SRLA	Sustainable Rural Livelihood Approach
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	United States Dollar

CHAPTER ONE

The Sundarbans – an Archipelago

1.1 Sundari: “A Beautiful Forest” or “The Cyclone Capital of India”

“Jomeen o naai

Poisha o naai

Kothai akhon jaabo”

(Halima Bibi, 3 July 2023)

“No land, no money, where to go?” stated the 35-year-old respondent, Halima Bibi, during the fieldwork, who lost her house and cattle when cyclone ‘Yass’ hit West Bengal.

One of the world's most vulnerable areas, the Indian Sundarbans, is plagued by climatic uncertainties that inhabitants live with daily (Sengupta, Samanta, 2022). With two divergent water flows, fresh water gushing down from the Himalayas towards the Bay of Bengal and salt water flowing upwards with the tide from the Indian Ocean into the West Bengal hinterland, combine to produce the Sundarbans, an archipelago (Jalais, 2010, p 1).

The name ‘Sundarbans’, which translates to ‘beautiful forest’ in ‘Bangla’, the predominant language of the region, may have also been inspired by the “Sundari” trees, which are particularly abundant in the area. The Sundarbans were formed around 7,000 years ago by sedimentation from the Himalayan foothills through the Ganges River network (Mahmood et al., 2021). The confluence of the Ganges, Meghna, and Brahmaputra rivers, as well as their various tributaries, created the Sundarbans, which make up the southernmost portions of West Bengal and Bangladesh (Jalais, 2010, p 1). It was referred to as the “gift of the Ganges” because of its extensive and extremely rich alluvial nature (Rainey, 1891, p 273).

The Sundarbans, the world's most extensive mangrove forest, has an approximate area of 10,000 square kilometres, of which 62% lies in Bangladesh, whereas the rest, 38%, is in India (Ghosh et al., 2015, p 150). At the land-sea confluence, mangroves safeguard coastal areas from natural disasters by conserving sediments, regenerating nutrients, and supporting clear offshore seas, promoting the photosynthetic activity of phytoplankton (microscopic marine algae). Mangroves are of tremendous economic worth since they serve as crucial habitats and sustain living organisms (ibid). Consequently, mangroves are seriously threatened globally due to anthropogenic and climatic influences, with yearly loss rates of 0.26% and 0.66%, respectively (Hamilton, Casey, 2016).

The effects of climate change are undoubtedly one of the biggest environmental problems confronting humanity today and, at present, outpacing previous predictions (Zander, Petheram, Garnett, 2013, p 592). The United Nations Framework Convention on Climate Change (2007) estimated that the yearly worldwide expenses for coping with climate change would range from 40 to 70 billion USD. Developing nations will bear the brunt of these costs, which will also be used to fund infrastructure projects, thus calling for more precautionary adaptation strategies (ibid). The coastal communities in tropical regions are among the most susceptible to the effects of climate change and are likely to be impacted by cyclone frequency and rising sea levels (ibid). As a result, the discussion around migration or relocation is an extreme adaptation that has recently been the subject of considerable debate (ibid). Given that migration "is not always a default option given social, psychological, and financial factors," it is crucial to consider "staying" as an alternative approach in the face of climate change (Pemberton et al., 2021, p. 193).

The "ideas of place attachment" have received little attention despite the rising research on staying as an adaptive strategy (Adam & Adger, 2013). Inspired by Donna Haraway's idea of 'staying with trouble', this study explores the islanders' decision to *stay*, significantly influenced by their emotional ties, feelings of community, culture, history and social capital (Pemberton et al., 2021, p 193). The underlying presumption that the deterioration of living conditions caused by climate change will naturally cause migratory behaviour is now being challenged by a growing body of research, including the present work. This paper aims to examine the primary reasons why individuals might choose to stay in this coastal location despite the level of vulnerability, drawing attention to this kind of adaptation strategy at the household level, which remains underexplored, especially among the lower castes and Adivasi population in the Indian Sundarbans, who are amongst the most marginalised in the region.

In the Indian Sundarbans, sea levels are rising faster than the global average, which was predominantly around 1.7 millimetres per year between 1870 and 2000 and 3.27 millimetres per year between 1993 and 2010 (Karmakar, 2022, p 54). This has an immediate impact on the "defensive earth embankments", which are man-made and referred to as the 'bundhs' in the islands for the protection of the cultivated lands and houses from the high tides of the saline rivers (Jalais, 2010, p 2). The threat of the salt-water rivers and their tributaries recovering the hamlets or villages in just a few minutes is constant with these structurally weak embankments.

According to Karmakar (2022), the degree of salinity is also "another proof of climate change" since it has reduced the availability of freshwater supplies, hampered the development of the mangrove forest in the area, and reduced agricultural output on the islands. Coupled with the regular storms and cyclones, these cause harm to the ecosystem and cause loss of life and property (ibid). The recent storms in the region, namely, Fani, Bulbul, Amphan, and Yaas, that hit the Indian Sundarbans between 2019 and 2021,

coincided with the COVID-19 pandemic. It increased the population's susceptibility to socioeconomic upheavals and volatile circumstances (Mondal et al., 2022).

It can be noted, however, that groups or individuals seek to embrace a "new equilibrium through developing new ways of living" to adapt to climate change rather than resist it, building on the ecological approaches to resilience (Pemberton et al., 2021, p 193). This provides an additional viewpoint on the importance of socio-cultural, political, and religious aspects on people's lives and the ongoing negotiation and re-negotiation of those influences, which in turn dictates staying strategies in response to the difficulties that climate change brings.

According to a recent study by the India Meteorological Department (IMD), Sundarbans can be regarded as the cyclone capital of India (Basu, 2012). The region's sporadic cyclonic disturbances have caused alterations to the coastline and mangrove structure (Ghosh et al., 2015, p 160). Mangrove ecosystems are known for their strong resistance to natural disasters and ability to flourish in unfavourable coastal locations. Given that the area has been a cyclonic succession that continues to occur, there is concern regarding the mangroves' capacity to regenerate. From 1881 to 2001, there was a 26% rise in the frequency of cyclones in the Sundarbans (ibid). A 110 km/h tropical storm named Aila struck the Sundarbans in 2009, striking India and Bangladesh both. Following this, 8,000 people were reported missing, and approximately a million were left homeless in both countries (ibid).

Savitri, a forty-year-old mother of three who is an Adivasi from the island, lives in a thatched mud home with her family. Her mother passed away when the Aila flood-ravaged West Bengal in 2009, and her father died when she was quite little from a snake bite. She still remembers when the flood hit, her old mud house collapsed, and she and her father discovered her mother dead beneath the tin sheets that served as the roof of that house. Although the incident happened more than ten years ago, a hospital or doctor was unavailable on call or accessible for visits. To get medical attention, they had to cross the river. Given that fishing was regarded as the foundation of the Sundarbans economy, her father suggested she marry a fisherman to guarantee her a happy and lasting existence. However, since fishing is not enough anymore to give them a sustainable income, she finds herself going deep into the forest to collect honey and catch crabs to sell in nearby local markets.



Figure 1. Honey collection by women islanders

Source: Photo taken during fieldwork (3 July, 2023)

This is indicative of the fact that in recent years, erratic climatic events such as a rise in sea level, intense, fluctuating rainfall patterns and heatwaves have added to the existing problems of the islanders, namely, earthen embankment breaching, brackish water intrusion in agricultural plots and freshwater ponds, loss of land, life, and livelihood (Ghosh et al., 2021, p 109). As a result, this has put a lot of pressure on the traditional agro-fishing economy and has forced them to change their livelihood strategies.

Thus, due to its monocropping-based agricultural and progressively declining fishing industry, recent demographic patterns demonstrate the marginalization of the Sundarbans (Ghosh et al., 2021, p 110). Owing to the poor quality of the land and soil, the possibility that paddy can be mono-cropped and can be reclaimed by the salty rivers, combined with the threat of having their homes blown away or buried by the next tidal bore or storm, makes the environment of this region relentlessly fierce (Jalais, 2010, p 80). Given that the region's saline ponds and rivers are unsuitable for cultivation or pisciculture, households are forced to alter or change their mode of subsistence through a variety of means, including the collection of prawn seed, wage labour, fishing, crab catching, honey gathering, adjustments to crop patterns, or seasonal migration (Ghosh et al., 2021, p 114). Therefore, having such a volatile environment that involves risks and uncertainties on a day-to-day basis, people residing here choose not to migrate but rather prefer re-adjusting their lives depending on the meteorological circumstances (Sengupta & Samanta, 2022).

Tarashankar Bandyopadhyay (1946) described the Bengali hinterland as “throughout the year, people have to watch out with one eye for a piece of dark cloud in the sky, and with the other on the grass and crop-clad earth for a crack-yes, anxiety is a part of life here because of the unpredictable river” (Bandyopadhyay, 1946). This expression captures the unpredictability of the river during the monsoon season and how a storm will rise one day, destroying homes and villages, and the next day would be tranquil and calm. In light of this, life is getting harder for the islanders, an observation confirmed by my fieldwork. Despite being the most obvious consequence, migration is not the only alternative. The situation is significantly more complex and requires more attention.



Figure 2. Islanders of Mousini trying to rebuild the embankment that keeps the gushing water at bay
Source: Photo taken during fieldwork (5 July, 2023)

1.2 Research Inquisition & Explorations

Research question:

How has “staying” as a potential climate adaptation strategy shaped the lives of impoverished and marginalised people residing in the South 24 Parganas of the Indian Sundarbans?

● Sub-questions:

- ☐ Why do impoverished and marginalised people continue to stay on the island despite its high climatic uncertainties?
- ☐ What role do the social, economic, and cultural factors play in influencing their ability to adapt or re-adjust their lives on the island?

Section 1.3 is devoted to the methodology used to explain the basis of using participatory qualitative field research. Further, this section includes important considerations of ethics in research with the marginalised population and their positionality with respect to the research. Thereafter, the second chapter is devoted to the historical perspective where pertinent events have been highlighted in Bengal and Sundarbans in order to situate the vulnerability of the local population. The third chapter elucidates the key findings that are in constant interaction with the secondary data. Finally, the concluding chapter draws from previous chapters to link findings that can aid future policymakers in better understanding the topic of ‘staying’.

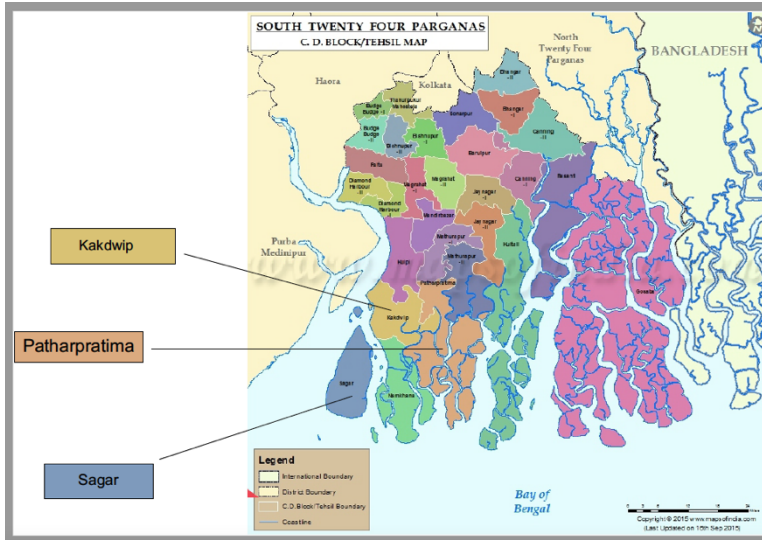
1.3 Methodology

1. South 24 Parganas: The Largest District in West Bengal

The study was conducted in the South 24 Parganas district in West Bengal, India. The focus of the study was primarily on the Patharpratima community development block and the Mousini Islands, which are among the Sundarbans' most severely impacted areas by climate change (Ghosh, Kjosavik, Bose, 2022, p 110).

The 2011 Census of India indicates that the Indian Sundarbans' overall population increased by 18% during the last ten years (Ghosh et al., 2018). Following this, there has been a population increase of 15.11 percent in the Sundarbans' Patharpratima region. The overall population (all rural) was 3,31,823 in 2011; in 2001, it was 2,88,259. Of this total, one-fourth, or 76,163, belonged to the region's scheduled castes; the remaining 2,640 belonged to scheduled tribes (Census India, 2011).

In a similar vein, the Namkhana CD Block to which Mousini Island is a part had a population of 1,60,630 in 2001 and 1,82,830 in the year 2011 (ibid). Despite the increase in natural disasters, the population has grown in both locations, highlighting the need to consider "staying" as a strategy for coping with climate change in the Indian Sundarbans.



Map 1. Map of the South 24 Parganas District

Source: Office of the District Magistrate & Collector, South 24 Parganas (30 June, 2023)

Using qualitative methods, the study on the Indian Sundarbans attempts to unravel the complex social dynamics between out-migrants or seasonal migrants from the archipelago, the ones who chose to stay back and how the topography and climate change affect these life decisions. A dense population of about five million people (2011), spread across 54 islands and 19 administrative divisions, live in the Sundarbans (Ghosh et al., 2018). Given their fight with geo-climatic phenomena, such as poverty, marginalisation, diversification of livelihoods, rising temperatures, rising sea levels, storm disruptions, and deforestation, these communities regularly confront and tackle significant obstacles (Ghimire & Vikas, 2012). Farming, fishing, and gathering different kinds of forest products for personal and commercial use are the Sundarbans islanders' main livelihoods (Ghosh et al., 2018). Access to the area is severely hampered by the concentration of rivers, estuaries, tributaries, and streams, as well as the inadequate road system. The condition is harsher in the outlying islands, where residents must use boats and various native modes of transportation, including 'tuk-tuks' (autorickshaws) in the swampy interior channels of the Sundarbans. Especially when the monsoons hit the Sundarbans, it becomes exceedingly difficult to traverse between islands, especially since the locals rely on moving from one place to another by boat, and the high tides make it even more challenging and daunting. As a result, a sizable portion of the population living in the Southern part of the Sundarbans, are unable to receive power supply (ibid). The region's topography has hazardous impacts not only on the human population but also on the flora and fauna.

In addition, the Government of West Bengal claimed that the agricultural area in the Sundarbans decreased from 2,149.615 square kilometres to 1,691.246 square kilometres between 2002 and 2009 (Ghimire & Vikas, 2012). The islanders' seasonal monoculture of rice and their seldom cultivation of horticulture crops led to this shrinking agricultural land (ibid). Moreover, most of the fields in the region are rainfed, while only 12% of the

farmland is irrigated using water tanks, river networks and ponds (ibid). Consequently, agricultural production cannot meet the demand as the population grows (ibid). Growing rain-fed paddy has historically been the most important economic activity of the region. The locally made embankments facilitated the process of keeping the brackish tidal water at a distance, enabling salt-resistant rice varieties to flourish in the area. However, Scientists' research indicates that only two distinct varieties of paddy have been found, with all the others being destroyed under the umbrella of India's green revolution (ibid).

2. Purposive Sampling and Aggregation

Findings in this paper are drawn from the primary fieldwork conducted over a period of over two weeks from 30 June to 15 July, 2023 in the Sundarbans, West Bengal, India. 'The South Sundarban Jankalyan Sangha', a local grass-roots non-governmental organisation (NGO), assisted me in selecting the aforementioned regions for the interviews using snowball sampling as the initial step of this process. Two main factors led to the use of this approach. Firstly, since I speak Hindi, and Bengali is the local language, there was a significant language barrier to overcome. The NGO assisted me with translations while doing interviews, which helped me narrow the communication divide. Secondly, because the study aimed to interview members of marginalised communities, they were reluctant of me because I was an outsider. The NGO helped me break down those barriers because they have a history of working with the local community members and shared a friendly rapport with them. For years, this NGO has aided in putting hand pumps near their houses through collaboration with big multinationals who use their corporate social responsibility (CSR) budgets to help these communities with the issue of potable water. Along with constraints on time and given the NGO's access to all these communities, they helped me identify the two regions relatively easily.

A purposive sampling approach was used to collect relevant primary data. This was largely based on my observations, my interactions with local residents, and their reactions. I conducted a total of fifteen interviews with the members of the scheduled castes and scheduled tribes, eight of which were with women, while the remaining seven were with men. The interviews took place at home in the afternoon hours when they were done with their household chores and were relatively freer. As the men of the house were either employed as contract labourers or construction workers in the adjacent cities of Kolkata, Hoogly, or Bakkali, I could not maintain the gender ratio simply because I only found women at home. The number of men I could converse with was thus limited as a result. In addition, the study uses a case study approach, which involves conducting extensive, unstructured interviews.

3. Yin's Case Study Approach

According to Yin (2014), a case study is defined as “an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-world context” (Yin, 2014, p 16). It answers the "how" and "why" concerns and enables one to keep a comprehensive and pragmatic viewpoint (ibid). Thus, given the nature of the research question, lack of control over occurrences, and the focus of the study on ‘staying’ as an adaptation strategy in the face of climate change for the Sundarbans islanders, the case study research method was an appropriate choice for an in-depth exploration of the process, context and situation.

Recognizing that climate change is a complicated and multifaceted phenomenon that varies by context, case studies can be utilized as a research approach to advance understanding of people, communities, social and political processes (Yin, 2014, p 4). When researching the Sundarbans' unpredictable climate, it was useful in determining its implications, vulnerabilities, and effects. Due to the possibility of overlap between case studies and history, the former has the capacity to deal with evidence, such as observation, interviews, and documents, that contribute to the data's increased validity and legitimacy (Yin, 2014, p 12).

Additionally, case studies can be very beneficial in informing policy agendas of the efficacy or inefficacy of climate change adaptation techniques, assisting them in making better decisions regarding upcoming guidelines and interventions. This study can, therefore, provide valuable information regarding how coastal regions on a global scale may be impacted in the backdrop of potential climate change adaptation strategies.

4. Social Stratification: An Ethical Dilemma

While acknowledging how important ‘jati’(caste) and religion are in the Indian subcontinent, the book by Jalais (2010) provides insight into their function in creating social and economic hierarchies and how they are frequently seen as the indicators of social divisions (Jalais, 2010, p 45). One-fourth of the Patharpratima block inhabitants belong to the scheduled castes category and are part of one of the lowest castes of Bengal – Bagdhi, Namasudra or Pod. The Adivasi community, who were transported to the Sundarbans as contracted labourers for clearing forests and building embankments, have traditionally been closely associated with them (ibid).

Due only to their purported trait of conforming to the idea of a physically hard-working indigenous person, they were incorporated into the colonial labour market. In addition, their socio-economic circumstances are entirely dissimilar from others (ibid). Hence, owing to their innate affinity for nature and historical involvement in land reclamation, their position has persisted over time as they are exclusively responsible for the preservation and upkeep of the embankments (Jalais, 2010, p 46). This makes them the most socially and economically

vulnerable group and further widens the gap between the “educated” islanders and forest workers or prawn seed collectors (Jalais, 2010, p 49).

Against the backdrop of everyday caste-based relations and power dynamics characterized by stratification in a society where the voices of the scheduled castes and Adivasi community are often silenced or ignored, the main ethical dilemma I had to deal with was how to quickly establish equal terms of participation and discourse during my fieldwork in the Sundarbans. I was unable to avoid being perceived by the islanders as an urban, educated woman.

When I was first introduced to the islanders as a research student, I feared that my affiliation with the NGO would influence the local populace's reactions. I initially sensed fear and reluctance on their part, so I knew I had to acquire their trust and confidence before starting the interview process. During my initial stay in the village, I helped the residents with their daily tasks, including chopping wood, fetching water from the adjacent tube well and teaching young children basic mathematics. As days went by, they would invite me to join them for meals; eating with them made me feel love and warmth unlike I had ever experienced before. As time passed, the gap between us that had previously appeared overwhelmingly significant narrowed, allowing me to speak with them freely and informally inquire about them and their life in the Sundarbans. Surprisingly, with time, I came across as more approachable and began to pick up on the dialect, having grown up hearing it at home from my grandmother, who was of Bengali heritage and had lived most of her life in Kolkata. It progressed to the point where I could understand them more easily and did not require as much assistance with translation from the village chief representative.



Figure 3. Purnima Devi plucked me some fresh cucumbers from her backyard

Source: Photo taken during fieldwork (6 July, 2023)

In reference to the ethics portion of the study, I sought consent before going over the questions I had listed in my diary. I informed them about the purpose of my research and emphasised that I did not represent the NGO in any form and was just a student, curious to know about the way of life on the island. However, they were sceptical about being voice-recorded but showed enthusiasm when I asked if they would like to be photographed.

5. High Tides: A Boat Over Troubled Waters

Having outlined the context in which the research was conducted, it is important to highlight the limitations that followed. Jalais has been a repeated source in the literature review as she accurately maps the socio-cultural contexts of the Sundarbans and helps build an in-depth understanding of the perceptions of the islanders, geographical divisions, the ongoing politics and environmental changes that surround the Sundarbans. Additionally, there was a lack of literature when it came to looking at ‘staying’ as a climate adaptation strategy in the context of West Bengal. Therefore, the idea of ‘staying’ needs to be explored further. I gathered the bulk of the information during the monsoon season, which made it challenging to access several locations due to road closures and high tides. Moving from one island to another required a wooden boat. It still seems vivid in my memory, the day I inevitably found myself stuck on a boat with a boatman and two other fishermen when the skies grew ominously dark, the turbulent winds howled, and the strong currents brought on by the high tide started crashing around us making the boat tremendously difficult to steer towards the shore.

I was immediately instructed to move to the middle of the boat, sit on my knees, and support myself with a steel beam in the centre of the boat originating from the hatch of the engine bay below. I was additionally forewarned to be ready to swim in the likelihood that the boat capsized due to the gush of the waves or the wind speeds. I remember being frightened, shivering, and covered in river water, imagining how impossible it seemed at that moment we would safely make it to the other end. Our phones had no coverage, and no boats could rescue us in such weather. I had never encountered the brute force of nature like this before. After 40 minutes of laborious effort by the boatman and the two fishermen, we eventually reached the shore. In their eyes was a glint of providence, as if the strength they mustered was godsent to aid them in getting to the shore safely against the furious tides.

Having experienced it myself, I realized how harrowing it would be to live with so much angst and uncertainty every day.



Figure 4. Ganga Palli and Jamuna Palli, West Bengal. My journey over troubled waters

Source: Photo taken during fieldwork (1 July 2023)

As mentioned above, language was also one of the most significant limitations. Using an interpreter during the interviewing process introduced another layer of complexity, which could have impacted rapport building between me and the interviewees, giving rise to potential bias. There was an ingrained fear of not understanding the cultural and social nuances of the interviewee's experiences and being able to gather data that was not misinterpreted, incorrect, or irrelevant to their reality.

Lastly, the islander's expectations from the study were different from my observations leading up to the interview. They believed my research and interviews would help them advocate for more hand pumps in the area so they could avoid standing in long lines for hours. This expectation was not something I could meet, is what I emphasized; however, I felt a sense of urgency to reclarify this when the question was raised multiple times. I was concerned that this would elicit socially acceptable responses that would cloud their perception of me as a student researcher and would not accurately reflect how they innately felt about living on the island.

CHAPTER TWO

The Sundarbans lost in time

2.1. Land of the Mogs

Edward Said (1978) introduced a critical concept – ‘Orientalism’ – which, according to him, is “not an airy European fantasy about the Orient, but a created body of theory and practice” (Said, 1978, p 6). Since Said's work, historians, economists, and anthropologists have increasingly disproved the long-held notion that Asia was fundamentally distinct from Europe. In fact, industries and markets were flourishing in pre-colonial India, and especially in Mughal Bengal. In the 18th century, Bengal was one of the world’s most prosperous maritime regions with extensive local, regional, and long-distance trade, a sizable manufacturing capacity, high standards of living, and the ability to sell its products in far-off markets (Parthasarathi, 2011, p 15). Due to its clearly defined agrarian property rights and decades of investment resulting from extremely successful agricultural orders, Bengal was so prosperous that it not only provided food for its own non-agricultural people but also exported grain to other parts of India and across the Indian Ocean (Parthasarathi, 2011, p 3). All of this did of course change with British colonization.

What is of special interest to this study is the way the environment changed from pre-colonial India onward. Karl Marx emphasized long ago that the natural world constantly exhibits "humanized nature" and serves as a tangible illustration of how history and labour have moulded it (Mosse, 2003, p. 3). From this perspective, the historical context becomes of utmost relevance to anyone interested in grasping how the Indian Sundarbans altered over time and space. Over the past centuries, the Sundarbans' landscape has undergone significant alterations. The Sundarbans were a "frontier zone" from 1200 to 1750, particularly an economic one (Mahmood et al., 2021). Under the tutelage of pioneers claiming an Islamic Sufi identity, forest tracts were continuously converted to wet-rice farming throughout the Bengal Sultanate's rule from 1204 to 1575 (Nishat, 2019, p 27). They cut down the thick forests and dug up tanks for the freshwater supply to build human settlements, transportation infrastructure, and places of worship (ibid). The practice was carried out by the Sufi settlers in the delta's northern and eastern regions, where they also brought agriculture into practice. As a result, this area served as Bengal's “agrarian frontier” (Jalais, 2010, p 3).

Following that, the forest was routinely cultivated from 1575 to 1765 throughout the Mughal Empire. This, therefore, influenced the brief dispersion of human settlements in the Sundarbans region between 1200 and 1750 (Mahmood et al., 2021). Jalais (2010) contended that the Portuguese and Arakans, who initially worked as traders in the region's

riverbank markets, quickly gained a reputation for their violent piracy. In response, many locals left, and the area experienced a severe population decline and faded into oblivion (Jalais, 2010; Mahmood et al., 2021). In reference to the region's rampant disorder and brutality during this time period, from the 16th to the 18th centuries, the Sundarbans were known as "Moger Muluk," the homeland of pirates (ibid).

2.2. British Raj: The Imperial Rule

In 1757, the British East India Company's victory against the Nawab of Bengal and his French allies at the Battle of Plassey was decisive in enabling British control over the subcontinent (Nishat, 2019, p 28). During their colonial rule, the British continued to clear forests by leasing out pieces of land, following which the East India Company acquired the 24 Parganas' territory (Mahmood et al., 2021). They set their main headquarters in Kolkata, the capital of Bengal, which is located on the edge of the Sundarbans. The British then advanced a policy of deforestation and expanded agriculture in the Sundarbans, allocating land to aristocrats for reclamation of land for cultivation and timber supply between 1770 and 1773 (Nishat, 2019, p 28). Furthermore, the 'zamindars' or the lease-holding landowners encouraged poor farming communities to settle in the area, which led to a significant influx of these population groups (Nishat, 2019, p 28). These new inhabitants came from the neighbouring states, namely, Orissa, Jharkhand and Myanmar, and other parts of Bengal such as Midnapur, Jessore, Bankura, and Birbhum (Jalais, 2010, p 3). The most important group, however, came from the 24 Parganas (ibid), where my fieldwork was conducted. This is rather indicative of the fact that the population in the Sundarbans has been migratory in nature. It comprised of the marginalised and tribal populations who were brought by the British to construct embankments and came in search for work and land (Ghosh et al., 2015, p 156). Overall, little has been written about the demography of the area prior to the first census of 1872 (ibid).

Henry Beverley, who then served as Bengal's Inspector General of Registration, conducted Bengal's first-ever census (Beverley, 1874, p. 69). The outcome was concerning since it revealed 25 million subjects of the Royal Highnesses, whose existence the government was absolutely ignorant of. The population of Bengal was 3,67,69,735 at the time of this initial statistical study, with 389 individuals on average living within each square mile (ibid). Consequently, the lieutenant governor discovered he was in charge of a population "more than equal to that of the whole of England and Wales" (Beverley, 1874, p. 69).

Furthermore, the Sundarbans' abundant and durable timber resources attracted much interest and fascination and were severely extracted, which increased illegal sawing in the region (Mahmood et al., 2021). The British adopted the first official forest policy in 1894 as a result of this (ibid). This policy reiterated the need to expand agricultural production and emphasised that forest resources were now under state control, and the primary objective

was revenue generation. As a result, the British created numerous management plans between 1876 and 1951, some of which were successful and some of which failed to modify the strategy for the conservation of forests (ibid). In the early 19th century, since the British acquired proprietary rights to the forest, extensive settlement began, with the main activities of the settlers being woodcutting, fishing, and collecting honey (Nishat, 2019, p 28). The Sundarbans saw a surge in revenue at this time but at the expense of an invasion of the forest, which was home to several species of wildlife and was covered with dense trees. (ibid).

2.3. Post-colonial Marginalisation

The Partition of Bengal was probably the most significant event of post-colonial India. As an outcome of this partition, the British Indian Bengal Province was divided between the Dominion of India and the Dominion of Pakistan. Here, the Hindu majority Bengalis of West Bengal became a state of India. In contrast, the Muslim majority of East Bengal became a province of Pakistan, which in the present day is referred to as Bangladesh. Bengali cultural and linguistic identities eventually got divided along sectarian and religious lines as political mobilization gained traction (Jalais, 2010, p 164). Due to the partition's caste-based division of Hindus and Muslims, Ross Mallick (1999) claimed that the lowest in the hierarchy were the "Dalits," also referred to as untouchables in Indian society, who found themselves marginalised in both nations.

Following the partition of Bengal in 1905, a sizable portion of the Bangladeshi people moved to Kolkata, which increased the population of the Indian Sundarbans. Urban settlement growth began in the 1990s but has only accelerated (Sarkar & Samanta, 2022). In addition, between 1951 and 2011, following India's independence from Britain, the population of the Indian Sundarbans increased from 1.15 million to 4.44 million (Ghosh et al., 2015, p 156). As a result, the demand for resources increased, placing constant strain on the forest and its products. Due to the forest being turned into agricultural land and towns to accommodate the growing population, the area covered with mangroves was reduced by nearly half (ibid).

Migration persisted until Bangladesh was freed in 1971, and it even intensified during times of communal upheaval brought on by the Calcutta riots of 1964 and the Indo-Pakistani War of 1965. It is estimated that 6,00,000 refugees fled East Pakistan for India at this point (Mallick, 1999, p 106). Up to 1970, more than five million people had fled their homes, predominantly to West Bengal. Either the Sundarbans region or unoccupied land dispersed throughout West Bengal served as the locations for the resettlement of these refugees (ibid). With this large influx of migrants, the government authorities began forcibly deporting them, anticipating that this would delay the state's economic recovery. Many of them escaped during this time and found refuge in West Bengal, including the Sundarbans, where they could make a living as forest fishermen (Jalais, 2010, p 165). To establish themselves, 30,000 refugees, most of whom belonged to the scheduled castes, journeyed to

Marichjhapi island from 1978 onwards to establish a settlement there (ibid). For them, it was an effort to establish a legitimate identity and a quest to regain their stance in the West Bengals political arena, as they had historically been the poorest and most marginalised.

The 'Marichjhapi Massacre', one of the most heinous crimes against humanity in India's history of refugee rehabilitation, took place in 1979 (Chowdhury, 2011). Marichjhapi is one of the several Sundarbans islands where many people had settled due to the Bangladesh Liberation War in 1917 and the military coup in 1975, which saw a wave of refugees enter West Bengal (Chowdhury, 2011). To boost state revenue, the mangroves on the island were removed in 1975 and replaced with a government-sponsored coconut and tamarind plantation. The government, on the other hand, was of the opinion that the refugees were "in unauthorised occupation of Marichjhapi, which is a part of the Sundarbans government Reserve Forest violating thereby the Forest Acts" (ibid). According to officials, these refugees intended to permanently settle there, disrupting the potential forest richness and disrupting the ecological equilibrium of the region (Jalais, 2010, p 167).

The conflict occurred between two groups of people, one supported by government authority, while the other left without anything but their hands and a spirit of camaraderie (Jalais, 2010, p 169). The latter primarily comprised of agriculturalists who belonged to one of the untouchable castes, referred to as 'Namasudras', due to which the Congress government of West Bengal was unwilling to accommodate them within the state machinery (ibid). These people were at the state's mercy, yet the state's apparatus cracked down hard on the refugees (Chowdhury, 2011). To economically isolate the refugees and deny them access to necessities like food and water, the state enacted the Forest Preservation Act concurrently with an economic blockade (ibid). Many refugees' lives were lost due to the violent expulsion carried out with force. Although there is no precise count of those who died, the state consistently denied all such incidents, while people were killed and their remains disposed of into the river. The government charged these people with unauthorised occupation and creating an ecological imbalance. "Humanity died on that island in 1979", wrote an Indian journalist to express the brutality of the incident in his book – 'Blood Island' (Deep Halder, 2019). The memory of this enormous catastrophe quickly vanished from many people's minds. With this episode came a feeling of betrayal, and the islanders expressed their perception of the urban as central and the rural as peripheral (Jalais, 2010, p 168).

2.4. An Array of Future Uncertainties

In the colonial era, the Sundarbans were a nearly uninhabited wasteland; however, in 1989, to preserve biodiversity, it was included in the UNESO's list of World Heritage Sites and has drawn international investment over the last few decades (Jalais, 2010, p 181). The Indian

Sundarbans were solely managed by the government until the 1990s, with little participation from the local populace, which sparked several protests from the community. The government's land distribution programmes opened the way for low per capita land holdings, and the fragmentation of farmland contributed to the marginalization of a sizable portion of the population (Ghosh et al., 2015, p 157). Since agriculture has been the dominant occupation in the region, 85% of the population has relied on it (Mondal, 2019). The Sundarbans mangrove forest is gravely endangered due to processes including urbanization, globalization, and privatization, jeopardising the biosphere reserve and causing the area to be reclaimed for aquaculture, agriculture, urban expansion, and economic development (ibid).

Despite its high susceptibility, urbanization is occurring more rapidly in the Sundarbans, a phenomenon which has not received enough attention from global academic or policy agendas (Sarkar & Samanta, 2022, p 2755). Urbanization is a process that affects a wider range of aspects of society in addition to the movement of people from rural to urban areas (ibid). In India, 400 persons per square kilometre is one of the three requirements for a region to be deemed urban (ibid). Therefore, the Sundarbans can be classified as urban due to its population density of 968 people per square kilometre (Sarkar & Samanta, 2022, p 2763). Unexpectedly strong urban population increase has been observed over the past ten years (ibid). The urban population increased at a pace of 384.43% between 2001 and 2011, which is 12 times greater than the national growth rate of 31.80% (ibid). To explain this growth, several variables, including population density, road infrastructure, decadal population growth, and the pace of non-farming activities, are essential. In addition, the North has a faster population growth rate than the South, which has a potentially higher vulnerability rate. Therefore, this pushes people living in the South to the Northern part of the region (Sarkar & Samanta, 2022, p 2767). According to research on land use and land cover, even the built-up area of the Indian Sundarbans has increased rapidly over the past ten years; “the “spill-over effects of Kolkata urban agglomeration and the local economic development are working hand in hand” contribute to the Sundarbans urban process (Sarkar & Samanta, 2022, p 2771).

Therefore, The Bengal Delta has become an overwhelming location for creating and regulating an array of future anxieties due to current trends towards urban growth and development (Cons, 2020). Against the backdrop of climate change, the Sundarbans as a region provide insight and a chance to prepare for impending catastrophic disasters like embankment collapse, rising sea levels, brackish water invasion, and cyclonic storms against the backdrop of climate change (ibid). As a climate anxiety hotspot, the Sundarbans suffer from a wide range of effects of global warming and major ramifications for economic growth, ecological stability, and human displacement (ibid). Therefore, the desire of people to ‘stay’ in the Sundarbans in the face of climate change is a topic that has not received much attention but is crucial to understanding why people do so and whether it represents a type of defiance or resistance for them. A migration-centred perspective has been widely

discussed in scholarly literature as a crucial solution to climate-related catastrophes. Evidence, however, points to the possibility that people may consciously choose to "stay" as a climate change adaptation strategy (Pemberton et al., 2021). To better grasp this proposed idea of staying as an adaptation strategy, it will be explained in the following, highlighting the key theoretical concepts.

2.5. THEORETICAL CONSTRUCTS

2.5.1 Haraway's 'staying with the trouble'

The possibility to "stay with the trouble" stems from the body of thought accumulated by American feminist philosopher Donna J. Haraway, who offers inspiring reflections- at a broader level- on how we ought to reconsider our relationship with the planet and its inhabitants in these unsettling times of rapidly increasing ecological changes. In her words, the challenge is to "become capable, with each other in all of our bumptious kinds of response". Such appropriate and concerted responses are especially difficult to find in a highly differentiated world and in a time characterized as unsettling, confusing and challenging (Haraway, 2016, p. 1). Through her writing, she reminds us that in the face of devastating occurrences, it is critical to raise issues, have robust responses, resolve tense situations, and conclusively restore the tranquility and harmony of places (ibid). She emphasizes that 'staying with trouble' does not require thinking about the future or future generations; instead, one needs to be genuinely present (ibid). She suggests staying with the problem even though our first instinct might be to run (Shotwell, 2017). Haraway (2016) proposes the concept of 'making kin' as a way of fostering interconnectedness through co-existence and encourages a more inclusive, collaborative, ethically informed approach to mitigating climate change and other environmental and social crises. Given this, I found it noteworthy to examine how the Indian Sundarbans' inhabitants have structured their lives over the years by learning to "stay with the trouble" in the region, literally employing it as a climate change adaptation strategy.

2.5.2 Vulnerability and resilience

The International Strategy for Disaster Reduction (ISDR) of the United Nations defines "vulnerability" as "the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of hazards" (Biswas & Nautiyal, 2020, p 11121). The likelihood of damage or the potential for loss essentially constitutes vulnerability (Cutter, 1996). Given how ominously serious climate change is, the global conversation for policymakers around it has shifted progressively towards understanding and assessing vulnerability (Das & Ghosh, 2022, p 1). Given the conceptual overlap between vulnerability and resilience, resilience is the capacity of a socio-ecological system to recover from any

shock, threat, or instability. It involves a community's capacity to adapt, change, and acclimate to hazards from within and beyond the community (Lanlan et al., 2023). Adaptation is about helping people cope with climate change, and it emphasizes how people and the climate interact, not how people are susceptible to the harmful impacts of climate change (Donnel & Wodon, 2015).

In developed and developing nations, the severity of climate-related disasters varies greatly, which can be ascribed to the different societal structures and government capacities (Biswas & Nautiyal, 2020, p 11121). Studies on the Indian Sundarbans in the present-day exhibit “a lopsided dichotomy: fascination, on the one hand, for the natural aspects of the Sundarbans, but on the other, an unsettling silence on the social and human facet of the region” (Jalais, 2010). Since the dawn of time, people in the Sundarbans have moved, deciding to remain in their native habitat and adjusting to the alterations in the climate in the delta brought on by environmental and political factors (Pemberton et al., 2021). To facilitate adaptation in the future, the ‘vulnerability approach’ to climate change adaptation focuses on minimising vulnerabilities today by focusing on employment, poverty, and access to resources (Donnel & Wodon, 2015). It considers how livelihoods change in response to climatic conditions and acknowledges the role of institutions in such precarious situations (ibid).

Hence, it is crucial to look at ideas of resilience to understand why people continue to stay in climate-impacted areas as a form of resistance to the effects of it (Pemberton et al., 2021). Therefore, recently developed evolutionary or adaptive strategies have drawn attention to the necessity to see resilience as "an ongoing process of adaptation and re-adaptation" (Adger et al., 2009). This illustrates how society's and people's ideals and lifestyles change with space and time (ibid). For instance, utilising regional resources and including mitigation efforts like constructing new flood walls or embankments. Moreover, the idea of "linked lives" concerning kinship or interpersonal connections affects power dynamics and unequal resource distribution among community members, which affects the choice of staying as an adaptation strategy in the context of climate change (ibid). Even financial or social remittances can influence immobility choices, aid communities in recuperating from catastrophic events, and boost long-term household adaptive ability (Adger et al., 2002).



Figure 5. Idea of strong inter-personal relations and sense of community. Fetching water is form of socialization for the women living in the region.

Source: Photo taken during fieldwork (2 July, 2023)

Vulnerability is related to poverty, gender, and other factors (Donnel & Wodon, 2015). Research suggests that the marginalised and impoverished are more vulnerable to disasters and suffer the most from its consequences (Sahana et al., 2019). During the time when flood ‘Yass’ hit the Sundarbans in 2021, marginal farmers found themselves in a vulnerable position due to low agricultural produce. However, they were nimble in adapting their livelihoods to the climate occurrences and opted for the contractual construction of embankments sponsored by the government. Even though vulnerable in nature, they acted with resilience. In addition, women may be more vulnerable to environmental threats and the dangers of climate change, particularly in the Global South (Alston, 2015). Women may not always have a voice due to the gender constructs in this society, where men are positioned as the household's decision-makers and the breadwinners. These gender constructs also influence and shape migration decisions. However, women may consciously decide to stay by acquiring new information, abilities, and resources (Pemberton et al., 2021).

2.5.3 Climate Change Nexus

Considering climate change, migration and mobility are increasingly seen as adaptation strategies (Pemberton et al., 2021). Migration was formerly considered detrimental because of securitization problems, which included estimating the number of migrants and

considering national government policies to restrict their movement. However, in more recent times, they are now more widely regarded as a successful technique for coping with environmental challenges and climate change as they have the potential to reduce the excess strain on resources and limit demographic pressure in areas vulnerable to climatic occurrences (ibid).

As suggested by Scoones, the livelihood perspective brings to light “how different people in different places live” (Scoones, 2009, p. 172) and emphasizes the resources they need in order to make a living for themselves (ibid). Numerous climatic changes as well as anthropological factors, such as the ethnic diversity of the area, the communities' traditional belief systems and norms, their social organization, conflicts over land and resources, and their vulnerability to natural disasters, have continued to shape this coastal region. For centuries, the islanders have been increasingly flexible in their choices for sources of household income, being geographically mobile for work, and frequently selecting seasonal migration (primarily men) to sustain themselves in the Sundarbans. According to Scoones, the sustainable rural livelihood approach (SRLA) is a “people-centred” approach and attempts to understand the realities of the poor (Scoones, 2009, p. 180). The approach strongly emphasizes the optimist dogma of "what households already have" rather than what they lack.

Research suggests that migration and adaptation are interlinked. However, what constitutes "successful adaptation to the effects of climate change” remains controversial (Pemberton et al., 2021). Although a report (Foresight, 2011) predicts that migration would rise as a result of climate change, it might be challenging to categorize “pure environmental migrants” because of the multifaceted nature of both pull and push variables that are involved in making this decision (Donnel & Wodon, 2015). The report states that those who cannot afford to migrate, particularly vulnerable groups, may find it challenging to do so because of the resources lost and the additional costs involved in migrating, thereby feeling “trapped” (ibid). The focus of migration studies has typically been on looking at movement, with little emphasis on the subjective experiences of individuals and their behavioural attributes towards staying as a choice (Pemberton et al., 2021). Therefore, it is necessary to investigate the agency that drives migration to understand one's intrinsic wants, desires, and capacities to move (Foresight, 2011).

CHAPTER THREE

Findings & Analysis

3.1 Rural Livelihood Framework

In agreement with the SRLA approach briefly outlined above, one could say that in the Sundarbans, wage labourers, landless farmers, and households with small businesses constantly lose different forms of capital for subsistence, including natural, physical, human, financial, and social capital owing to the vulnerable nature of the delta (Ghosh et al., 2022, p 116). They struggle to meet even the most basic necessities, such as having access to clean water, fertile ground for farming, and wind-prone shelter, which makes it increasingly difficult for them to survive on the island.

According to research, the Green Revolution in Asia has increased faith in agriculture as a viable profession and a growth engine to combat poverty, particularly in rural areas (Hajra, Ghosh, 2018). However, it came at a huge social and ecological cost, leading to widespread debt and water overuse. Similarly, severe coastline erosion and storm surges in the islands have resulted in saltwater inundation and resource overuse. Hence, agricultural productivity has been poor due to weak embankments, beach erosion, ongoing flooding, and submergence of homes and crops.

The primary crop grown in the area is paddy, which grows in numerous salt-resistant varieties there (Hajra, Ghosh, 2018). According to the government of West Bengal, paddy production from 2000 to 2012 has shown a significant decrease (ibid). The number of mono-crop practices on the islands has decreased due to the deterioration of the soil quality, unstable water infrastructure, and reliance on monsoon rain. Farmers are forced to hunt for alternative sources of income because of the unstable crop market, low pricing for their produce when sold to intermediaries, and storage problems. As a result, farmers are forced to sell their land, and instead choose professions that provide more stable and long-term income. Moreover, most respondents reported a loss of agricultural produce, leading to a cycle of non-ending debts and capital loss. From growing crops like vegetables and rice, there has been a shift to growing cash crops like betel leaves, endangering the region's food security.



Figure 6. Paddy cultivation by Pratima Das and her family
Source: Photo captured during fieldwork (8 July 2023)

In an interview with Pratima Das, who has been growing paddy for decades and was taught by her parents how to work on the land shared, “I can barely plant enough rice to feed the three of us as my husband only owns a little plot of land. My son wants to work as a construction worker in the city since he sees little room for advancement in this area”. This highlights how most of the youth are unwilling to take up farming as a means of living, and the parents also believe that diversifying their livelihoods is the only way of sustaining themselves on the island.

The term "Blue Revolution" refers to the rapid expansion of the prawn aquaculture business, drawing comparisons to the Green Revolution (Jalais, 2010, p 124). In the Sundarbans, this business began to multiply in the latter part of the 1970s, and it marked an important transition from the conventional fishing industry that Hindus carried out to prawn aquaculture. Prawns were called the "living dollars of the Sundarbans" because they provided islanders with a convenient and fast way to generate income (Jalais, 2010, p 126). Moreover, it was a very gender-neutral business, independent of one's network and dictated by the larger market economy, and it gained popularity over time in the Sundarbans. The wage labourers and sharecroppers were now more inclined to take on loans rather than work on zamindar fields for meagre pay. Furthermore, turning one's flooded paddy fields into prawn fishery was the most straightforward course of action if there was an embankment breach and the land was inundated with water.

Additionally, the appetite for prawns in Europe and China has altered many people's way of life in the area (ibid). Tanush Giri, a fish and prawn exporter in the Patharpratima area, rented a block of land to accommodate his exporting requirements. Over 110 days, he

grows baby prawns, feeds them, keeps the water's pH levels between 7.90 and 8.20 because of how brackish it is, and makes a livelihood off it. Having worked in the industry for more than 20 years, he is accustomed to the saltiness and regulates his pond's water appropriately to ensure the survival of the fish and prawns. Over two lakh fish in his pond died from the red virus, a week before I went to see him in July due to the excessive monsoonal rain. He stated, "I could not control the pH levels of the pond water beyond a point, and it led to the fishes' catching diseases. I gave up that pond since too many fish died, making the water further of no use to me" (Tanush Giri, 8 July 2023).

Consequently, due to his lack of exportable produce, he could not repay the merchant on credit for the fish and prawn fodder he had purchased. He clarified that any future loans that may have supported him were rejected due to this debt. The most pressing issues were funding his two children's schooling, providing money to his ageing parents, and handling daily utility payments. He was forced to look for opportunities to work as a wage labourer in the urban states of Hoogli and Kolkata. Similar situations continue to compel the islanders to look for other livelihood options.

In addition to Jalais's (2010) findings, my findings confirm that the southern islands' agricultural land serves as the line of distinction between the wealthy and the deprived and is the focal point of hostile and hierarchical interactions (Jalais, 2010, p 35). There is a distinct division between the landowners, who own the land and derive their livelihood from it, and those who part-take in the labour of the forest or along the rivers and are relegated to less desirable locations such as living close to embankments or mangroves (ibid). In contrast to land, the forest is seen as "favouring the deprived" since it levels and equalizes people regardless of social indices like caste and status. Thus, while the forest provides easy access to all, land restricts easy passage (Jalais, 2010, p 37).

In addition, caste, or "jati" in Bengali, is a comprehensive term that encompasses identities including gender, religion, and regional affinity (Jalais, 2010, p 49). These divergent interpretations of collective identities highlight the conflicts between the islanders who identify as educated and those who identify as forest labourers (ibid). Thus, it is suggestive that people perceive inequalities based on socioeconomic status between one another. Hence, the forest labourers strive to do well to guarantee their children receive a good education. Majority of the respondents stated that during the past ten years, there had been a rise in the number of schools in the area as more and more parents are willing to send their kids to school for them to become teachers or other professionals here or on other nearby islands.



Figure 7. A government school in the Patharpratima Block that was built recently owing to the increasing willingness of parents to send their children to school.

Source: Photo captured during fieldwork (10 July, 2023)

In addition, we are not all equally affected by climate change. ‘Midnapuri’s are at the top of the caste structure in West Bengal, while Adivasis are at the bottom (Jalais, 2010, p 50). While the former has access to better infrastructure, information, political connections, healthcare, and broad social networks, the latter does not benefit similarly and is frequently marginalised when it comes to protection against climate change. The Adivasis reside near a river, which is particularly hazardous because of the high tides, flooding fields, drowning buildings, and occasionally by overgrown mangrove trees. Since they lead a nomadic lifestyle, they have temporary huts and are prepared to migrate as soon as they feel threatened by environmental alterations (Jalais, 2010, p 61).

Interestingly, most of the people I spoke with in the Patharpratima block belonged to the same caste; however, they avoided using their traditional caste titles, ‘Sabar jati’ or ‘Tanti jati’, as they found it derogatory. For this reason, they prefer to endorse the phrase ‘scheduled castes’, which allows them to retain some degree of “caste autonomy” while simultaneously providing them with access to government jobs and allowances for their children to attend school (Jalais, 2010, p 49). Therefore, they elevate their social status by taking on “high-caste surnames” or modern first names instead of engaging in practices that Srinivas (1965) terms “ritual pollution” and “sanskiritization” (ibid). Surnames such as

'Mondal' which can belong to any of the four communities and are not indicative of the actual caste, are preferred by them and are most frequently chosen by the Adivasi, Scheduled castes, and Scheduled tribe's populations. Thus, one's caste is subtly concealed and updated to fit the urban and peri-urban environment to prevent traces of subordination and inadequacy that continue to exist in the Sundarbans (Jalais, 2010, p 53).

Revati Mondol, a resident of Patharpratima, stated that she has been living on the island for the past fifteen years with a family of twenty people. Previously, the family had been on the other side of the river, but they were forced to move because the land was too unproductive to support any farming, and they had no choice but to do so to provide food for the entire household. To generate daily income in this matriarchal household, all the house's women have cattle they care for daily. They have kept 4 cows, 40 hens, and 16 goats that they feed, clean, bathe and sell at the weekly market once they are of a good size. They keep the eggs and some chicken for self-consumption and earn money from the rest. They raise them for a period of 6 months to one year and get three thousand rupees for each; hence, the smaller the cattle, the lesser the price. When they need additional money to keep the house running, they collect crabs while submerged in water up to their waists. They often have to wait hours in the salty water until they have enough to sell in the market. While the elder brothers and husband work as wage labourers in Kolkata's central city and only visit once or twice a year, the women of the house and the little boys and girls are in charge of the household's daily operations.

She remembers the time the flood 'Yass' hit in May 2021. She recalls, "I had to move my entire family into a relative's home, a 'puccha hut' (made with bricks) because the water had reached my hip, the pond's fish had all perished due to the river's increased salinity, and the floor had developed cracks. As a result of the water remaining in my house for more than two days, I was forced to tether the goats, cows, and my dog to a high platform to prevent them from drowning while the ducks and hens were kept tied up in the house with food for a few days. They had nowhere to go, she sobbed, and she frequently daydreamed of travelling abroad". In the summertime, the water is scarce, and during monsoons, they are sleepless, wondering when the next flood will hit; they would have to move with some food, clothes and documents to a place they can take refuge in for the interim.



Figure 8. Livelihood diversification as demonstrated by Revati Mondol
Source: Photo captured during fieldwork (9 July, 2023)

In the South 24 Parganas, practically every home has their own pond; however, due to the pond's salinity, residents cannot utilize the water for drinking, cooking, or bathing. In situations where it is used, it has caused severe health issues like redness, allergies, eye irritation, and a variety of reactions on the body, face, and nails. According to research, prolonged exposure to and immersion in saltwater increases the risk of skin infections and infections of the reproductive tract (Dasgupta et al., 2021, p 11). Additionally, the results of the fieldwork are consistent with earlier studies that have demonstrated a strong correlation between excessive salt intake and high blood pressure, as suggested by conducted clinical trials and international observational studies (ibid). However, what needs to be considered is that the data acquired is self-reported by residents, and there might be a possibility that their expectations regarding their respective occupations are auto-generated and come with certain psychological biases (ibid). The inhabitants use the pond water to wash utensils and do other household chores. Most islanders rely on hand pumps provided by government organizations, neighbourhood NGOs, and corporate social responsibility programmes run by multinationals like Gas Authority of India Limited (GAIL), Perfetti Van Melle, and others.

The Sundarbans' need for potable water is related to the region's population growth over the past century (Bhadra et al., 2018). Potable water demand climbed from 9.21 mcm in 1991 to 10.97 mcm in 2001 and to 12.93 mcm in 2011 per population trends (ibid). The majority of the populace relies on the manually operated hand pump. In Patharpratima, 45% of the families must walk farther than 500 metres to obtain water at least five to six times a day (ibid). The information acquired during the fieldwork indicated a constant need for hand pumps in the Patharpratima and Mousini Island regions.



Figure 9. One tube-well serving an area of 150 families in the Patharpratima Block; Residents use muslin cloth to filter the brackish water in order to get rid of any excess sediments or contaminants.

Source: Photo captured during fieldwork (1 July, 2023)

The landed zamindars can purchase tankers for themselves at a somewhat higher cost, indicating how the disadvantaged, are the ones most impacted by climate change because they lack the resources to safeguard themselves. Thereby emphasising the reality that everyone is distinctively impacted by climate change. In addition to collecting water, the locals must filter it by placing a muslin cloth over the tube well's mouth to eliminate any remaining sediments and large salt particles. This is a customary method the natives employ to improve the water's suitability for drinking and cooking by removing visible contaminants from what they call 'Noona Jal' (salty water).

As shared by the 35-year-old woman, Gouri Sardar, a representative of the Patharpratima region during the fieldwork, remarked, "The water has overtime become so salty that we are unable to grow any vegetation on it, and are forced to buy from the market, increasing our everyday expenses. The rise in sea level is destroying all existing embankments, making cracks in our 'puccha' houses (houses made properly with cement,

bricks), and my friends with ‘kuccha’ (mud, bamboo, thatch) houses have lost theirs completely” (Gouri Sardar, 2 July 2023).

This shows that the increase in salt has resulted in the soil becoming less productive for farming, limiting the kinds of crops that can be cultivated and lowering the economic viability of the inhabitants. Furthermore, because salt water is robust, it weakens the foundations of structures, causing crevices and destruction. Additionally, when agricultural activities are not possible, people resort to fishing, prawn seed collection, honey collection, and crab catching. The burden of this falls predominantly more on the women of the family. Even though these diversification practices help generate income, they have yet to prove to be sustainable in the long run (Chattopadhyay, 2023, p 119).



Figure 10. Fishing and prawn seed collection have become increasingly popular among women as a means of supporting their families.

Source: Photo captured during fieldwork (12 July 2023)

Landless households are engaged in diverse agricultural and non-agricultural remunerated activities, making de-peasantization a key feature of rural households in India (Naidu, Ossome, 2016, p 57). Due to institutional limitations, women predominate subsistence production, even if they are not necessarily responsible (Naidu, Ossome, 2016, p 65).

“Nobody lives everywhere; everybody lives somewhere. Nothing is connected to everything; everything is connected to something” (Haraway, 2016, p 31).

Haraway states that each person has unique, subjective, localized experiences and viewpoints influenced by their context, exposure, and surroundings, which make up for their knowledge and existence. Hence, she advocates for the notion that we build our knowledge using our particular, situated experiences and interactions, which are the foundation of our understanding of the world. Therefore, the idea of "staying" is pertinent when considering how islanders who choose to remain in the Sundarbans despite hardships and calamities might adapt by making the most of their resources and existing knowledge. Similarly, Tanush Giri, despite the vulnerability of his situation, lacks the desire to relocate and finds himself making spontaneous life adjustments, in this case, seasonal migration, to maintain his ties to his homeland. Environmental, economic, and societal factors account for most of the explanations.

3.2 Dusk by The Tube Well

Feminist political ecology theorizes that gender plays an essential part in determining the control and accessibility of resources (Rocheleau et al., 1996, p 4). Gender as a social construct interacts with social markers like caste, class, ethnicity, religion and culture that influence environmental change, the adversity of women and men to maintain sustainable livelihoods and opportunities for achieving ecological growth and development in their communities (ibid). In addition to many authors including the International Union for Conservation of Nature (IUCN) report (2015), the effects of climate change are being felt differently by men and women, and this can be attributed to the fact that women are more heavily dependent on natural resources for their livelihoods (Karmakar, 2022, p 49).

The women living on the islands of the Sundarbans negotiate with the anthropogenic circumstances and biodiversity of the region every day to meet their basic sustenance needs. As a result, women and men bear the weight of it very differently, as illustrated by Kabita Bhagta's story, in which she not only falls victim to nature's fury but also constantly bargains with it while having minimal resources at her disposal (Karmakar, 2022, p 60). In cognisance with feminist political ecology author, "Why are only women asked to supply voluntary labour for the benefit of the community?" is an imperative question that women islanders of the Sundarbans battle with on a constant (Rocheleau et al., 1996, p 143).

"Aamaar jonmo ekhaaney hoye cheelo, aami shaara jeebon aaie bhaabhe hi thaakbo"
(Kabita Bhagta, 10 July 2023)

"This is where I was born, and I will stay here for the rest of my life", said Kabita Bhagta, a veteran fisherwoman who has been fishing and collecting honey. She could not quite place her age, but after giving it some thought, she concluded that she must be thirty years old by now. In order to survive, she packs a stove, some pulses and rice and spends

ten days out of the month in her wooden boat, where she catches fish from the river. Whenever she needs to relieve herself, she has to go into the forest or occasionally wade into the river and use the water there. She is a member of the Scheduled Tribe, one of the most marginalised and underprivileged groups in the area. As a result, she lacks access to a pond of her own, and her neighbours are reluctant to share. Her only choice is to use the saltiest seawater because they frequently hurl disdainful remarks at her. Life got harder when she lost her husband due to an ailing disease.

To make matters worse, their brick-built home was destroyed during Cyclone Aila, leaving her alone with her two small children. They currently reside in a barren region in a hut constructed of bamboo, mud bricks, and cow dung with fractures on the floor. At sixteen, she got her daughter married off, and her son now accompanies her with fishing-related activities. Not being able to support themselves through fishing, she plants paddy on other people's farmlands and gathers honey from the jungle, highlighting forced enrollment in wage labour, as a consequence.

For millions worldwide, particularly the most disadvantaged and impoverished populations in developing nations, fishing is a vital source of income, nourishment, and livelihood. It has long been a customary way of life in the Sundarbans (Roy et al., 2023). This low-resource operation for the islanders needs little from them: basic supplies, small fishing boats that may be rented or purchased, and neighbourhood consumption of the catch. In addition to participating in small-scale fishing excursions, women also spend their downtime making fish nets at home for personal use and resale in the local market. The Food and Agriculture Organisation (FAO) reported that women are essential to coastal small-scale fishing operations, making up 30% of the labour force in the production and post-harvest operations (ibid). Not only do these women actively participate in the fishing industry, but they also have the responsibility of providing sufficient sustenance and nourishment for their families. Notwithstanding the perception of male domination in the fishing industry, mounting evidence shows that women play a significant role in the capital creation of fishing households (ibid). Women work in various capacities, from gathering to reaping and post-harvesting; however, their contributions are frequently disregarded and overlooked due to a lack of gender-specific data (ibid).



Figure 11. Small scale fishing
Source: Photo captured during fieldwork (12 July, 2023)

Furthermore, because small-scale fishing was considered to be safer than deep-sea fishing, it was considered to be associated with occupations held by women (Ghosh et al., 2022, p 119). Similarly, female fishermen were linked to harvesting prawn seeds, one of the Sundarbans' most conventional vocations. Though less dangerous, this practice is nevertheless laborious because it requires standing in waist-deep water for extended periods of time, which can have adverse medical consequences on the bodies of women, including bodily discomfort and infections of the vaginal tract (ibid). In addition to attesting to this during my fieldwork, some female respondents reported experiencing dyspepsia, redness in the eyes, and skin rashes. Essentially, it can be stated that women spend a large amount of their time engaged in reproductive and productive tasks and have barely any time to recuperate. This double burden has consequently had social, economic, and health repercussions for women living in the Sundarbans. (Roy et al., 2023). Furthermore, despite being surrounded by water on all sides, the Sundarbans suffer from a persistent shortage of potable water due to the nature of the area's water resources, which eventually adds to the labour of local women and young girls (Karmakar, 2022, p 55). This has led to a ripple effect on their education, representation and decision-making, where they are overburdened with unpaid care and wage labour, and there is no time to get involved in matters that concern them and their well-being.

Additionally, the Sundarbans have been undergoing a noticeable alteration in the topography (Karmakar, 2022, p 54). The region has witnessed 5.50 square kilometres of coastline erosion annually between 2001 and 2009 (ibid). The erosion trend has been alarming - the island's overall area was 11,904 square kilometres (km² from now on) from 1904 to 1924; however, it dramatically decreased to 11,663 km² in 1967, then again to 11,506 km² in 2001, and most recently to 11,453 km² in 2015–16 (Karmakar, 2022, p 54).

According to a recent analysis by Climate Central, the Sundarbans have lost 12% of their shoreline in the last 40 years, and the sea level has risen by approximately three centimetres annually over the past twenty years (Muller, 2020).

When I arrived at Mousini Island for fieldwork, I noticed eroded sandy beaches, salt marshes, dunes, and mangroves. This area has an average elevation of 3.9 metres above mean sea level (Chattopadhyay, 2019, p 74). The entire island is influenced by the winds and tides, with high waves flooding the island's periphery. Since silt and clay are the primary building materials of the island, erosion from waves, tides, and cyclonic activity is a common occurrence (ibid). According to the respondents, soil erosion caused by rising sea levels has a significant detrimental effect on people's lives, especially on women disproportionately affected by these changes and bearing the brunt of its consequences. During the interviews, it was obvious that the experiences of cyclone Aila in 2009 were still felt among the islanders, especially women who lamented at the thought of those memories. I vividly recall the day I met Jharna Sardar on the island as she was frantically glancing out over the "Gangasagar," often known as the Bay of Bengal, to see if the water levels were going to recede as she could not cross over to run her household errands. In conversation with her, she stated:

“The sheer terrifying force of the water causes the embankments to collapse and briny water to seep in. By observing the flow, we can determine whether to relocate to a secure area and leave behind everything but the necessities (cattle, paperwork, and grain). We no longer have any fears owing to the changing climatic conditions of the island” (Jharna Sardar, 11 July 2023).



Figure 12. Jharna Sardars makeshift hut in the Mousini region
Source: Photo captured during fieldwork (11 July, 2023)

She continued by giving an account of her life on the island. She claimed that the surrounding water was all 'Noona' or salted. Having failed to cultivate much on her land for the past sixteen years owing to the brackish water, she now sells young prawns and receives one hundred rupees for every thousand pieces. She married a man who was previously an affluent fisherman, but their living conditions have altered along with the environment. Her day begins at 5 a.m. by standing in a long queue to gather water from a tube well serving 50 families. She must do these 5 to 6 times during the day. Her next tasks include cooking for the family, cycling her three kids to school, doing laundry, cleaning, and gathering wood for the fire.

Moreover, the government-installed tube well in her neighbourhood is rusted, ancient, and has very little pressure. Despite numerous requests and complaints, neither the police nor the "panchayat" (village council) show up. In order to avoid waiting in the queue, which frequently leads to conflicts and disagreements among the islanders, she uses the brackish pond water to do all household chores. In addition to labour involving water, women are required to gather wood from the forest because no gas service is available for their town. Although wood can be obtained readily in the area, it takes time to collect, saw, and use it for cooking, which increases the workload for women on the island and adds to the burden of unpaid labour. As a result, women in the Sundarbans have been given the time-consuming and physically demanding task of gathering water and forest wood for ages. This task consumes the majority of their day. These household chores, unpaid caregiving and underappreciated tasks include labour that women do invisibly (Naidu, Ossome, 2016, p 63).

The Sundarban women are accustomed to battling for their very existence (Karmakar, 2022, p. 58). In their daily struggle against nature's chaos, they frequently rely on indigenous wisdom that has been culturally passed down to them. With this understanding, these women address biological, domestic, and environmental challenges and share an undying belief in the Indian Forest deity 'Bonbibi', who lives in the forest according to them (Jalais, 2010). She is prayed to by the islanders, who are profoundly religious and culturally anchored.



Figure 13. A significant portion of the islanders' way of life is centred around Bonbibi, where they decorate and worship daily even in their 'kachha' houses.

Source: Photo captured during fieldwork (14 July, 2023)

According to popular belief, she offers equal protection to members of all groups, regardless of caste, class, or gender. Almost all respondents stated that they adhere to these deeply ingrained beliefs and have never questioned them. Bonbibi is regarded as their omniscient and omnipresent protector who has established the forest “as a kind of commons to which all have access” (Jalais, 2010, p 72). However, the women are forbidden from entering forests, participating in religious activities or praying to Bonbibi while they are menstruating since they are viewed as "impure" during this time (Jalais, 2010, p 67). Ironically, although menstruation is a "God-given necessity" (ibid), it limits a woman's range of motion and is associated with the unfavourable perceptions of pollution and purity that the women of the island strongly embrace.

Additionally, there is a lack of suitable toilets in their huts, which forces women to use farms or forests as restrooms. Entering the forest during a woman's menstrual period is prohibited; hence, they must use the nearby farmlands. They have privacy and safety issues because the entire area is open, and they occasionally linger until it is dark before leaving, making them more vulnerable to infections and water-borne ailments. As stated in one of the interviews, it was indicated by a young woman who said, “There is a dearth of clean water, and because we cannot afford sanitary napkins, we use a cotton cloth instead” (Kukuduloi, 6 July 2023), making them more vulnerable to illness. As a result, insufficient hygiene and poor sanitation remain significant issues in the area. Due to their regular

exposure to this saline water and inability to live without it, women are the ones who suffer the most from it. They bathe in brackish ponds, live in waterlogged salty dwellings, and submerge themselves in saline water to gather the means for their livelihood in order to survive on the island (Karmakar, 2022, p 57). High concentrations of salinity have led to unsanitary circumstances, which have led to uterine and vaginal immune system issues as well as urinary tract infections. Scholarly attention to these health issues confronting Sundarban coastal women has been comparatively lacking (Bhattacharya, 2021).

Comparably, this battle has been exacerbated by low educational attainment, early child marriages, increased familial pressure, and abuse (Sarkar, 2022). Given the high correlation between education and development, Sundarbans's overall development is heavily influenced by education levels (Datta & Mete, 2022, p 38). Early marriage is one of the primary contributory factors to the island's high school dropout rates (Sarkar, 2022). During the fieldwork, I engaged with eight women, and only one of them had finished her graduation; the others had only obtained schooling up to grade 5.

In my conversation with Purnima Das, she remarked.

“my parents did not have enough money to let me go to school further, and education was not a priority since we had to find ways to fill our stomachs. I have been able to send my kids till grade 4 as it is a hefty amount of 300 rupees monthly for the nearby government school. They now help me with prawn seed collection and household chores” (Purnima Das, 7 July 2023). This claim is a fair representation given the low level of female literacy in the area and the greater rate of adolescent pregnancy in West Bengal than the national average, particularly in the province's rural districts where child marriage is still common (Datta & Mete, 2022, p 39). Inadequate nutrition, young maternal age, and inadequate access to prenatal care services all raise the likelihood of high-risk pregnancies. Further, mother and infant mortality can be attributed to these conditions (Karmakar, 2022, p 51).

‘Rupasree’, a programme the West Bengal government launched in 2018 to reduce child marriage in the Sundarbans, was disclosed to me during my conversation with a fisherman, Gura Pada Giri. This scheme came with an alluring idea that once the girl was 18 years of age, the family would get an amount of 25,000 for her marriage. Although this programme had an effective forethought, it needed to establish a minimum educational requirement for females in the area. As a result, these girls will continue to assist their parents until they turn 18 because the government will now pay for their marriage, and the parents need not get their girl child educated so she can make a living for herself and the family (Sarkar, 2022).

Observing the households of the Sundarbans, I noticed that the ladies always covered their heads with veils, also called ‘ghoonghat,’ as a symbol of respect for long-standing customs and traditions. Generations have carried on this custom, frequently regarded as a

symbol of deference, cultural pride, and modesty. A 27-year-old island native named Kukuduloi described how to preserve the tradition. She wore the ghoonghat in her husband's home and has grown accustomed to wearing it daily. From Macaulay's writings, "tender and delicate women, whose veils had never been lifted before the public gaze" (Balfour, 1885) reflects how women are supposed to be seen. Nowadays, wearing a ghoonghat is perceived as restricting a woman's freedom, confining her to the house's four walls, and inhibiting her ability to pursue her interests (Jain, 2017). On the other hand, the women of the island view it as a symbol of honour, duty, and responsibility that they never hesitate to wear with great pride.

In Haraway's words, "Food, jobs, housing, education, the possibility of travel, community, peace, control of one's body and one's intimacies, health care, usable and woman-friendly contraception, the last word on whether or not a child will be born, joy: these and more are sexual and reproductive rights. Their absence around the world is stunning" (Haraway, 2016, p 6). The absence of some of these is also felt, without a doubt, by many women who live on the island. In essence, the conversation should revolve around a woman's agency- her rights, powers that give her the freedom to make choices and decisions about herself and her body and the strength to override patriarchal systems that continue to handicap them. Haraway highlights that the denial and disregard of these sexual and reproductive rights is likely to significantly impact the lives of these women and their society. Haraway thus emphasizes how important it is to acknowledge and defend these rights to guarantee women's autonomy and overall wellness around the globe.

3.3 Resistance or Rebellion

Haraway disagrees with two common responses "to the horrors of the Anthropocene and the Capitalocene": the first one is what she calls "a comic faith in technofixes, whether secular or religious: technology will somehow come to the rescue of its naughty but very clever children, or what amounts to the same thing, God will come to the rescue of his disobedient but ever hopeful children", the second response is that, "the game is over, it's too late, there's no sense trying to make anything any better" (Haraway, 2016, p 3). Instead of these responses, Haraway states that the only way forward is to persevere rather than give up and walk away. In the face of an ecological apocalypse, it is worthwhile to resist and navigate the challenges that come with living on a damaged planet (Tsing, 2015) and continue to "stay with the trouble" (Haraway, 2016, p 3) rather than flee from it. In the context of my fieldwork, this approach would be equivalent to resisting – socially, economically, and politically.

Migration as a phenomenon is multi-layered and intricate, with a range of nuanced causes, such as push and pull factors, that interact to produce continually shifting trends over lengthy periods (Hossain et al., 2023, p 3). Environmental degradation has been identified as

a significant driver of displacement (ibid). As a result, the concept of "non-migration"—which can be interpreted as the "antithesis of migration within literature"—has arisen as a strategy for coping with climate change (ibid). It refers to the decision to stay where one is rather than migrate. This phenomenon, though it has received little consideration from academia, could serve as an adaptive strategy for the Sundarbans islanders, who are susceptible to recurrent natural disasters and cumulative environmental stressors (Hossain et al., 2023, p 2).



Figure 14. Aftermath of ferocious winds destroys roof of this shelter in this image
Source: Photo captured during fieldwork (14 July, 2023)

Consequently, migration is considered an unavoidable coping mechanism in climate change discussions (Das & Ghosh, 2022).

Although male heads leaving the Sundarbans to find work has made migration a dominating aspect of the region, mobility is intimately related to people going back to their original homes (Das & Ghosh, 2022). Even people who have left the hamlet come back occasionally over the years, both continuously and sporadically (ibid). Thus, climate migration is a substantially more complex phenomenon. After conducting my fieldwork, it emerged that migration seemed to be one of the last resorts, even for people who have been uprooted by embankment breaches and had their homes moved.

However, the Sundarbans islanders' inclination towards staying and considering seasonal migration reflects the history they have had with mobility. Some interviewees claimed that because their mode of existence traditionally necessitated extensive resource movement, the islanders were more equipped to adapt to the effects of climate change, thus making them climate resilient. A turning point in the Sundarbans' history of mobility occurred in 2009 when cyclone Alia struck the region (Das & Ghosh, 2022). People moved in large numbers to distant locations to find employment after the cyclone since the high salinity ruined their agricultural lands, and the fields became unsuitable for farming. The effect is still present today when you look at the monoculture patterns of rice, while the cultivation of pulses and chillies has virtually disappeared from the islands (ibid).

For several decades, the inhabitants of the Sundarbans have been adapting to unpredictable weather and storm disruptions. Significant “internal and external migration” occurred in the Sundarbans based on historical events in Bengal, yet many people continued to reside during this time (Pemberton et al., 2021). While many islanders made the conscious decision to stay based on several reasons, namely, personal connection to their ancestral roots, a sense of belongingness, and psychological attachment, the others opted to remain in the region because they did not have much choice and were, therefore, part of the “trapped population” (ibid).

Contemporary data on economics indicates that the choice to migrate is not predicated on maximizing one's utility; instead, it is contingent on how people and household economies respond to abrupt shifts in their incomes, job prospects, and limited returns in various markets, including credit and labour.

The concept of immobility is, therefore, relevant to this discourse. The German Environment Agency (2002) defines immobility as the absence of migration and further divides it into two primary cohorts (ibid). First, this cohort includes those who have opted to stay put in their existing residence, recognized as the immobile population. Second, what is known as the trapped population consists of people who cannot relocate or lack the necessary means to do so. As mentioned by Pemberton (2021) earlier in Chapter 1, it is crucial to remain conscious of the fact that individuals who do not move or are immobile cannot be classified as vulnerable populations in relation to this distinction. Having access to possibilities for a living, an emotional attachment to their home, place identity, and location dependency are a few examples of the variables that may impact their decision to stay even in precarious circumstances (Hossain et al., 2023, p 4).

By contrast, Mallick and Schanze (2020) focus on the element of “voluntary non-migration”, which is crucial to comprehending islanders' decision to remain in the Sundarbans despite climate change (Mallick & Schanze, 2020). It is advantageous to adopt this framework since it reduces vulnerabilities within the household and establishes the foundation for subsequent possibilities for employment (ibid). Additionally, the

diversification of livelihoods has resulted in a protracted non-migration of islanders who constantly wrestle with enduring challenges and hazards on the island on an everyday basis. Yet, they continue to stay (Biswas & Mallick, 2019). It was thus feasible to comprehend how the households of the Adivasi, scheduled castes, and scheduled tribes blend livelihood resources and capacities and choose to remain in their current location by using this framework in conjunction with the data I collected during the fieldwork.

During an interview, 47-year-old Mousini Island daily wage labourer Abu Hussain remarked,

“I get funding from the government to construct and maintain embankments, but during high tide, nothing lasts—not the earthen embankments, not our homes, not our cattle—so we seek safety in the local school, which is perched on a hill. I have repeatedly rebuilt my home because the saltwater ruins the soil and turns the area I live in into a wasteland. I now work on construction sites in the city every three months, which helps me get a little extra income for the family. If I could afford it, I would relocate near a freshwater well and the road network, where the zamindars live” (Abu Hussain, 13 July 2023). On asking if he ever thought of moving outside the Sundarbans, he chuckled and said,

“Keechu soptar jonney... jaabar obdi toh thik aachey...kintu kotheen somay te... jonmor jagya sthan theyke paaliye jaaba ke korey?” (Abu Hussain, 13 July 2023)

“Going for a few weeks is okay, but who leaves their place of birth just when the going gets hard?” (ibid)

The topic of "seasonal out-migration," which has become a frequently employed technique for coping, was brought up during this conversation, particularly in relation to the men who reside on the islands (Ghosh et al., 2022, p 124). For temporary labour prospects in unskilled labour, such as construction labour or waitressing, the male inhabitants of the Sundarbans sometimes relocate to West Bengal's nearby cities and towns or occasionally to other states of the country (ibid). More specifically, seasonal migration is preferred by the uneducated rural poor, who are amongst the most severely impacted. In the context of Hussain's narrative, respondents asserted that their only alternative was to engage in labour-intensive activities because there was no chance for skill development and enhancement in the area. Also, women take up the role of head of household affairs while men migrate seasonally. Inevitably, when the menfolk are unable to send money home for running household expenditures, women/woman of the house take on the responsibility of generating additional income to manage the household through various means of subsistence, or in more dire situations, they are forced to borrow money at exorbitant interest rates from the local money lenders (Ghosh et al., 2022, p 125). Thus, it can be concluded that even though the men migrate seasonally, households occasionally struggle to cover their expenses, contributing to a great deal of uncertainty on the island.

In addition, migrant labour jobs are being taken up by the local youth for various reasons. Young married couples must help with the sowing and reaping operations to obtain their share of the crops, as they are not automatically given access to their parents' land and must work on the ground to acquire their share. As a result, a majority of their income comes from trading or gathering prawn seeds (Jalais, 2010, p 26). This also enables them to become wealthy over a short period (ibid). Secondly, land is regarded as an asset that stratifies, corrupts, and creates hierarchies, which has led to worrisome quarrels and violence among groups. There are divisions along the lines of caste, class, and gender, which are frequently the markers of segregation between people, and the youth attempt to detach themselves from their regional identification and construct a life outside of their home cities, hence being attracted to the idea of seasonally migrating.

After listening to this conversation with Hussain, I was moved to learn how each of us is uniquely impacted by climate change. Haraway (2016) likes to refer to this epoch as the “Capitalocene” to draw attention to the intricate web of networks that alter people’s lives (Butler, 2016) and to the part capitalism plays in precipitating social and ecological crisis. Due to the fact that capitalism is built on accumulation – which entails resource extraction and expropriation, it must give precedence to growth over environmental sustainability and well-being of the ecosystem. Eco-tourism was presented as capitalism’s “magic bullet” in the context of the Sundarbans (Ghosh & Ghosh, 2018). It offered financial support to the underprivileged and economically marginalised groups residing near ecologically sensitive regions and encouraged them to preserve the area's biodiversity (ibid). Following its designation as a UNESCO World Heritage Site and as the habitat of the Royal Bengal Tiger, governments and conservation organizations have made protecting the Sundarbans Biosphere a top priority as they work to draw tourists from all over the world (ibid). During my fieldwork on Mousini Island, I discovered tent sites around 100 metres from the coast, places to fish at sunset with little tea shops, and boat trips for vacationers. Ghosh & Ghosh (2018) argued that ecotourism has exacerbated and replicated existing marginalities despite the fact that this is a seasonal phenomenon. The educated elite who already held positions of opulence and power were given senior or managerial roles to achieve this. Members of the socioeconomically disadvantaged groups received inadequate or no instruction in order for them to engage in tourism-related activities (ibid).

Furthermore, ecotourism did little to assist marginal farmers, fishermen, or daily wage workers and did nothing to help them diversify their sources of income or even augment it during the tourist season. Instead, ecotourism has strengthened socioeconomic inequality through capitalist regimes and reproduced patterns of pre-existing power relations, prejudices, and biases when it has benefited those who were already in an advantageous position (ibid).

Donna Haraway's *Cat's Cradle* represents our world's interdependencies and involvements, advising that one must stay with the world's troubles and learn to live with the complications rather than trying to simplify them.

Cat's Cradle is a game played by people all over the world. It involves making a myriad of entangled intricate designs with your hands using a loop of string. Haraway uses this metaphor to demonstrate a correlation between various societal factors, emphasizing the importance of navigating and understanding the complexities through this web of interdependencies.

She talks about human beings' profound impact on the planet and calls for a more collective and conscientious approach to tackling environmental and social issues.

In keeping with this model, the Indian Sundarbans can also be understood as highly interdependent and interwound. Many elements, such as the terrain of the area and the local population, are interdependent on one another. The community's sources of income primarily originate from the forest and its natural resources, such as farming, gathering prawn seeds, harvesting honey and fishing. Spiritual and cultural bonds also exist between them. Thus, it interlinks the environment and inhabitants like the *Cat's Cradle*.

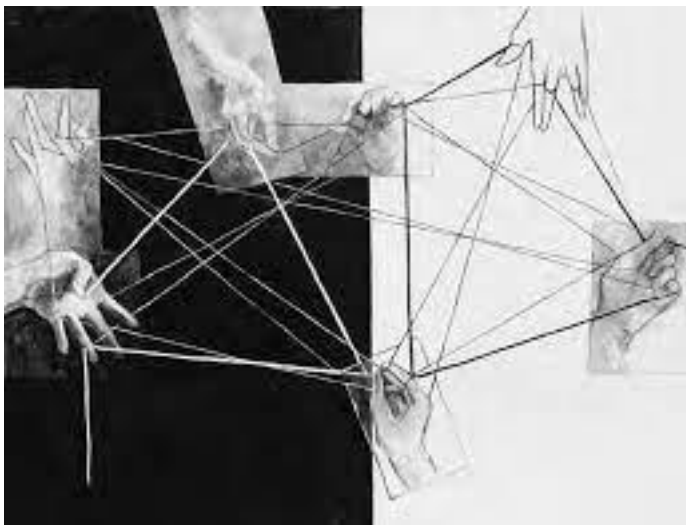


Figure 15. *Cat's Cradle*

Source: *Staying with the trouble – Making Kin in the Chthulucene* by Donna Haraway (2016)

Thus, staying as a strategy for adapting to climate change may prove beneficial in the future and should be explored more thoroughly by researchers, with a focus on “these leaks and eddies which might help open passages for a praxis of care and response—response-ability—in ongoing multispecies worlding on a wounded terra” (Haraway, 2016, p 105).

Haraway's statement is essentially an invitation to take action. Her approach would emphasize the need to take a nuanced approach to addressing the Sundarbans' ecological

and societal difficulties within the context of the climate change crisis. Haraway (2016) plays on the on the word “response-ability”, emphasizing our call to responsible action towards a wounded world, that the actions of humanity (or some humans in particular) have harmed. Hence, she calls for collaboration to commit to mending the wounded world in a way that honours the mutual dependence of all species while recognizing the liability of capitalism.

CHAPTER FOUR

Encapsulating The Findings

4.1 Migration: Fight or Flight

By assessing the complex interactions amongst the livelihood framework, the gendered role experiences, and the multidimensional, knotty migratory decisions, this research paper sheds light on the subtle elements that influence the severely vulnerable individuals of the Sundarbans on staying with the trouble. When resource availability and income opportunities become scarce in the region, migration is the last hope for those seeking a fresh start (Hossain et al., 2023). In light of this, my research question explores the principal forces behind the communities' adoption of "staying" as a livelihood strategy at a household level and climate adaptation in the context of ongoing terrestrial shifts and climate-induced environmental alterations. It is essential to highlight that the marginalised population's politico-institutional framework significantly impacts their capacity to decide whether to leave or remain in the Sundarbans.

For centuries, the locals have adapted internally to deal with unforeseen and insurmountable external events. They have garnered the ability to establish an eclectic mix of livelihood strategies and asset creation to continue staying in the Sundarbans. Thus, it can be said that the households of the Sundarbans have made themselves resilient over time by re-negotiating and re-adapting how they lead their lives through their resources, skill sets, socio-cultural networks, and indigenous knowledge. Therefore, the civil society of the Sundarbans has strengthened itself through bottom-up development. However, it is striking that despite this, they are still devoid of some basic human needs. For instance, this research found that there was a lack of potable water in the region, significant brackish water intrusions, and weak embankments that were unable to protect shelters and agricultural lands. There is also a lack of basic infrastructure, such as road networks, to access hospitals and other healthcare facilities.

Every individual is impacted by climate change differently. A claim that my fieldwork helped verify. "A more nuanced conception of governance" that considers the various needs of the population is essential (Pemberton et al., 2021, p 195). Considering how the population is segmented in India based on caste, class, gender, race and religion, a more in-depth and intricate approach is required to see why people continue staying on the island.

Despite a shortage of possessions and resources in this setting, meaningful interpersonal relationships exist. Most interviewees identify their present neighbourhood in the context of a primary socio-psychological and sociological barrier to migration. Despite their inherent

instability, the livelihood options available to locals are deemed financially feasible, enabling them to continue staying in their native places of residence (Rabbani et al., 2022). Thus, people adapt to unfamiliar ways of life under the social, political, and religious awnings that direct their resistance in remaining on the island despite its growing vulnerability. This will encourage future generations to stay on the island and provide them with infrastructure to support themselves. One could argue that the degree to which the islanders' households are sensitive to environmental change determines whether they leave or remain (ibid).

Migration should not be viewed as the exclusive means of defending those impacted by climate change (Naser et al., 2023). It is vital to increase the resistance and resilience of the remaining residents of the Sundarbans so that they can adjust to a changing environment and way of life, as opposed to advocating for the mass relocation of the Sundarbans population, which is incredibly impractical and utopian to envision (ibid).

Climate migration has been a worldwide problem and needs local solutions. Therefore, culturally and regionally feasible strategies must be incorporated into current climate change policy discourse. A significantly rigid and standardised view of migration leads to restrictive measures, jeopardising well-being and distorting the reality of state society (Priodarshini & Mallick, 2021). Future studies ought to examine the 'staying' factor in greater detail.

4.2 Unexpected Realities in Troubled Times

“Stay with the trouble in order to nurture well-being on a damaged planet. Symchthonic stories are not the tales of heroes; they are the tales of the ongoing” (Haraway, 2016, p 76).

Since Haraway served as an inspiration for this research paper, we must heed her counsel on overcoming any challenges we may encounter in the future. Through her work, Haraway urges us to stop brooding on issues or circumstances beyond our ability to influence. Instead, 'stay' and interact with the intricately intertwined obstacles. Notwithstanding the difficulties and harm done to the planet, she stresses the need to persevere and be dedicated to any cause—political, social, or environmental—and calls for support in creating an environment that promotes wellness and growth. She underlines the fact that narratives are not essentially about traditional heroic storylines; instead, they are about people who, with a never-say-die attitude, persevere and work their way through difficult circumstances.

Global shocks and crises have befallen us, ranging from the COVID-19 pandemic to the food and energy crisis, soaring inflation, and other climatic catastrophes that shook the world in recent years. As a result, we have had to adapt our way of living and deal with a constant stream of natural disasters, political turbulence, economic hardships, and social upheaval. In recent times, the world over, people have experienced tragedies such as losing loved ones, losing their jobs, experiencing worsening health, and violence. This brings on

feelings of helplessness, worry, anxiety, and grief because it is beyond our ability to change. What we can control, though, is how we handle these situations.

Through personal experience, I have learned that perseverance pays off. Staying on with that trouble and fighting back is crucial as humanity strives only in the face of adversity. Our innate ability to adjust and evolve is acquired only during challenging circumstances.

Finally, lending forward inspiration from a verse in a poem by renowned Bengali poet Rabindranath Tagore that seems potent to the reality of the communities' struggles in the Sundarbans -

“Let me not pray to be sheltered from dangers, but to be fearless in facing them”
(Rabindranath Tagore, 1916).

These words sing a home truth and illuminate how crucial it is to push through life's challenges and stay with the trouble.

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