

Misreading the Bengal Delta

Climate Change, Development, and
Livelihoods in Coastal Bangladesh

Camelia Dewan

Foreword by K. Sivaramakrishnan



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Seattle

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For Aurora, Ulrik, and my mother



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FOREWORD

For several decades, Bangladesh has been the destination for internationally designed and funded interventions to bring economic and social development into a country rocked by war, buffeted by severe storms along its coastline, and challenged by political instability in a struggle to establish democracy and better futures for its citizens. At various points such programs have targeted rural credit, the empowerment of women, and small-scale industries, often leading to the proliferation of regional and international NGOs across the country (see Bornstein 2005; Shehabuddin 2008; Karim 2011; Julia Huang 2020). Camelia Dewan shows in this clearly argued study based on sustained fieldwork with farmers, fishers, and development experts that climate change has become the latest lens through which development possibilities and plans are now viewed in many parts of Bangladesh.

Development programs have a long and controversial history of seeing the landscape they wish to transform through a particular cosmopolitan perspective—one that is shaped globally and expected to be meaningful in all local situations. Growing concern about anthropogenic climate change and its likely adverse effects in vulnerable places has generated its own all-consuming, parallel discourse. Dewan joins a growing scholarship identifying a configuration of power in development enterprises and policy that shapes interventions considered possible in the face of climate change.¹ Drawing on ethnographies of aid and development brokerage, she develops the concept of “climate reductive translations” to capture how knowledge and technocratic consensus on climate change is produced and deployed to affect the lives of poor people in coastal Bangladesh in distinctly different ways.

As Dewan notes, low-lying areas of coastal Bangladesh, sandwiched between the occasionally turbulent sea in the Bay of Bengal and the rivers draining into it, are familiar with the floods, storm surges, and cyclones that periodically shift the course of rivers, deposit sediment, dissolve small islands, sink fishing boats, and inundate paddy fields. Land captured from silt deposits is also lost to unruly waters when embankments breach or when sea levels rise: as tidal waves or as the more gradual ingress of saltwater into intertidal zones. To some extent, the

more frequent disturbances and the havoc they create have been attributed to a monsoon season that has become less predictable and more extreme (Amrith 2018). This is often understood as the outcome of climate change.

After providing a dynamic history of flood control embankments that take the story back to colonial encounters with rivers in the Bengal delta, Dewan situates this fine study in two coastal villages: one dealing with saltwater ingress and the other confronting freshwater excess. The vulnerability and struggle for viable livelihoods in these coastal villages is examined through clear-eyed ethnography.

The southwestern coastal zone has undergone several transformations in recent decades. For example, in the late twentieth century, some farmers in this region grew rice, sometimes combining it with freshwater shrimp cultivation and adapting the rotation to the seasonal monsoon. Intensive shrimp farming increased the precarity of this economy, making it more vulnerable to price fluctuations and extreme weather disruptions (Paul and Rasid 1993). In the twenty-first century, some have argued that coastal sea-level rise has frequently inundated fields with brackish water (Chen and Mueller 2018). Camelia Dewan, however, documents how salinity is introduced into fields via embankments that are purposefully broken for the cultivation of brackish tiger prawns. She also looks beyond the specific villages in which she carries out her detailed investigation to provide an ethnography of the workings of the development industry through a close examination of its institutions, which operate from outside and beyond the village to contribute to the exacerbation of rural vulnerability.

To do this, she investigates how an itinerant community of NGO workers, development consultants, and government officials—development brokers—translate the life and challenges of these villages into what she conceptualizes as the metacode of climate change. These mediators decipher the shifting priorities of the development industry and find ways to attract its funds to these areas, which have been characterized as the frontlines for fighting climate change in South Asia and the Global South more generally. Along the way, tiger-prawn cultivation and rice farming are subject to the logic of climate change adaptation, having already been shaped by prior development projects and investments.

The ethnography also reveals how villagers, across class and ecological differences, and women in particular, perceive the threats to their homes and livelihoods from both the inclemency of weather and the vagaries of development projects. Dewan joins a rich tradition of scholarship on how development projects misrecognize the people and landscapes they choose to engineer and transform. She is also pioneering how these approaches can be deployed in the study of climate change adaptation and mitigation projects where the focus shifts from

extracting the most from the land and labor to defending the land and residents from cataclysmic events seen as the consequence of nature unbound and unleashed by human endeavor gone awry. The result is a nuanced, analytically sharp account that listens closely to coastal villagers and comments astutely on those who would alter their lives in the name of promoting climate change resilience in rural coastal Bangladesh.

In the latter part of the book, Dewan takes the analysis outward to the larger questions of persistent inequality and vulnerability in coastal Bangladesh. She brings the larger story back to the relative absence of reliable state programs. The reliance of these coastal areas on fitful NGO projects, and their being subject to the enduring structural violence of poverty, inadequate health care, and vicious cycles of debt aggravated by proliferating credit schemes operated by NGOs, is powerfully narrated. However, she also listens carefully to the women villagers and the way they see pathways out of their suffering and precarity. The perspectives of villagers on food, health, fishing, farming, kinship, and migration shine through the text, providing a vivid description of the place and its location amid the turbulent waters of coastal zones facing climate change.

These accounts place in relief some of the obtuseness and insensitivity of climate change–related projects. Dewan situates the solutions to climate change vulnerability in coastal Bangladesh in a history of development that dates back to the Structural Adjustment Policies of the 1980s and the successor programs of microcredit and agrarian enterprise that left the poor exposed, women marginalized, and the whole region at the mercy of growing climate instability. She provides an original contribution to the ethnographic study of climate change–related development projects in the Global South.

K. Sivaramakrishnan
Yale University

PREFACE

In the autumn of 2011, I met with Dr. Mohammed as I was finishing twelve months of qualitative research on an internationally funded water governance project in Bangladesh's coastal zone. My field trips drew my attention to several urgent problems that our rural interlocutors had raised: from monoculture—such as saline tiger-prawn cultivation that weakened flood-protection embankments and destroyed the soil—to canals, which filled up with heavy sediment each year. The goal of that project, however, was to assess the operation and maintenance of the embankments and their sluice gates. I therefore had to exclude many of my findings about the contentiousness of infrastructure and land-use practices. I sought to explore these issues further in a new project and began asking fellow researchers I met during the year, such as Dr. Mohammed, how to best pursue this. When I mentioned my interest in land use and siltation as we sat in Gulshan—Dhaka's fanciest neighborhood, bustling with international development professionals—he commented on the increasing amount of financial support for climate change research and proposed that the title of my research proposal ought to mention climate change.

Although I followed this advice, I wondered whether this inclusion of climate change deflected attention away from the most pressing concerns that arose during my previous study. Climate change has become a buzzword used to attract donor funding, but to what extent do climate-funded projects address coastal vulnerabilities and needs? This book investigates climate change knowledge production in development aid projects. How does the idea of climate change shape the direction of development interventions in the Global South? To what extent do these interventions correspond with the concerns of the populations they seek to help?

I returned to Bangladesh in August 2014 to further explore these questions. I conducted twelve months of multisited, interdisciplinary fieldwork, concluding in July 2015. I spent a total of six months in the southwest coastal zone of Bangladesh, mainly in an embanked floodplain (“Nodi,” a pseudonym) in Khulna District, where I conducted ethnographic fieldwork: participant observation, ethnographic interviews, oral histories, and household surveys. I first

conducted in-depth qualitative interviews with development professionals in Dhaka (the capital) and Khulna city during the monsoon period. This was followed by ethnographic fieldwork in Nodi for three months, where I spent time with two groups of landless women doing earthwork—repairing small roads in a donor-funded rural employment scheme—and getting to know their families, who were living in different places throughout Nodi. I also visited tiger-prawn cultivation areas in Satkhira District and conducted archival research in Dhaka and Khulna city. I returned to Nodi in May and June 2015 where I conducted a qualitative household survey among a total of four hundred households in two different administrative units (Dhanmarti and Lonanodi), employing two different landless earthworking women as my field assistants. I spent July 2015 in Dhaka, where I conducted follow-up interviews with development professionals and academics.

Both before and after my fieldwork in Bangladesh, I conducted archival research and literature reviews of the Indian Office Records and Private Papers in the Asian and African Studies Reading Room and the Maps Reading Room at the British Library, the SOAS Library, and the Anthropology Library at the British Museum. In April 2015, I spent three weeks at the National Archives of Bangladesh (NAB), the Bangladesh Bureau of Statistics (BBS), and the Divisional Library of Khulna. Through this archival research, I found a wealth of historical documents on embankments, changes in agriculture, irrigation, labor, and demographics from a variety of sources specific to the Khulna District and the southwest coastal region. It helped unveil continuities and divergences of commercial and environmental change (railroads, early embankments, other industries) and the colonial narratives of progress (e.g., railways, embankments, artificial irrigation, and “modernized” agriculture). Maps, censuses, and cadastral lists are compiled by the state to simplify and grasp complex realities (Scott 1998, 44). These archival objects thus capture the models and language of decisionmakers at a particular time and must be treated as ethnographic data (Shore and Wright 1997). I therefore critically engage with these sources and discuss this in-depth throughout this book.

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arguments of this book—a book I regret I cannot hand to him in person at the British Library where we first met.

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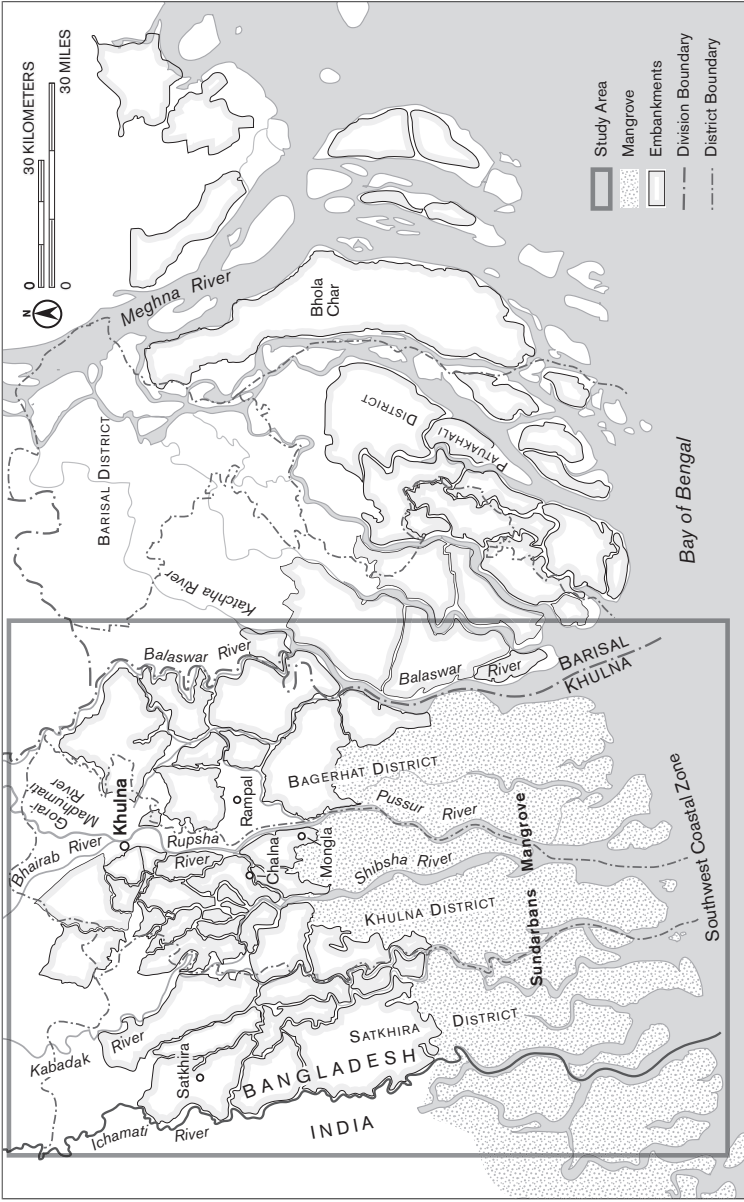
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ABBREVIATIONS

BDT	Bangladeshi Taka
BWDB	Bangladesh Water Development Board
CEIP	Coastal Embankment Improvement Project (2013–2022)
CEP	Coastal Embankment Project (1960s)
CGIAR	Consortium of International Agricultural Research Centers
FAP	Flood Action Plan
IPCC	Intergovernmental Panel on Climate Change
IRRI	International Rice Research Institute
LGED	Local Government Engineering Department
NGO	Nongovernmental Organization
OOP	Out-of-Pocket Expenditure
ppt	parts per thousand
PRSPs	Poverty Reduction Strategy Papers
SAPs	Structural Adjustment Policies
TRM	Tidal River Management
USAID	United States Agency for International Development
WaSH	Water, Sanitation, and Hygiene
WFP	World Food Programme



Map 1. Bangladesh. Mapped by Ben Pease.



Map 2. Southwest and South-Central Coastal Zones. Mapped by Ben Pease.

MISREADING THE BENGAL DELTA

Introduction

Climate Reductive Translations in Development

In 2018, climate-related overseas development assistance totaled US\$33.2 billion globally, up from US\$24.2 billion in 2014. In order for countries and NGOs to access this funding, climate change adaptation or mitigation must be a principal or significant goal of development interventions (Donor Tracker 2021). The Intergovernmental Panel on Climate Change (IPCC) ranks Bangladesh as one of the most climate vulnerable countries in the world, and climate change is now mainstreamed into all of Bangladesh's development activities (Lewis 2010; Alam 2019). From 2011 to 2018, donors and development agencies (including EU member states and the World Bank) allocated approximately US\$20.59 billion to Bangladesh.¹ In 2012 the World Bank allocated US\$400 million for flood-protection embankments as climate adaptation infrastructure. To access such considerable funding streams, nongovernmental organizations, state bureaucracies, and research institutions in Bangladesh must ensure that their project proposals for development interventions appear as climate relevant. Often, such project proposals rely on appealing to donors' perceptions of Bangladesh's low-lying floodplains as being at particular risk as global sea levels rise, making the country an "epicenter of climate change" (Cons 2018, 272).

The common reading of Bangladesh as a victim of climate change assumes that as global warming increases, ice caps will melt, sea levels will rise, low-lying Bangladesh will drown, and people will flee because of floods and increasingly frequent natural disasters (cyclones), thus in turn becoming climate change refugees (Jolly and Ahmad 2019; Vidal 2018). While simplified narratives may help make development interventions seem related to climate change adaptation or resilience in order to attract aid funding, does it accurately capture the causality of floods in complex coastal landscapes? Might it even risk exacerbating environmental degradation and increasing coastal vulnerability to climatic change?

Bangladesh is located in the largest delta in the world, formed by the Ganges, Brahmaputra, and Meghna rivers. This is a hydrologically active delta with meandering rivers that continuously reshape the land, through both erosion and sedimentation. Each year, these rivers carry approximately 40 billion cubic feet of silt on their journey from the Himalayas down to the Bay of Bengal—an

incredible 25 percent of the total annual sediment of the world river system (Iqbal 2010). Silt can be described as part water and part mud (Lahiri-Dutt and Samanta 2013, 7) and is the intractable soil-water admixture particular to the Bengal tidal basin (Bhattacharyya 2018). Accumulated sand and silt are embedded into riverine environments making it hard to distinguish solid land from fluid waters, especially during the annual monsoon. Indeed, silt destabilizes a clear dichotomy between land and water. Silt in these waters have, after all, the ability to raise existing land levels and create new land masses in the rivers, locally known as *chars*, best described as islands made of silt. Silt can change whole waterscapes and ecologies. In the unembanked Sundarbans mangrove forests, the flooding of silted river water raises land levels each year, keeping pace with sea level rise (Auerbach et al. 2015).

This silted delta has an innate ability to adapt to a certain amount of sea-level rise caused by global warming. Together with monsoon rains, rivers, canals, (agricultural) wetlands, mangroves, and *char* islands (da Cunha 2018), the hydrological characteristics of this delta complicate narratives of Bangladesh's vulnerability to rising sea levels. A misreading of the coastal landscape, such as viewing embankments as "flood-protection" infrastructure against rising sea levels, diverts attention away from environmental processes that compromise Bangladesh's ability to withstand future climatic risks.

Misreading the Bengal Delta combines detailed environmental history with an ethnographic study of southwest coastal Bangladesh to show how the development industry tends to simplify the complexities of a wetlands delta in ways that may exacerbate environmental risks and the vulnerability of the people it seeks to help. My intent is not to deny climate change, but to show the risks of development projects attributing environmental change to climate change, even when it is not the case. Until the 1990s, global warming was often associated with "*climatic* change," an index of change in the climate system to which interseasonal variations in weather would contribute. Since then, the term has been increasingly replaced by "*climate* change," a discursive shift from an adjective to a noun that denotes the role of climate as the main causative agent of interannual weather variation (Hulme 2015; 2011). *Climatic* change denotes the physical effects of anthropogenic global warming. It is a real material phenomenon that will subject Bangladesh to a certain amount of sea level rise, changing monsoon patterns, variability of the dry season, and increasing frequency and intensity of extreme weather events such as cyclones, thunderstorms, and tidal waves (Hanlon, Roy, and Hulme 2016). By differentiating between physical processes of climatic change and the discursive ideas of climate as the main cause of

change, this study demonstrates how climate change can be a powerful discursive phenomenon that alters expectations of causality.

As more attention and resources are shifted toward tackling climatic change both in the Global North and Global South, it is necessary to recognize that knowledge production of climate change is situated in particular social contexts (Barnes et al. 2013). Detailed ethnographies anchored in real places, ecosystems, and societies can illustrate the complex environmental challenges that face many low-lying coastal countries: the double-edged swords of flood-protection embankments and their interwoven relations with meandering rivers, sedimentation, and different types of local floods.

In this post-truth era, critical engagements with scientific research run the risk of being co-opted by climate change deniers to dismiss the scientific consensus on global challenges caused by anthropogenic climatic change (Kofman 2018; Latour 2004). To support anthropologists' efforts to advocate for climate justice globally, Susan Crate has advocated for the practice of "climate ethnography" to describe local experiences of weakened livelihood capacities: "By using the term environmental ethnography, we lose both the urgency and reflexivity necessary to advance our methods to address climate change. . . . Climate ethnography, by contrast, is tied to the global phenomenon and communicates a sense of immediacy and of an ethnography with a mission" (Crate 2011, 185).

Although this concept acknowledges multistressors and other environmental factors that affect livelihoods, it risks suggesting that climate change is a causative agent—that is, that it causes most of the environmental problems local people are experiencing. Archaeological analysis of human agency and historical climatic change shows that the impact of any climatic event depends on the local and social ecological settings in which they take place, urging caution against simplified notions of change that attribute causality to climate change alone (Hassan 2009). By replacing "environmental ethnography" with "climate ethnography," anthropologists may be at risk of losing a holistic understanding of localized processes that are tied to context-specific anthropogenic land-use practices, environmental degradation, and social issues that affect livelihoods in specific places.

The use of "climate ethnography" may thus play a reductive role in describing human–environment interactions and increase the risk of "climate reductionism"—a trend that ascribes all changes in the environment and society to climate, where climate plays a reductionist role in discourses about the environment, society, and the future (Hulme 2011). As political ecologists point out, climate change adaptation is an increasingly political industry: "In this vast industry of

work on adaptation to climate change, critical social science and hard-edged political economy are strikingly absent. The rough and tumble of actual struggles and the relations between households, communities, and powerful state and corporate agents are missing” (Peet, Robbins, and Watts 2011, 10).

A growing body of anthropological literature engages with the politics of knowledge production about climate change. In Egypt, climate change is not the only factor that will shape water availability, yet the political decisions about water allocation and access are neglected when discussing Egypt’s water future through the lens of climate change (Barnes 2015). In Vietnam, ethnographic fieldwork among environmental policymakers highlights the social embeddedness of knowledge production where real climatic change coincides with “discursively and socially constructed climate changes” (Zink 2013). Ethnographic specificity can also be used to understand the different levels of performativity required in building expertise amid a changing climate affecting mangroves in Guinea (Vaughn 2017) and to understand how Western development professionals come to imagine climate heterodystopias in the Global South (Cons 2018). By deconstructing the production of knowledge (and ignorance), anthropologists are thus able to critically engage with discourses of climate change at both local and global levels.

A historical approach to human perceptions of climatic change helps to further unpack the complex relationships between society and climate (Barnes and Dove 2015). Carefully examining the colonial and postcolonial history of flood-protection embankments, aquaculture, and agriculture in the dynamic delta of Bangladesh, this book shows how knowledge about climate adaptation is not necessarily bifurcated between different groups of experts (Vaughn 2017), but can be contained within the same individual. While it is important that anthropologists relate local community experiences of adaptation to climate change to global policy levels (Crate 2011), it is also imperative that anthropologists reflexively analyze discourses of climate change. This is particularly the case in development projects, which are sites of competing interests and conflicting agendas (Mosse 2005), resulting in divergent conceptions of the very notion of climate change. Such a critical approach to the knowledge production of climate change by particular actors and interests can help shed light on how policy discourses may work as instruments of governance to “identify the mobilizing metaphors and linguistic devices that cloak policy with the symbols and trappings of political legitimacy” (Shore and Wright 1997, 3). Bangladesh’s ability to deal with environmental challenges is entangled with the priorities and funding concerns of international bodies—an inherently political dynamic that constitutes

an example of unequal power relations at global levels. This monograph contrasts the narratives of climate-funded projects with local environmental history and the lived experiences of social and environmental problems. By doing so, it illustrates the broader dynamic interrelations between development, anthropogenic environmental problems, and climatic change.

Decolonizing Development in Bangladesh

Climate change is increasingly, and intimately, tied to significant financial funds distributed through international development. As such, it is important to look at how development in the form of capitalist (extractive, colonially rooted) practices forms part of current representations of Bangladesh. I am a second-generation Bangladeshi born and raised in Sweden, and I have grown up in a society where media portrayals of Bangladesh are often victimizing, pauperizing, and condescending. This book is a decolonial project that historically situates “development” in Bangladesh and the continued image of the country as poor and vulnerable in order to understand the links between colonial knowledge production and the knowledge production of climate change.²

The concept of “decolonizing development” contests the ways in which development has been used as a way to legitimize external actors radically altering environment and societies in former colonies of the Global South. This is part of a wider agenda of decolonizing the curriculum and higher education, which is based on the assumption that global histories of Western colonial domination have had the effect of limiting what counts as authoritative knowledge, whose knowledge is recognized, what universities teach, and how they teach it. The university, as a privileged space of knowledge production and dissemination, is a key site where the historical legacy of colonial social constructions, imaginaries, practices, hierarchies, and violence still resonates today (Decolonising SOAS 2018). The image of Bangladesh as a climate change victim reproduces such historical imaginaries of its inferiority while ignoring its complex past.

The state of Bangladesh came into being through two traumatic partitions—one in 1947, where independence from colonial rule also split Bengal in two (West Bengal to India, East Bengal to newly created Pakistan), and the other in the 1971 War of Liberation, when East Pakistan broke away from oppressive West Pakistani rule to reclaim Bengali language and culture. Yet despite eastern Bengal’s central importance in British India, Bangladesh often falls out of discussions of the history of India. For example, the Victoria and Albert Museum’s *Fabric of India* exhibition (2015) included colonial-era textiles from Dhaka (now

in Bangladesh), but the modern-era textiles in the exhibition were only from the nation-state of India (created in 1947), thus excluding both Bangladesh and Pakistan. The separation of West Bengal in contemporary India and East Bengal in Bangladesh is noteworthy since the Bengal region was integral to “India” and its ancient history goes back to when it formed part of the Maurya and Gupta empires in northern India. The Pala empire was established in Bengal in the eighth century and continued until the twelfth century. It was the dominant power in the northern subcontinent. At the height of its power, it included parts of modern-day eastern Pakistan, northern and northeastern India, Nepal, and Bangladesh (Majumdar 1991). The Pala Empire had a strong administrative system from the village level to central government, including a system for tax collection. It expanded Buddhism; created outstanding works of art, literature, and architecture; implemented policy oriented toward the welfare of the people; and undertook public works like excavating water tanks, ponds, and canals (Majumdar 1991). After Pala’s fall, various dynasties ruled wider Bengal, from the Sena dynasty to the Moghul empire in the sixteenth century. State administration continued with complex systems for revenue collection and public works—but this came to change under the colonization of Bengal under the East India Company and the British Raj.

British colonial officials came to use representations of “modernity” and “progress” to legitimize the exploitation of the Indian subcontinent, its natural resources, and its people. Through its efforts to understand its “subjects” and comprehend the internal workings and logic of India, the colonial state created various censuses, surveys, and classifications (Cohn 1996) and ethnographies (Dirks 2001, 59; Willford and Tagliacozzo 2009, 2). Regardless of whether or not the flawed categorization of Indian knowledge was intentional, colonial knowledge cemented a view of India as a Hindu, caste-stratified, ancient, unchanging village society (Cohn 1996)—an image further reproduced through official colonial documents (Cohn 1996; Dirks 2001). The British administration increasingly engaged in historical revisionism and instructed their officers through James Mill’s (1817) *The History of British India*, a book that ignored ancient Indian history and emphasized British superiority (Hill 2008, 90–91). This construction of India and its diverse population served to alienate non-Hindu groups from the narrative of India (Cohn 1996). While Indians would negotiate and reconstitute their identities, they could only do so within the limits of these colonial categories (Arnold 2009, 34). As an increasing number of Bengalis joined the British as civil servants during the Raj (1857–1947), the narrative of superiority crept into the minds of some Indian colonial subjects, who reproduced

British claims of progress by viewing precolonial institutions as traditional to legitimize colonial interventions as a means to reach Western modernity (Chatopadhyay 1990).³

This is in turn linked to the perceived superiority of the European Enlightenment that emphasized rational knowledge and the importance of technology and science. The historian Fredrik Cooper suggests that modernity is a way of talking about the world, where western Europe is the model to which the rest of the world should aspire. Such a representation casts modernity as a condition in and of itself; it creates a story of people becoming modern. The colonizer's society is presented as "advanced" and embodying "progress," while colonized societies are portrayed as "traditional" and "backward" (Cooper 2005). Modernity has come to be associated with progress, development, the West, science and technology, high standards of living, rationality, and order. Tradition, in contrast, is associated with stagnation, underdevelopment, the Orient, conventional tools and technologies, poverty, superstition, and disorder (Gupta 1998).

Colonial knowledge production corresponds with Foucault's "governmentality," or the "art of government," where power is the ability to impart knowledge in a way that means it is internalized as truth (Foucault 2007).⁴ In the Foucauldian sense, to be governed is not only to have a form imposed upon one's existence, but to be given the terms within which existence will, and will not, be possible (Butler 2002). Colonial knowledge both enabled conquest and was produced by it (Cohn 1996). Without understanding "precisely how the social domain has been restructured (constituted), our accounts of the dynamic connections between power and knowledge during the colonial period will remain limited" (Asad 1991, 324).⁵ This is important, since the colonial dichotomy of modernity and tradition continued in the postcolonial period through a new dichotomy of developed and underdeveloped (Gupta 1998, 9). After independence from colonial rule, India and Pakistan saw the post-World War II rise of the Bretton Woods Institutions (World Bank, International Monetary Fund) that institutionalized a global governmentality of development, where underdevelopment became a new form of identity for North Indians (Gupta 1998, ix).

Development is thus a highly contested and ambiguous term that carries several layers of meaning: an organized system of power and practice that has formed part of the West's colonial and neocolonial domination of poorer countries; a form of "planned social change" that involves external intervention by one group in the affairs of another; the activities required to bring about change and progress often linked to economic growth; an adjective that implies there is a subjective standard against which different rates of progress may be compared

(Lewis 2005, 474). Since it came into being in 1971, Western countries have perceived Bangladesh as a “bottomless basket case”—a country of poor and starving people (New York Times 1972). This image, along with those of famines (including the one in 1974–75) and floods, portrayed an inferior Other (Said 1979) that needed the superior expertise and funds of foreign donors and consultants to bring growth and progress—to “lift it up from poverty.” This “development industry” is “a powerful and complex constellation of public and private agencies channeling large amounts of international development assistance, including intergovernmental organizations of the United Nations, multilateral and bilateral donors such as the World Bank or the United States Agency for International Development (USAID), and a vast array of nongovernmental organizations (NGOs) ranging from small specialized, grassroots concerns to large transnational organizations such as Oxfam or the Bangladesh Rural Advancement Committee (BRAC)” (Lewis 2005, 473).

This longer history shows how Bangladesh has long been acted upon by both colonial administrators and foreign donor agencies. *Misreading the Bengal Delta* discusses the ways in which development in the context of aid projects in Bangladesh constitute a continuation of the preceding notions of progress and modernity used to justify interventions in its environment and society. This illustrates how external ideas, external institutions, and external resources shaped the current form of Bangladesh and its state—from the creation of colonial railways and World Bank embankments to its dependency on development funding allocated to poverty reduction, modern agriculture, and now climate change—rather than creating a system of citizen entitlements to reduce societal inequalities.

The priorities of the development industry may not match those of the people it is seeking to help. As anthropological studies of development have long shown, the latest development paradigms and donor priorities can be summed up with specific buzzwords that unlock funding and influence the direction of intervention (Cornwall 2007). Buzzwords include *agricultural development* (Ferguson 1990; Li 2007), *gender* (Cornwall and Eade 2010), *participation* (Harriss 1988; Cooke and Kothari 2001), and *poverty reduction* (Cornwall and Brock 2005). Such buzzwords are easily co-opted and reconfigured into “fuzz-words”—that is, they no longer contest the argument they may originally have challenged (Cornwall 2007). The vagueness of buzzwords is also a part of the anthropological critique of development, which shows how development projects, particularly at the World Bank, are made to appear disembedded from a historicized, politicized, and social context (Ferguson 1990; St. Clair 2006; Broad 2006; Goldman 2005).

Today, *climate change adaptation* has become one of the main development buzzwords (Barnes and Dove 2015). However, climate change is distinct from development buzzwords such as *poverty reduction* and *gender empowerment*. While ineffective development interventions may not have had the intended results (Ferguson 1990; Mosse 2005), the stakes were low since the interventions aimed to alleviate already poor situations. Yet the stakes of ineffective development interventions earmarked as climate funding is far higher as they should address actual environmental conditions and challenges so as to remediate climatic risk, rather than exacerbate it.

Climate Change and Capitalism

The misreading of the coastal landscape illustrates the entwining of capitalist practices and development buzzwords. As this book shows, old forms of capitalist activities are continued in many development interventions now posing as climate related. This is a significant problem since the environmental challenges we face on a global scale today are inextricably linked to the advent of capitalism, which reduced both human beings and the natural environment to pure commodities. Political economist Karl Polanyi (1957) predicted such commodification would lead to the destruction of both. As political ecologists point out: “Environmental degradation is not an unfortunate accident under advanced capitalism, it is instead a part of the logic of that economic system” (Peet, Robbins, and Watts 2011, 26), where economic acceleration caused by late capitalism has resulted in considerable environmental overheating (Stensrud and Hylland Eriksen 2019).

Today, we are witnessing the most rapid and extensive destruction of biodiversity in human existence, a trend that has escalated since the Industrial Revolution. Climatic change arose from the unsustainable exploitation of nature in the name of profit and progress. Polanyi (1957, 42) further suggested that capitalism “was utterly materialistic and believed that all human problems could be resolved given an unlimited amount of resources.” Herein lies the contradiction between capitalism and the environment. For capitalism to thrive, it requires endless natural resources. Yet, natural resources are finite (Soule, Carre, and Jackson 1990). The extraction and use of fossil fuels has resulted in greenhouse gas emissions that contribute to long-term climatic change through global warming. While some academics propose to call our current geological epoch the Anthropocene, in which humans have become the dominant force shaping the earth (Gan et al. 2017), others suggest that we call it the Capitalocene to

highlight the system of power, profit, and re/production in capitalism and the way it has, and continues to be, entwined with the [use and abuse of the] environment (J. Moore 2016).

Indeed, in today's focus on climatic change, rising sea levels, and extreme weather phenomena, there is sometimes a risk of neglecting how capitalism, based on the commodification of nature (land) and humans (labor), has contributed to global warming. In addition, capitalist land-use and industrial practices have also resulted in significant localized environmental degradation, including, but not limited to, pollution, water scarcity, soil acidification, deforestation, desertification, and salinization of once fertile lands. Those climate-related projects that are based on the same capitalist modes of production as in the past exacerbate environmental crises while diverting funds and attention away from where they might be most needed.

Furthermore, capitalism's quest for profit leads to the expansion of technologies that seek to control and tame nature. The embankments of Bangladesh's coastal zone embody such technological visions of control as they facilitate profit-oriented agriculture and aquaculture while enabling land-based transport such as railways and roads. The entanglement of embankments with the environment and with human livelihoods illustrates the ways in which environmental degradation is the result of modern land-use practice. This is a factor that is often lost in problem formulations that focus solely on global warming through greenhouse gas emissions, where mitigating policies are often reduced to CO₂ caps and trading. But most importantly, we must be aware that climate change adaptation and mitigation can be harnessed by particular capitalist actors to continue with their existing and environmentally damaging activities.

Simplifying Floods and Embankments

Misreading the Bengal Delta begins by historicizing the World Bank's current framing of flood-protection embankments as a new form of "climate adaptation infrastructure." Drawing on archival sources and oral histories, it reveals how the ecological problems now associated with climate change, and the embankments that are proposed as its solution, both have their roots in an unfolding sequence of colonial initiatives dating back to the mid-nineteenth century. Development portrayals of floods as being caused solely by rising sea levels is complicated by the fact that Bangladesh experiences three types of floods: *borsha* (annual monsoon rains), *bonna* (irregular destructive floods in the wake of cyclones, tidal surges, and storms) and *jalabaddho* (waterlogging, drainage congestion). The

earliest embankments in the Sundarbans were not made to stop floods. They were temporary and made of earth to prevent the dry season incursion of saline tidewater: they were broken each year to support monsoon flooding, which colonial accounts lauded as a “blessing of fertility” for Bengal and the cost of repair was borne by the cultivators and landholders themselves (1770s–1850s).

However, under the centralized administration of the British Raj, the narrative shifted: all floods were viewed as damaging to life and property, which justified the creation of watertight embankments so as to reduce the costs of annual repairs. Not only did these new embankments not break, but railways and roads, crisscrossing the delta, were built on top of them to promote British military and economic interests. The imposition of a permanent infrastructure on top of a dynamic landscape interrupted the natural cycle of monsoon floods and silt deposits. Like the “schemes of improvement” described by James C. Scott (1998), embankments were cast as part of modernity and a vehicle for betterment. In reality, they oversimplified complex environmental and social processes and profoundly damaged the fragile coastal ecology. Similar to how “policymakers may have been misreading Kissidougou’s landscape by reading forest history backward” and wrongly blaming local villagers for deforestation and environmental destruction in Guinea (Fairhead and Leach 1996, 3), representations of Bangladesh’s climate change vulnerability also risk reading the coastal landscape backward by simplifying the complex and interlinked processes affecting Bangladesh’s southwest coastal zone.

This longer history of how permanent embankments in a dynamic eroding, accreting, and meandering delta highlights how efforts to prevent monsoon floods have had the unintended effect of increasing siltation in the southwest coastal zone of Bangladesh.⁶ Silt trapped in the canals and rivers makes the waterbodies shallow and reduces their water-retention capacity during the dry season, while raising the riverbed levels outside embankments. The difference in elevation traps rainwater inside the embankment, river water then overflows and the ensuing drainage congestion causes damaging floods called *jalabaddho* or waterlogging (Adnan 1994; Iqbal 2010). Thus, while many international experts argue that climate change causes floods in Bangladesh, floods in Bangladesh are not just about climate change.

To build flood-protection embankments as a form of adaptation to climate change may in fact only serve to worsen preexisting flood problems (Auerbach et al. 2015). A historical discussion of floods and embankments further illustrates the role of donor-funded development projects in shaping water management in southwest coastal Bangladesh. This contributes to existing scholarship on

how managing water and the movements of water bodies in South Asian deltas impose artificial land-water separation (Lahiri-Dutt and Samanta 2013; Mukhopadhyay 2017) while being deeply entangled in projects of state-making from the colonial period to today (Mosse 2003; D'Souza 2006; Bhattacharyya 2018).

Translating Climate Change

While this book begins with a critical analysis of embankments as adaptation, not all projects using climate change to attract donor funding exacerbate or ignore environmental problems. Various development brokers (specific donors, NGOs, consultants, and government agencies) use climate change to attract and legitimize funding for their particular development interventions. These projects simplify complex environmental processes, especially in deltaic waterscapes. They do this by rearranging events and outcomes to alter expectations of causality, thus making the interventions appear as if they were addressing climate change.⁷ They translate the *metacode* of climate change—a code that strips out context so that it appears neutral and universal in order to provide a space for resolving differences and carry out transnational negotiations (Rottenburg 2009, 142). Translation here refers to the processes by which development brokers produce “coherence”; that is, they make projects real by generating and translating interests, mutually enrolling supporters, and stabilizing interpretations and representations so as to match causal events to the prevailing project logic or policy theory (Mosse and Lewis 2006, 13; Mosse 2005, 9).⁸ The policy theory in Bangladeshi climate change projects tends to be climate reductive: the country will drown because of rising sea levels caused by global warming. “Climate reductive translations” thus help conceptualize how different climate projects produce coherence, creating causal narratives linking development interventions to the policy theory of climate change.

This approach is anchored in the anthropology of development that analyzes development as a practice of politics (Li 2007). It draws on “aidnographies,” or ethnographies of aid, where development is “not a coherent set of practices but a set of practices that produces coherence” (Yarrow 2011, 6). Power in development is not simply a hegemonic discourse *forcing* certain outcomes (Mosse 2011), but is a practice resulting from the actions of development professionals complicit in maintaining and reproducing dominant development narratives (Mosse 2005). Bangladeshi development professionals can be conceptualized as development brokers—social actors that actively build social, political, and economic roles rather than simply following normative scripts (Bierschenk, Chauveau, and

de Sardan 2000; Mosse and Lewis 2006). Building on *assemblage* as a concept that captures how multiple parts form a whole (Deleuze and Guattari 1987, 69), these Bangladeshi development brokers can be understood as partaking in “development assemblages” that constitute heterogeneous development actors (donors, NGOs, state units, consultants) that come together to create a common development project by translating climate change.

To illustrate the importance of brokerage in such development assemblages, I draw on ethnographic materials from development meetings, conferences, and interviews with researchers, NGO workers, and development professionals who work with climate-related aid-funded development projects in Bangladesh. Such an aidnography highlights how the development industry forms part of a “technical game”—a game that strips out context in order to resolve differences and carry out transnational negotiations between diverse actors with different interests, beliefs, and knowledge backgrounds. To participate in the technical game, Bangladeshi development brokers use climate change as a *metacode* (Rottenburg 2009, xxvi), or what they themselves refer to as “spice.” Their performativity helps explain the diversity of development project proposals and highlights the importance of analyzing the actors and networks that actively *translate* climate change to legitimize widely different project activities, such as those that generate rural employment, restore important local canals, and provide safe drinking water. This is a stark contrast to top-down projects such as large infrastructure projects (such as embankments) or export-oriented brackish aquaculture, which contributes to agrarian dispossession.

The concept of “climate reductive translations” thus centers on heterogeneous development brokers who are social actors with a high degree of agency, but who are structurally constrained by the funding paradigms of development donors (Long 2001). This focus on development brokerage nuances previous work suggesting that development discourse is internalized by development actors in ways that control and shape their thoughts and actions (Ferguson 1990, 18; Escobar 1995, 52) and complicates ideas of development as an “extremely efficient apparatus for producing knowledge about, and the exercise of power over, the Third World” (Escobar 1995, 9). Existing enquiries into this development–climate change nexus in Bangladesh have focused on English-speaking Western development professionals. For example, Jason Cons suggests that Bangladesh can be viewed as laboratory for donor-funded climate interventions best conceptualized as a Foucauldian “heterodystopia” (Cons 2018), while Kasia Paprocki proposes that the increased amount of climate funding in development has resulted in an “adaptation regime” that governs both people and landscapes in ways that

results in agrarian dispossession and outmigration where climate change projects operate as an “anti-politics machine” (Paprocki 2018; 2016). *Misreading the Bengal Delta* contributes to this critical literature on climate change and development through its examination of brokerage undertaken by local Bangladeshi development professionals in climate-funded projects to better understand why climate-related projects can have such widely diverse interventions, aims, and outcomes both on the environment and society.

Climate Reductive Translations in Salt- and Freshwater Villages

The particular characteristics of each development assemblage helps explain the shape and form of widely different adaptation projects, such as saline tiger-prawn cultivation and intensive high-yield agriculture, that repackage longstanding interventions as climate solutions. The recasting of brackish-tiger-prawn cultivation as climate adaptation by foreign actors and research institutes in Bangladesh serves as another illustration of a climate reductive translation that is out of touch with the lived experiences of the landless poor. Tiger-prawn-related brokers translate climate change as the sole, or inevitable, cause of salinity in the coastal zone in order to legitimize the expansion of brackish shrimp aquaculture for exports. By doing so, they ignore how salinity is both seasonal and reversible and can be alleviated by temporary breaches during the monsoon and tidal river management, which may help enable longer agrarian futures.

Land-centric Marxist theories of accumulation and the privatization of common lands are difficult to apply in the analysis of tiger-prawn cultivation because of the Bengal delta’s fluid land- and waterscapes where the rights to water bodies are as important as, and often indistinguishable from, land rights. This results in multiple and more-than-economic dimensions of dispossession where the quality of water used in aquaculture matters. A gendered ethnography in the saltwater village of Lonanodi captures how suffering is used as an affective critique against saltwater practices and its devastating ecological effects—showing the relevance of emotional political ecologies to better understand shrimp aquaculture (Sultana 2011).⁹ Rather than being against capitalist land use practices, people in the embanked floodplain of Nodi are happy with export-oriented and capitalist crab and freshwater *golda* prawn production as these require fresh—not saline—water.

In Dhanmarti village, locals stopped tiger-prawn cultivation and returned to freshwater farming. Because salt reduced the soil fertility, they are now dependent on a package of agricultural technologies (intensive crop patterns, pesticides,

synthetic fertilizers, and high-yield and high-value crops/seeds). These interventions formed part of the Green Revolution that American actors introduced to Bangladesh in the 1960s. Today, particular development assemblages, including USAID and the World Bank, are repackaging these same agricultural technologies as adaptation measures in most of Bangladesh using neo-Malthusian discourses. This image of Bangladesh as Malthusia (poor and starving because of a large population) is contested by local critiques of yield-centric modes of agriculture through technology. Such critiques are articulated through emic concepts such as *shakti* [strength, power, soil fertility] and *bhejal* [impure, adulterated, corrupted].

While anthropological critiques of Green Revolution technologies have generally focused on the symbolic dimensions of social change, the lived experience and materiality of *shakti* and *bhejal* illuminate the interlinkages between the environment, agriculture, and health. New interdisciplinary findings in biology and environmental anthropology on the importance of microorganisms for human health highlight the multispecies entanglements between environment, food, and humans—captured through local conceptualizations of *shakti*. Climate change adaptation projects that promote intensive agriculture fail to address historical lessons of soil degradation and biodiversity loss, while ignoring how weak institutional structures of enforcement contribute to an increasingly toxic landscape with health-harming foods. This focus on climate change in the development industry is thus at risk of failing rural society and ecology in southwest coastal Bangladesh in several ways: by funding unsustainable infrastructure, aquaculture, and agriculture that damage the local environment and weaken livelihood capacities by promoting capital-intensive technologies.

Misreading Coastal Vulnerabilities

Development projects not only simplify complex environmental processes by misreading the coastal landscape, they also misread coastal vulnerabilities in ways that do not always match the livelihood concerns of those they seek to help. On donor websites on climate-related development activities, several initiatives aim to “educate and train coastal communities” in Bangladesh to “build capacity” and “raise awareness” on natural resource and disaster risk management (USAID 2013). In light of the historic devastation brought on by cyclones, tidal waves, and storm surges, such disaster preparedness and shelters are important means to address a particular form of vulnerability of the biophysical coastal landscape. Notably, donors suggest that strengthening emergency preparedness

is a means to reduce “coastal vulnerabilities,” where climatic change will increase the “vulnerability of coastal populations” and the poor in the Global South (World Bank 2018) that risks reversing the effects of development interventions to date (UNDP 2019). Indeed, donor projects tend to view women as especially vulnerable. For example, the UNDP’s (2019) climate adaptation project “Coping with Climate Risks by Empowering Women in Coastal Areas” is based on the idea that “women in the project area are highly vulnerable to climate change impacts given their limited access to resources and limited stake in decision-making. . . . Their dependency on degraded natural resources makes women especially vulnerable to diminished livelihoods and increased poverty.”

Such a narrow concept of vulnerability has been criticized for enabling paternalistic, patronizing, and controlling tendencies toward those groups in society deemed differentially vulnerable, thereby reproducing and ratifying vulnerability (Gilson 2016). It is also based on a very simplified understanding of gender dynamics in rural Bangladesh, illustrating a wider tendency of projects and recent development literature on gender and climate change to reproduce stereotyped ideas of women as particularly vulnerable, poor, and needing special attention (Arora-Jonsson 2011). This is a typical example of how emphasizing vulnerability can be employed to get decision-makers to pay attention and do the right thing, while obfuscating the agency, knowledge, and resilience of marginalized groups (Cuomo 2011, 695).

Designating vulnerability to different groups—as many development interventions in Bangladesh do—becomes a political decision that may entrench the very conditions that it seeks to alleviate by making that group accountable for their own precarious situation and thus indirectly justifying injustice (Butler 2014, 111). In this sense, the widespread use of the concept of vulnerability in the literature on adaptation and climate change has often been conflated with poverty and diluted the concept. It has gone from being an inherently critical concept to becoming a dehistoricized term used to describe a set of fixed conditions and thus fails to systematically address imposed social vulnerability (Crate and Nuttall 2009).

What is imposed social vulnerability? There seems to be a tendency to use *vulnerability* synonymously with *precarity*, which may result in both words losing their analytical purpose (Millar 2017; Runacres 2020). Social vulnerability could be seen as a form of “ontological precarity,” where anthropologist Anna Tsing (2015, 20) argues that precarity is the *condition* of our time in a world filled with indeterminacy and unpredictability. This condition of precariousness is quite different from precarity used to understand “the predicament of those who

live at the juncture of unstable contract labor and a loss of state provisioning” (Han 2018, 331). The focus on loss of state provisioning in the term *precarity* captures a critique of contemporary capitalism and is linked to the concept of *precariat*, where workers in the West have come to lack benefits and securities once common before global outsourcing (Standing 2016). Yet workers have constantly been in precarious positions in the Global South: there were no labor rights in Bangladesh to dismantle to begin with. Instead, the precarity of work in Bangladesh—its insecurity and lack of stability—is arguably a demonstration of how global capital moves to low-income regions to exploit the lack of worker rights in countries that have not had an opportunity to develop them. Labor opportunities are sparse for the landless in Nodi, while the costs of healthcare, education, dowry, *ghush* (bribes), and microcredit result in unequal outcomes for the poor. This is further exacerbated by structural underemployment resulting in—and propagating—precarious work and uncertain livelihoods.

Thus, the development industry’s use of “coastal vulnerabilities” conflates the vulnerability of a particular place to climatic risk with the socioeconomic constraints of the people living there. Arguably, this is an example of an “antagonistic clash” between multiple vulnerabilities existing in the same context (Runacres 2020). Climate adaptation projects, like most development projects, are short and fleeting interventions that do little to remediate these widening socioeconomic inequalities in Bangladesh where the rich are becoming richer and the poor are becoming poorer. Moving away from the vulnerability of people in an area deemed by donors as climate vulnerable to understand everyday precarity arising from the long-term effects of donor-demanded structural adjustment policies illustrates how coastal vulnerabilities are fundamentally tied to inequality.

The macroeconomic effects of reducing the role of the state while targeting women in development projects have gendered effects that complicate narratives of poor Bangladeshi women as more vulnerable in an oppressive and patriarchal society. Structural inequality and everyday precarity of people in Nodi takes the form of women accumulating microfinance debt to afford education for their children, healthcare for their loved ones, dowries for their daughters, and even the labor and migration brokerage costs required to secure employment opportunities for their male family members. Providing a space for the livelihood concerns as they are articulated by landless earthworking women and their families in the embanked floodplain of Nodi sheds light on how misreading the coastal landscape also involves misreading the socioeconomic landscape.

Long-term ethnographic fieldwork with a historical outlook helps bring these complexities to light through the messy disjunctions of history and the voices of

people so often neglected. It highlights the livelihood concerns of these people so that development funds may be redirected toward these ends. It is essential to add these perspectives to discussions of climate change, which otherwise tend to be dominated by natural science perspectives and scientific models based on assumptions that risk overlooking the intricate chains of causality behind the correlations they measure. Examination of the intersection of ecology, politics, and society in this aid-dependent “climate hotspot” reveals the flawed assumptions of Western development donors seeking to save an “inferior other.” By understanding how development projects misread climate change in such an unequal aid context, we are better able to identify, and thereby address, pressing livelihood problems such as the environmental degradation caused by embankments and saltwater tiger-prawn cultivation, reduced soil fertility, food becoming an adulterated commodity, and weak public institutions. This analysis of the knowledge production of climate change in the global development industry is relevant for other places in the Global South, particularly coastal communities facing floods and rising sea levels.

Simplifying Embankments

Images of Bangladesh as a climate change victim frequently circulate in the news. It was with the cyclones Sidr (2007) and Aila (2009) that significant international attention was directed toward Bangladesh as a climate hotspot. A decade later, Bangladesh escaped the disastrous wake of cyclones Fanni (2019) and Amphan (2020). The country's low-lying topography is cast as particularly vulnerable to global warming: the frequency of tropical storms and tidal surges is expected to increase, and sea levels are projected to rise (Nikitas 2016). Alarming images (fig. 1.1) have been pivotal in attracting hundreds of millions of dollars in development funding toward climate change adaptation and mitigation (Global Climate Change Alliance+ 2012).¹

However, completely eliminating flooding in Bangladesh is undesirable since floods are entwined with the livelihoods of people living in the delta (Zaman 1993, 987). Despite well-meaning intentions, the way the Western press uses images like the one in figure 1.1 conflate beneficial monsoon floods with sea-level rise, portraying floods as being caused *solely* by climate change. The narrative that floods result in climate refugees ignores the fact that there are three types of floods in Bangladesh: *borsha* (annual monsoon rains), *bonna* (irregular destructive floods in the wake of cyclones, tidal surges, and storms), and *jalabaddho* (waterlogging, drainage congestion). In a natural environment without any artificial infrastructure, the *borsha* rainwater merges with the silt-laden river water to deposit silt on the floodplains. The silt raises the land levels and promotes processes of organic decomposition that make the deltaic lands fertile. These inundated wetlands are the breeding grounds for hundreds of spawning fish species and help irrigate *aman dhan* (rice planted during monsoon season). In view of this, the narrative that *all* floods must be prevented is highly problematic.

For instance, permanent flood-protection embankments (dikes) obstruct the process of monsoon *borsha* flooding. The construction of these embankments



FIGURE 1.1. Image accompanying a *Huffington Post* article on 28 January 2016, with the headline “Haunting Photos Show Effects of Climate Change in Bangladesh” and the tagline “The number of climate change refugees in Bangladesh is expected to increase dramatically in the coming decades.” Photo courtesy of Probal Rashid.

in the 1960s resulted in preventing the 1.5 billion tons of sediment that pass through the Bengal delta each year from being able to deposit on the floodplains during the monsoon. Instead, the silt clogs up the rivers and raises the riverbed levels outside the embanked floodplain (Brammer 2014; Hossain et al. 1987). This difference in elevation traps the heavy monsoon rainwater inside the embankment, as it can no longer drain out to the rivers. The ensuing congestion leads the water to stagnate and ruins crops in the type of flood referred to as *jalabaddho* (Iqbal 2010). Figure 1.1 is a typical image of *jalabaddho* during the monsoon, when water is unable to drain out through an embankment and back into the river—this is known as waterlogging or drainage congestion. Thus, the complexity of the local ecology and the distinctions between *borsha*, *bonna*, and *jalabaddho* floods are lost in portrayals of Bangladesh as a climate change victim.

The World Bank is spending US\$400 million on a project to build wider and higher flood-protection embankments based on a project rationale that this constitutes climate change adaptation. The logic is that (1) sea levels will rise and cyclones will increase in frequency and intensity; (2) this will lead to devastating floods and salinity in Bangladesh; and (3) the best way to protect Bangladesh is to build larger embankments (World Bank 2012). By rearranging

events to alter expectations of causality, the World Bank is in effect reinforcing a climate reductive narrative as it does not engage with past experiences of how flood-protection embankments worsen siltation and exacerbate damaging *bonna* and *jalabaddho* floods.

In Bangladesh's southwest coastal zone, embankments were built long before climatic change was identified as a problem and were not initially tied to preventing floods. The colonial state shifted from viewing floods as fertile inundations during the East India Company regime to viewing them as damaging under the British Raj. Today, external development agencies equate floods with rising sea levels. Attention to shifting portrayals of floods contribute to debates on colonial water management and the problems of imposing land-water dichotomies through statecraft.

For example, the very first embankments in the Sundarbans mangrove forest, in what is now the southwest coastal zone, were not built to stop floods but were entwined with processes of deforestation to expand arable land. Each year, temporary earthen embankments were constructed after the monsoon to protect against saltwater intrusion from the Bay of Bengal in the dry season. This helped to prevent paddy fields from reverting back to mangrove forest. The change from salinity protection during the East India Company regime to flood protection during the British Raj coincided with the creation of a centrally administered colonial state. The official colonial narratives shifted from lauding *borsha* floods as a blessing of fertility for Bengal to portraying all floods as damaging and that needed to be dealt with technically through impenetrable and permanent embankments. This shift was motivated by centralizing maintenance costs and strategic military and economic gain, but was also contested by dissenting voices within the colonial apparatus.

Finally, the construction of permanent flood-protection embankments after the colonial period through the Coastal Embankment Project (1960s–70s) and the Flood Action Plan (1990s) illustrates how narratives of improvement, whether through railways, flood protection, or climate change adaptation, have the potential to enable simplification in ways that increase the financial interests of particular actors, both within state administrations and within international organizations. The current reading of coastal Bangladesh as requiring higher and wider embankments is unsustainable as it ignores how such infrastructure exacerbates siltation and increases flood risks. Climate change in Bangladesh is often reduced to rising sea levels causing floods, but floods in Bangladesh are not just about rising sea levels (Auerbach et al. 2015; Brammer 2014).

Deforestation and Embankments as Salinity Protection (1770s–1850s)

Embankments were constructed long before climatic change was identified as a problem for Bangladesh, and they were not originally intended to prevent floods. Instead, the earliest recorded forms of embankments in Bengal were built to protect newly created arable land—made by clearing coastal mangroves—against seasonal salt tide-water incursion. In order to comprehend the complexities of different types of floods in Bangladesh, it is important to understand the history of embanking the Sundarbans forest in Bengal and how it was interlinked with the deforestation of these mangrove wetlands.

The Bengal delta is formed by the confluence of the Ganges (Padma), Brahmaputra (Jamuna), and Meghna rivers. Each year, the monsoon *borsha* rains cause the rivers to flood the deltaic plains, depositing fertile silt and creating new land. The enormous volume of rainwater, combined with Himalayan runoff, also results in a freshwater surge through the delta that flushes out the residual salinity from the dry season. Before it reaches the ocean, the delta meets with the Sundarbans, the largest remaining mangrove forest in the world, which once covered the entirety of the delta. The forest grew on the land created by the silt carried from the Himalayas and by the saline tides of the Bay of Bengal. The mangroves form a unique ecosystem rich in fauna and flora and embody the entanglements of land and water, soil and sea, with their roots in the water and their trunks emerging from the silted earth. The forest protects people and land from the ravages of the ocean, saline tidal inundation, and occasional cyclones that cause tidal surges (*bonna*): they are a fluid boundary between arable, habited settlements and the Bay of Bengal. But as humans cut down the forest to expand arable land, they replaced this natural barrier with artificial earthen dikes to protect crop yields from the brackish tidewater of the Bay of Bengal.

The deforestation of the Sundarbans predates British colonialism. From the early Turkic sultanate (1204–1576) to the end of the Mughal period (1576–1765) the Sundarbans was perceived as a frontier pushing steadily southward, closer and closer toward the Bay of Bengal through the “reclamation of jungle” (Eaton 1993). Deforestation was part of “reclaiming” and converting “wild jungle” into arable land for “human civilization.” Turkic officers in the Bengal Sultanate, later seen as Sufi saints (*pirs*), played a pivotal role in converting the jungle to paddy fields and converting Bengalis to Islam. This is symbolized through the local legend of the *pir* Badi Ghazi Khan who fought the tiger demon Dakshin Ray of

the Sundarbans, creating an imagery of Islam mastering the forest through the struggle against tiger and tree (Eaton 1993, 9).

From the late sixteenth century onward, the Mughals continued the practice of converting forests to farmland, with the primary objective of extending rice cultivation for land revenue collection. They actively encouraged peasants to cut down more forest to expand arable land. As the population increased, the need for more farmland was sustained through encroaching on the Sundarbans (Singh 1995). Forest clearance for the expansion of agriculture and crop production was pursued under both Muslim regimes, but, unlike their predecessors, the Mughals did not actively promote Islam in Bengal (Eaton 1993; Van Schendel 2009).

Deforestation under the East India Company

The Mughal rule of Bengal effectively ended with the 1757 “Battle” of Plassey when the East India Company forced the Mughal-appointed Nawab of Bengal to give up his territory. Bengal thus became the first part of the Indian subcontinent to be colonized by the British. Under Company rule, the Bengal region saw a decline in its existing textile industries and trade-based prosperity (H. Hossain 1988). By 1765, the Company, under Sir Robert Clive, formalized its control by seizing revenue collections rights for Bengal and Bihar from the severely weakened Mughal emperor. Subsequently, the Company commissioned Major James Rennell to survey its new territories. Information was collected from 1764 through 1773, resulting in the *Bengal Atlas* (Rennell 1779a). In one of the journals from this survey, Rennell’s surveyor Martin describes the Sundarbans as an unpopulated forest with economically valuable salt production (Phillimore 1945, 1:50–51).² Fleets of boats transported salt produced in the Sundarbans to Calcutta and Bihar via the small port of Culna situated at the northern boundary of the Sundarbans forest (La Touche 1910), as illustrated in Rennell’s (1779b) *A Map of the Sunderbund and Ballagot Passages* (fig. 1.2).³ Today, Culna has become the divisional city of Khulna, a large industrial urban hub.⁴ When the East India Company first seized the right to collect revenue in Bengal and Bihar in 1765, the unpopulated Sundarbans mangrove forest was used for profitable salt production, in which the Company’s Salt Department upheld a monopoly and kept their headquarters in Culna (Phillimore 1945, 1:50–51).

By the 1770s and 1780s, there was increasing tension between the Salt Department and the Magistrate—a rival Company faction. Magistrate Henckell’s work entailed administering justice in Jessore and curbing the violent oppression and use of slave laborers in the East India Company’s Salt Department (Westland

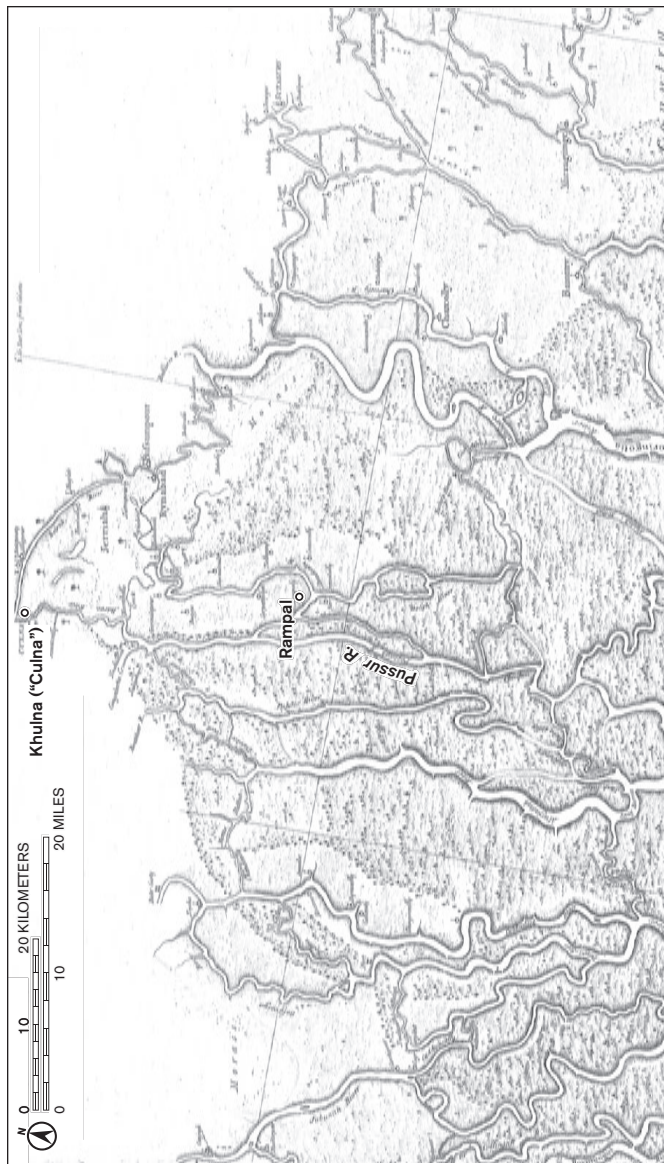


FIGURE 1.2. Map by James Rennell of the Sunderbund and Ballagot Passages, 1779, showing that the boundary of the Sundarbans was once Culina, now Khuina city. © British Library Board (Rennell map 25.b.8).

1871). In addition, Henckell's own interest in forest clearance was at odds with the work of the Salt Department, as he belonged to the group of Company men interested in bringing the "waste lands" (Sundarbans forests) into "cultivation"—that is, cutting down mangrove forests and turning them into farmland for revenue.⁵ Henckell, who was also a European *zamindar* (landlord), turned a forested area into arable land with 150 leases from 1784 to 1800, naming it Henc-kellganj. It became the most well-known reclamation of the Sundarbans (Lahiri 1936; Westland 1871, 137).⁶ Unsurprisingly, Henckell's work, both in terms of forest clearance and administering justice, was actively resisted by the dominant salt monopoly actors in the Sundarbans as it encroached on their territory both physically and judicially (Lahiri 1936).

The violence of the salt monopoly was part of the larger problem of overtaxation. Such an extraction of surplus contributed to the Great Famine of Bengal (1769–73), where 10 million people—one-third of the Bengali population—died (Sirajul Islam 1997).⁷ Poor governance, monopolies, greed, and exploitation characterized Company rule (Ranajit Guha 1963, 13). It has long been debated whether overtaxation was the result of greed alone (Bolts 1772), or an overly complex Mughal revenue collection system (O'Malley 1925; Hill 2008; Iqbal 2010; Ludden 1999). Under Mughal rule, the emperor owned all land. Rather than collecting a fixed sum each year, the emperor's nonhereditary and appointed governors collected a share of the annual yield. This allowed for flexibility in revenue collection as it took into account variable harvests and the fact that land erodes each year because of meandering rivers (Iqbal 2010). The Mughal system of land tenure and revenue collection in Bengal mystified East India Company officials with its intricate customary rights and obligations in Persian script; they found it too complex to interpret in Western terms (Ranajit Guha 1963, 13).

The Permanent Settlement Act: Accelerating Deforestation

In his *History of Bengal under British rule*, the British civil servant Lewis S. S. O'Malley (1925) suggests that Lord Cornwallis imposed a British-style land-tenure system—the Permanent Settlement Act of 1793—because of this inability to understand a fundamentally different land-revenue system. The Permanent Settlement determined fixed revenues based on the boundaries of 1793 for tributes, rents, and services of rajas, *zamindars* (landlords), and other landholders. While Mughal emperors could award and take away official positions and titles, the Permanent Settlement Act instead established hereditary "private proprietary rights" based on British ideas of landowning estates and aristocracy. This resulted in the creation of a new tax-paying landlord class, the *zamindars*,

who became full owners of the land with the right of inheritance and sale where none had previously existed, forming a radical break from the Mughal land-tenure system (Ranjit Guha 1963; Scott 1998, 48).⁸

James C. Scott (1998, 48) argues that this new system was based on a completely different social and ecological context with no regard to local knowledge and practice, and was imposed as a means of simplifying the functions of taxation for the benefit of the colonial administration.⁹ However, archival sources from this time show how Cornwallis's insistence of giving proprietary rights to *zamindars* stemmed from his conviction that the prosperity of the country depended on the existence of a class of landed proprietors (O'Malley 1925, 258). While Cornwallis disregarded local knowledge and practice, the Permanent Settlement Act was contested and opposed by Sir John Shore and several directors of the Company, and condemned by the subsequent administrations of Warren Hastings and Lord Metcalfe (O'Malley 1925, 261–71). This highlights that the interests of the state and capitalists did not envisage a similar or uniform agenda of simplifying taxation.

The Permanent Settlement failed to consider variable, weather-dependent crop yields or the loss of land to riverbank erosion that is so characteristic of the Bengal delta (Iqbal 2010). Because of the meandering of the Ganges, Brahmaputra, and Meghna rivers, several thousand hectares of floodplain is subject to erosion each year along 2,400 kilometers of riverbank (F. Islam and Rashid 2012). This is a feature of the delta that contributes to its ever-shifting land-waterscape. As the meandering rivers eroded riverbanks, many of those holding titles to such land were unable to pay the fixed revenue based on the 1793 boundaries and went bankrupt (Iqbal 2010). Indeed, those landlords who did not pay the revenue owed risked losing their estate (O'Malley 1925, 275).

The Sundarbans region was not included in the Permanent Settlement Act as an incentive to *zamindars* to reclaim the land from “jungle” that had spread since the famines of the 1770s. Coupled with the overwhelming tax burden of the new *zamindari* estates, these fixed boundaries provided a strong incentive to escalate the conversion of Sundarbans forest into arable land free from additional tax burden (O'Malley 1925, 258). From the 1780s onward, the southwest Sundarbans of Jessore and the 24 Parganas saw increased deforestation as their borders expanded southward (Hunter 1875a). While Khulna was the boundary to the Sundarbans in 1779, much of the forest was cultivated by 1812. Extended forest clearance is seen in Hugh Morrison's (1828) *Continuation of the Survey of the Sunderbunds* where settlements and cultivated lands that correspond to contemporary villages in Nodi are seen.¹⁰

The transformation of the Sundarbans increasingly became a Government of Bengal priority as the Company administration awarded grants to bring the “wastelands” into cultivation. The Company’s revenue officials designed incentives for landowners to maximize the rate of transformation of wetland forest to taxable agricultural land. These included land grants, tax incentives, cadastral surveys, and subsidized irrigation (Iqbal 2010). However, archival records from 1830 indicate how high revenue demands of cleared land resulted in an unintended effect of accelerated deforestation of areas not authorized by existing grants and where colonial administrators struggled to obtain revenue from lands “brought into cultivation” beyond the size awarded in formal grants.¹¹ For example, revenue collectors of Jessore found that “large tracts of land in the Sunderbunds exceeding the quantity specified in the grants of the several Talukdars [landholders], have been brought into cultivation for which no revenue is paid. . . . It would appear that 25,000 beegahs of land have been brought into a productive state . . . the original grant for which was about four hundred beegahs.”¹²

The more land was liable to pay revenue, the more it was cleared to avoid such revenue collection. The deforestation of the Sundarbans thus continued to accelerate at a rapid pace. In the 1840s, twenty thousand acres in the “Backergunge Sundarbans,” east of Khulna, was cleared by the Morrells into *Morrelganj* (Bengal Revenue Board 1836, Paragraph 147, page 17C). Gastrell (1868)—a revenue surveyor—notes how the swamps from Rennell’s 1779 *Bengal Atlas* are dotted with villages and converted into “first-rate rice lands.” However, he warns against extended cultivation: “Care should . . . be taken eventually to preserve a broad belt of forest between the clearings and the bay, to protect them from the encroachments of the sea during the storms” (Gastrell 1868, 25).

Gastrell’s warning was not heeded. Two thousand square kilometers of land—70 percent of the Sundarbans—was cleared between 1830 and 1873 (Richards and Flint 1990). Figure 1.3, the 1874 *Map of Jessore District*, shows how Khulna is no longer the frontier of the Sundarbans as it was in 1779 (Thuillier 1874). The many place names on the map—so many that they are barely legible—illustrate how this vast deforestation led to both cultivation and habitation, while leading to settlements closer to the storms arising from the Bay of Bengal with less forest cover as protection.

John F. Richards and Elizabeth Flint (1990, 17) claim that “land-hungry peasants strove to transform the native tidal forest vegetation into an agro-ecosystem dominated by paddy rice and fish culture.” However, this is a simplified explanation, as colonial revenue officers actively encouraged cultivators to deforest the Sundarbans—Cornwallis himself excluded the Sundarbans from the Permanent

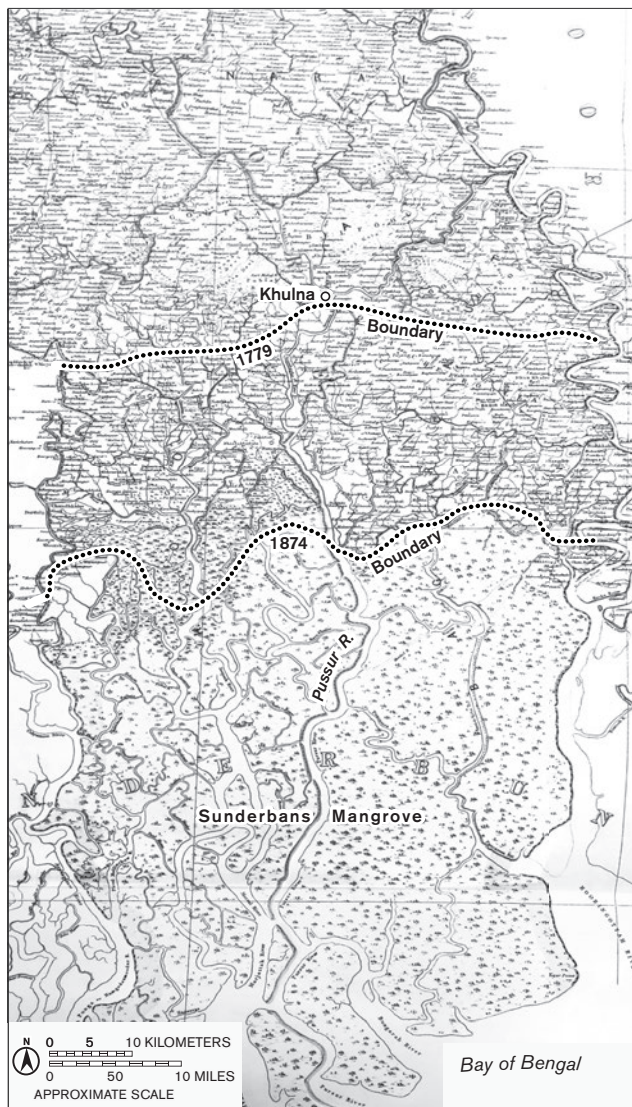


FIGURE 1.3. Map by H. L. Thuillier of Jessore District, 1874, showing the boundary of the Sunderbans in 1779 versus the boundary in 1874. Many place names litter the map, showing how the area has become more populated. © British Library Board (Thuillier, IOR/X/1176).

Settlement to incentivize *zamindars* to “reclaim the jungle” and expand arable and revenue-generating land (O’Malley 1925).

The 1830s cadastral surveys of the Sundarbans, together with high tax demands, motivated cultivators to exceed the boundaries to avoid financial pressure. However, with the next cadastral survey their tax burden increased yet again. As a result, they continued to exceed the official boundaries to enjoy tax-free yields, exemplifying how the production of capital necessitates the production of new spaces. William Hunter (1875b, 183) proposed further “reclamation” of the Sundarbans and the Government of Bengal *Large Capitalist Rules* (1879) continued such encouragement by providing financial incentives for doing so. This included, for example, nineteen years of revenue-free cultivation of reclaimed lands (Lahiri 1936, 114–15). The colonial enthusiasm for deforestation and embankments persisted into the twentieth century, with the Census of India reporting: “There is an immense quantity of fertile land waiting the axe and the plough. The jungle is steadily being pushed back, and every year more land is being brought under cultivation” (1902, 74).¹³ These colonial preferences undermine Richards and Flint’s claim that “land-hungry peasants” were exclusively to blame for the rapid deforestation of the Sundarbans.

Converting Sundarbans to Paddy Fields

The British colonial administration actively promoted deforestation of the Jessore (Khulna) Sundarbans for the expansion of arable land.¹⁴ This coincided with the most rapid destruction of the Sundarbans that Bengal had experienced until that point (Gadgil and Guha 1992; Richards and Flint 1990; Sivaramakrishnan 1999). By the end of the 1920s, the Khulna District had a considerable permanent population, while the “reserved forests” established in 1875 had now been converted to agricultural land (Census of India 1933). This change is clearly visible in H. D. Ryder’s (1929) map—based on a survey from 1922 to 1924—that is dotted red with homesteads and settlements now increasingly positioned at the banks of the rivers amid yellow-colored cultivated lands. The once “wild jungle” depicted in Rennell’s 1779 map had turned into tamed, cultivated land, where embankments—raised sea walls shown in black dashed lines—are for the first time visible in what is now Nodi.

Although the conversion of forest into arable land can be seen as a continuation of a practice dating back to the Turkic Sultanate and Mughal rule (Eaton 1990), the rapid pace of British deforestation (1765 to 1947) entailed the establishment of new arable lands and settlements into increasingly low-lying parts of the southern Sundarbans subject to the salt tides of the Bay of Bengal. A great

part of converting Sundarbans forest into arable land required the construction of *bandhs* (bunds), small earthen dikes adjacent to rivers that protected rice fields from saline tidewater during the dry season (Lahiri 1936, 39). *Bandhs* were not built to prevent floods; on the contrary, cultivators purposefully breached them each year to enable monsoon *borsha* floods, in order to reap the benefits of irrigation and silt deposition. The early colonial administration in Bengal lauded *borsha* floods as a “blessing of fertility.” Rennell (cited in La Touche 1910, 27) and Gastrell (1856) describe how monsoon “inundations” were a natural part of the landscape that deposited nutrient-laden silt from the rivers. These processes were key to the fertile lands of Bengal.

The much larger volumes of water toppled over the *bandhs* in the newly cultivated Jessore Sundarbans: “In the same trace, during the season of rain, a scene presents itself, interesting by its novelty; a navigation over fields submerged to a considerable depth, while the ears of rice float on the surface. Stupendous dykes, not altogether preventing inundation, but checking its excesses” (Hamilton 1815, 119). These dikes were not fully impenetrable, and this permeability allowed fertilizing substances, consisting of dissolved clay and calcareous matter, to deposit on the land (Hamilton 1828, 118). Various colonial accounts during Company rule lauded “inundations” for the “deposition of fertile silt” rather than describing floods as something that need to be prevented.

After the monsoon, cultivators repaired the *bandhs* to prevent brackish tidal water from spilling into arable land during the dry season (starting in January), when freshwater recedes upstream. Such *bandhs* enabled colonial civil servants like Henckell and the Morrells to convert the “salty marshes” of the Sundarbans into arable paddy land (Hunter 1875a; 1875b; Lahiri 1936; Westland 1871). Without annual repairs of the *bandhs*, the salinity could ruin crops, and thereby risk the reversion of the deforested lands back into mangroves (Hunter 1875b, 183). The necessity of salt-water-prevention *bandhs* made the British deforestation of Sundarbans mangroves in the Bay of Bengal different from deforestation processes elsewhere in British India (Cederlöf 2008; Ramachandra Guha 1991; Sivaramakrishnan 1999).

The British Raj (1850s–1947): Centralizing Administration, Simplifying Nature

During the East India Company rule of India from the 1770s to 1870s, the responsibility to erect and maintain *bandhs* belonged to the holder of the grant (*pottak*) to “reclaim” forest into land. In principle, the cost of erecting and

repairing embankments was to be borne by the individual *zamindars* and tenure holders, but in practice it was borne by whoever was cultivating the soil as they needed to ensure that *bandhs* were in a condition to stop saltwater intrusion during dry season.¹⁵ Thus, the construction and repair of earthen embankments was decentralized with no state compensation (to the cultivator).¹⁶ W. A. Ingles (1911, 46–47) in his review of embankment policy and legislation in Bengal, suggests that the laws under the Company “were so elaborate that they were unworkable—and were thus often uncompensated”: the decentralized construction and repair of embankments resulted in little to no state compensation to the cultivator.

Irrigation and its maintenance were thus predominantly neglected under Company rule (Mosse 2003; Washbrook 1988; Willcocks 1930). This formed part of a wider negligence of Moghul-era public work institutions that carried out irrigation maintenance and tank excavation (Mosse 2003) as well as overseeing grain reserves (Sirajul Islam 1997). In South India, this ultimately led to the decline of water bodies and grain reserves. Neglected canals and tanks silted up, and the depletion of grain reserves resulted in several incidences of famine (Mosse 2003).

Others further suggest that the colonial British administration bounded rivers to separate them from land in riverine Bengal (Lahiri-Dutt and Samanta 2007), using cartography to separate water from land with lines (da Cunha 2018). “Colonial capitalism” is interpreted as viewing rivers as destructive and in need of control (Lahiri-Dutt and Samanta 2013; D’Souza 2006).¹⁷ However, the East India Company’s lack of interest in repairing and maintaining these *bandhs* reflects a greater acceptance of various forms of wetness: of shifting rivers, canals, wetlands, marshes, and rains, evident in pre-1850 colonial maps. My own archival research of the East India Company showed great levels of detail of the fluidity and complexity of Bengal, particularly in maps of steamer routes and of settlement maps. Like historian Debjani Bhattacharyya (2018, 37), I did not encounter the well-known narratives of colonial fixities within the archive but stumbled onto flows, movements, and circulations of tides, rivers, inundations, and rains. In a temporal shift of perspective on floods in colonial Bengal, a decentralized Company rule cast floods as blessings, and the centralized rule of the British Raj later cast them as damaging.

This shift away from lauding *borsha* inundations as a blessing of fertility for Bengal in the Company period (Gastrell 1856) to a narrative of all floods as damaging to life and property in the British Raj period, is arguably connected with the replacement of temporary earthen *bandhs* with what Willcocks (1930, 23–24)

refers to as permanent “watertight” embankments. The Indian Rebellion of 1857 was a response to Company malpractice and incompetence. This uprising by the colonized Indians prompted the military intervention of the British Crown—which then took over the control of India from the East India Company in 1858, resulting in the creation of the British Raj. In contrast to the decentralized approach of the Company, the British Raj established various departments and institutions to centralize its rule over India, creating the Indian Civil Service (Mosse 2003, 246). Centralized management entailed that the colonial state took charge of the costs of annual repairs of *bandhs*, which were breached each year. The Indian civil servant James Westland (1871) lamented: “Much money continued to be spent upon the [maintenance of] embankments.” To justify such expenditure, the official colonial narrative under the British Raj emphasized that it was the state’s responsibility to protect “life and property” from damaging floods.¹⁸ Compared to Company portrayals of beneficial inundations, this later narrative casts the monsoon *borsba* as destructive and causing breaches in order to justify extensive and centralized maintenance expenses on embankments.

As these lower earthen *bandhs* broke easily and required considerable repair each year, the colonial administration designed and constructed higher and more permanent watertight embankments along rivers to prevent wholesale breaches to “protect subjects” (Willcocks 1930, 23–24). Watertight embankments were cast as “better” than local earthen *bandhs*. This new type of embankment, easier to control and requiring fewer repairs, was promoted as a scientific technology that would modernize Bengal (Willcocks 1930). In contrast to the permeability and impermanence of *bandhs*, the new British design of watertight embankments obstructed flooding during the monsoon, thereby hampering irrigation required for paddy cultivation.

William Willcocks, in his study of the earliest watertight embankments in the north-central and western parts of Bengal since the 1840s, points out that *zamindars* and their tenants secretly cut and made breaches (*kanwaz*) to the Damodar embankment in the Ganges River floodplain to facilitate flooding: “It never seems to have struck anybody that the breaches were made secretly by the peasantry for irrigation. And yet it ought to have been evident that forty or fifty breaches in a heavily embanked river of inconsiderable length in a single year could not possibly have been made by the river itself; for one or two breaches eased the situation” (Willcocks 1930, 22–23). The way in which *zamindars* and their tenants resisted the colonial invention of watertight embankments highlights how these centrally planned colonial embankments did not consider the complex hydrological and ecological processes of a deltaic floodplain with its many meandering rivers and

the seasonal variation of tidal inundation filled with salt and silt came to be simplified in the bureaucratic shift toward watertight embankments.

The creation of watertight embankments under a centralized colonial state gives credence to James C. Scott's (1998, 4) theory that many well-intended schemes to improve the human condition have failed because of the combination of four factors: state simplification as part of administrative ordering to make both society and nature legible; high-modernist ideology based on the belief of the superiority of Western science and technologies; the collusion of the state with capitalist interests legitimized through high-modernist ideology; and a weak civil society unable to resist these plans. This new type of embankment, easier to control and requiring less repairs, simplified the dynamics of floods and monsoons. The British Raj promoted watertight embankments as a scientific technology that would modernize Bengal—highlighting how state simplification and high-modernist ideology are entwined. Furthermore, this new infrastructure was tied to considerable capitalist interests working together with the colonial administration to expand profitable roads and railways in Bengal, which were used for colonial extraction.

While we can certainly see how embankments correspond with the first three elements of Scott's theory—simplification, modernization, and promotion of capitalism through collusion with state-cum-colonial administration—archival resources provide little information on the extent or form of civil-society resistance in this period. In addition, Scott's theory of state simplification fails to capture the diverging, and often conflicting, interests and agendas of the colonial state apparatus. Just as the Permanent Settlement Act was contested within the Company state, so was the introduction of watertight embankments in the British Raj. For example, the Military Board vocally criticized attempts to embank the Orissa delta in the 1840s and sought to dismantle existing embankments in order to end the rising spiral of expenditure on repair and maintenance, while the Revenue Department was opposed to this (supposedly out of fear of litigious claims by cultivators and landlords) and instead sought to control rivers through embankments (D'Souza 2006, 44). Rohan D'Souza (2006, 121) argues that "it [colonial capitalism] sought to bound the delta into the commodity-form in hitherto unusual ways and in unknown realms in order to once again establish its dominance over the rivers." This idea of a uniform and hegemonic colonial state actor is contradicted by the conflict between the Military and Revenue boards, instead highlighting internal divisions within the state.

By disregarding knowledge on the complexity of the delta and the importance of monsoonal floods, the continued construction of watertight embankments

prevented the monsoon floods from inundating the land with silt. However, schemes of improvement do not only fail because of the state and capitalist interests colluding to use high modernist ideologies to promote their interventions. Rather, the state is composed of actors with diverging agendas and beliefs that ally with capitalist actors with specific interests. In this case, the voices of colonial officials who understood the benefits of floods and siltation were undermined in the bureaucratic push toward a model of embankments that was seen as a means to maximize revenue, legitimized through the colonial state's self-appointed obligation to "protect life and property."¹⁹

Railways and Their Environmental Legacy

The centralized expansion of watertight embankments was interlinked with the expansion of colonial railways. These were portrayed as a colonial exemplars of progress and modernity in contrast to the traditional waterways of Bengal. Watertight embankments and railway bridges were built across the many crisscrossing rivers of Bengal and facilitated the construction of colonial railways and roads atop them, simultaneously enabling considerable capitalist interests to extract resources from its colonized territories. This infrastructure divided the delta into "innumerable compartments" as a means to control nature and floods (Iqbal 2010, 15). This process of simplification, high modernist ideology, and collusion with capitalist interests was to have wide-ranging ramifications that we still see today: worsening siltation and drainage congestion upstream as the fluid nature of waterways was hindered.

Many archival documents are concerned with logistics and matters related to revenue and communications—essential for the expansion and functioning of an extractive colonial capitalist economy. Prior to 1850, there were no railways and few roads in Bengal. In 1802, there were only twenty miles of road in Jessore and water transport was preferred to land carriage (Bentley 1925). In 1875, riverine traffic was extensive in the 24 Parganas and Jessore districts with boat routes connecting all of Bengal (Hunter 1875a); Khulna was an important river route and export goods center for the Sundarbans (Iqbal 2010). Traditional waterways were affordable and accessible to local people; it was the main mode of transport. Boats and river traffic were so well developed that there were a considerable number of people living on boats, making it difficult for census enumerators to estimate the size of the population (Census of India 1883).

Sir Arthur Cotton was a famous British irrigation engineer with five decades of experience on irrigation systems in India, including restoring Mughal irrigation works such as the Godavari Canal System. In 1872, he proposed a scheme for

navigable canals that was submitted to a Parliamentary Committee in London. He argued that India “demanded water carriage,” adding that it was considerably more cost-effective than railways and that the preference for railways comes from “utter ignorance of India and her needs.” However, Sir Cotton’s scheme was rejected because of the opposition of vested railway interests (Majumdar and Datta 1970, 863), who were involved in considerable financial malpractice in the expansion of colonial railways (Sweeney 2015). Capitalist interests in London thus worked together with the colonial administration to harness “high modernist ideology” to expand railways in a way that undermined the strong objections of colonial officials with local knowledge, such as Sir Cotton.

The ideology of railways as bringers of modernity was powerful. It left a post-colonial legacy in which the British Raj is perceived to have “modernized” India, and in which the sites of the railway became nodes for the expansion of “modern institutions, including law, bureaucracy, police, schools, the military, science, industrial technologies, and nationalism” (Ludden 1999). Railways not only connected ports to interior centers along lines of commercial investment and resource extraction, enabling the transportation of export goods (Ludden 1999, 180), they also played an important role in transporting landless wage laborers (former peasants adversely affected by the overextraction of agricultural surplus by elites) to wherever there was a labor shortage in the colonial economy (Van Schendel 1981, 288). Railways also facilitated the export of grain out of Bengal. Though the Indian Famine Commission further justified railways as a means to combat famine, its report has a note of a Bengali landlord pleading to restrict exports of grain during the famine when food prices rise beyond a certain point and that landlords need grain and silver to assist their tenant farmers with cultivation.²⁰ Grain exports played an important role in famines in India during the Victorian period (Davis 2007).

Railways also served a military purpose. In 1853, Governor-General Lord Dalhousie argued that building further railways “would enable the Government to bring the main bulk of its military strength to bear upon any given point, in as many days as it now requires months, and to an extent which is at present physically impossible” (Headrick 1988, 63; Kaijser, van Der Vleuten, and Högse-lius 2016, 189). After the Indian Rebellion against British rule in 1857, building railways became a high priority for the Raj. By 1872, Britain had built more than eight thousand kilometers of railroads in India (Headrick 1988, 65). A significant quantity of resources was shifted toward the expansion of the railways to replace waterways as the main mode of transport. Between 1872 and 1881, 845 kilometers of railways were constructed in Bengal and Bihar alone. Railway construction

commenced in the deltas of East Bengal in the 1890s, and by 1925 there were 4,828 kilometers of railways in Bengal (Bentley 1925, 27–33).

The expansion of railways in India may have supported colonial economies and military power, but it had several negative consequences for the ecology of the Bengal delta. First, the prioritization of funds toward railways resulted in the neglect of inland navigation, as Cotton had warned. Second, embankments that were secure against breaching stopped the annual monsoon *borsha* floods from depositing their fertile silt on the floodplains “and in consequence flood water was shut out from the country, the natural system of deltaic irrigation was interrupted, drainage was impeded, and the network channels which used to be formerly fed by the silt water from the great rivers became silted up and in many cases entirely destroyed, rendering boat traffic difficult and in many cases impossible” (Bentley 1925, 20). The colonial administration was aware of how embankments built parallel to rivers create considerable problems with engineers cautioning that embankments should not be constructed until their effects on the regime of the rivers have been fully considered (White 1909, 34).

Again, such warnings were not followed. By 1921, the delta is described as thoroughly embanked and suffering from siltation. Because of vast amounts of sediment in the rivers, many of these water bodies were rapidly filling up with silt, some becoming completely dry during the summer (Census of India 1923). The once great Kabadak River no longer received fresh water from the Ganges as its tributary had silted up. In embanked areas, the silt-laden river water, once able to inundate and deposit on the vast floodplains, was now confined to the rivers. This resulted in silt depositing on the riverbeds rather than on floodplains (Census of India 1923). A decade later, this region was described as consisting of dead or dying rivers (Census of India 1933, V; VI:10). As the waterbodies were filling up with silt, they could no longer retain the same amount of monsoon rain. Instead, the rainwater was trapped inside the embanked floodplains, unable to drain into the rivers because of the elevation difference between land and the raised, silted riverbeds outside. This came to be known as *jalabaddho* floods (waterlogging). By the 1920s, embankments contributed to longer and deeper lasting *jalabaddho* floods that spoiled *aman* paddy and disrupted natural fisheries (Bentley 1925, 33).

Ignoring Critics and Lessons from the Past

The accounts of the state of the delta as described in the Census of India reports (1923; 1933) mention “floods” as increasingly damaging to “life and property.” While early colonial accounts such as that of Rennell and Gastrell in the

eighteenth and nineteenth century mention monsoon “inundations,” these later reports do not distinguish between beneficial *borsha* floods and damaging *jala-baddho* floods caused by the disruption of drainage in the delta. The shift from perceiving the annual inundation of silt as a blessing to flooding as a damaging event is interlinked with the colonial government’s objective of centralizing its control over rivers and embankments so as to expand railways, while reducing annual maintenance costs.

Despite dissenting voices warning of the negative ecological effects of compartmentalizing a hydrologically active delta, the construction and expansion of watertight embankments continued. This may serve as an example of how an “armchair” imperial science preferred to maintain its ignorance of local knowledge and needs (Mosse 2003, 246). The certain coalition of actors within the centralized colonial administration imposed such infrastructure despite its inappropriateness for a delta best suited for waterways. These colonial watertight embankments were predecessors to current technological interventions, which repeat past mistakes and exacerbate environmental damage.

The 1960s Coastal Embankment Project and “Development”

The Sundarbans region south of Khulna did not form part of any railway route essential for the colonial state. Despite several legislative attempts to include the region’s embankments within centralized management beginning in the 1870s, they were mostly left alone under the British Raj.²¹ Thus, the Sundarbans embankments remained earthen *bandhs* that cultivators breached during the monsoon and then repaired during the dry season. Because of state neglect, the responsibility of these repairs fell under various constellations between *zamindars*, tenure-holders, under-tenure holders, and tenant farmers (Das Gupta 1935; Ingles 1911; Lahiri 1936). Rai Shaheb Anil Chandra Lahiri suggests that such a decentralized approach was negative. He describes how under-tenure holders purposefully neglected preemptive embankment repairs, instead relying on their poor tenant farmers and sharecroppers to repair the breaches of the embankments prior to the dry season—which they were forced to do if they wanted to ensure a good harvest. He highlights the short-termism of this approach as the cultivators’ finances were not sufficient to do more than patch the embankment, with the consequence that the gradual deterioration of the embankment over time culminated in a rapid and complete collapse (Lahiri 1936, 143).

In contemporary accounts, government embankments are seen as not having existed in the Sundarbans until the Coastal Embankment Project (CEP) of the

1960s (Brammer 2004; Elahi and Rogge 1991; M. Zaman 1993). Oral histories of the coastal zone instead refer to *zamindars* maintaining temporary, low earthen embankments and *aushtomashi bandhs* (eight-month embankments), allowing for overflow irrigation, until the partition of India in 1947. In contrast to Lahiri's account, such histories retell a story of cooperation and coordination of work. Sadhu Kaka, an eighty-five-year-old farmer in Nodi, describes the *aushtomashi bandhs* of his childhood as small temporary earthen dikes made with the excavated soil on the side of the floodplain. After the harvest of *aman* rice in mid-January, the *zamindar* coordinated the construction of these *bandhs* with villagers—with four to five people from each household working together—on the sides of the river to protect against saline incursion from the Bay of Bengal during the dry season. In mid-August, they breached the *bandhs* along the various canals connected to the river to facilitate monsoon *borsha* floods of rain mixed with sediment-laden river water to irrigate paddy fields. This system prevented saltwater intrusion in the dry season, while allowing for fertile silt inundation in the monsoon season beneficial for agriculture.²² Sadhu Kaka and many of my interlocutors depicted this as a dynamic system adapted to the active flows of the delta. The continuation of *aushtomashi bandhs* in this area highlights how local ways of organization continued in some places despite attempts at colonial centralization.

The Effects of 1947 on Bandhs and the Cold War Context of Structural Engineering

The Partition of 1947 separated Bengal and the Sundarbans into India and East Pakistan. Many Hindu landlords in Khulna migrated to West Bengal and the *zamindari* system was formally dismantled through the 1948 East Bengal State Acquisition and Tenancy Act (Lewis 2011, 60–61). This fracturing of the subcontinent severely fragmented the existing institutions and administrative capacity of what is now Bangladesh. The resulting postcolonial borders of partition were haphazard. For example, during my research at the National Archives of Bangladesh in Dhaka, I found several letters from both Hindu and Muslim civil servants prior to the announcement of the 1947 Partition borders explicitly requesting that they remain in Calcutta.²³ Nevertheless, civil servants were transferred to Dhaka, where they expressed dismay at the lack of printing facilities and institutions to take over.

The Home Department officer Motahar ul-Huq (1957) in a survey and settlement report on the Khulna Sundarbans from 1947 describes a land in chaos. Many of the British civil servants had retired or simply left: the colonial irrigation office and its revenue funds had all but disintegrated. The East Pakistan side

was now understaffed with little institutional capacity.²⁴ The combined gap left behind by *zamindars* and colonial irrigation officers coincided, or resulted in, the neglect of *bandhs* that by the 1950s were in a severe state of disrepair. Extensively broken embankments caused saltwater intrusion during the dry season and reduced crop yields; Huq proposed that the Irrigation Department should take responsibility for the embankments to prevent salinity intrusion and to ensure the agricultural productivity of the land (M. Huq 1957).²⁵

The publication of Huq's report overlapped with the floods of 1954, 1955, and 1956 that led the US-funded United Nations study (under the name Krug Mission) to recommend government intervention in flood protection. This resulted in the creation of a state engineering agency to overtake water management responsibilities in what was then East Pakistan (United Nations 1957). The Krug Mission advised that large-scale embankments based on Dutch dikes be constructed to "control damaging floods." In 1961, the newly created East Pakistan Water and Power Development Authority (EP-WAPDA) received funding from USAID (Chadwick and Datta 2003) and the World Bank (M. R. Islam 2006) for the Coastal Embankment Project (CEP), which commissioned the newly created irrigation agency—now known as the Bangladesh Water Development Board (BWDB)—to construct four thousand kilometers of embankments and 136 polders across the entire coastal belt of Bangladesh (FAO 1985). In the southwest region alone, the project constructed 1,566 kilometers of permanent embankments and 282 sluices. The immediate impacts were seemingly positive: from "only" being able to harvest paddy during the monsoon season, the local population were able to cultivate multiple crops per year (Firoze 2003; M. Hosain, Islam, and Saha 1987).

Hanlon et al. (2016) highlight how the Krug Mission was promoted by US interests²⁶ and suggest that technical assistance to (East) Pakistan was politically motivated because of its importance during the Cold War.²⁷ These geopolitical motivations were entwined with an ideology of development, the latest form of ideas of progress and modernity imposed on Bangladesh since the colonial era to justify interventions in environment and society. Many former colonized states sought to "catch up" with the "developed" world (Gupta 1998). The Bretton Woods Institutions such as the World Bank and International Monetary Fund were officially created to facilitate the "development" of "underdeveloped" postcolonial societies, an ideology that helped secure strategic alliances through "technical assistance." As part of this paradigm, Western donors cast modern technology and engineering works, agricultural productivity, urbanization, and industrialization (or high-modernist development ideology) as essential

components in the road toward development. The 1960s Coastal Embankment Project (CEP) was thus part of a global process of promoting state-led development through large-scale infrastructure projects in newly independent Third World countries. The ideology of essentially Eurocentric development entailed technical assistance for a capital-intensive project that employed mainly foreign engineering consultants unfamiliar with Bangladesh: Dutch-style polders were a technical solution detached from local ecology and the active hydrology of a dynamic delta with considerably higher rates of sedimentation than European deltas such as that of the Rhine (Hanlon 2020).

Extending and Worsening Deltaic Siltation

As with the watertight railway embankments of the British Raj, the CEP embankments extended the obstruction of floods to the coastal region. This resulted in a situation where over one billion tons of sediment, carried annually from the Himalayas, could no longer be deposited across the coastal region during the monsoon *borsha* inundation. The embankments confined the sediment to the rivers, silting up water bodies, raising riverbed levels, and reducing water-retention capacity in the coastal rivers and canals. Furthermore, the CEP embankments were built in such a way that they only have a few sluices connecting canals to the rivers, resulting in many of the canals being cut off from their water sources and disappearing (M. Hossain, Islam, and Saha 1987; Iqbal 2010). In a conversation I had with Sadhu Kaka, he recalled the changes since the construction of the CEP embankments: “This area was once filled with rivers and canals. If we wanted to go anywhere, we went by boat. It took only an hour get to Shobuj town and everyone had their own *nouka* [boat]. Due to these government roads/embankments, our canals have silted up and there is no longer any water transport between the villages and towns. This was better than road transport—they are useless during the monsoon as we are stuck up to our knees in mud.”

The CEP was implemented under Pakistani top-down rule. In 1971 East Pakistan fought West Pakistan in a nine-month liberation war. The newly created state of Bangladesh arose in a context of civil war and collective trauma with widespread societal effects. An estimated three hundred thousand to three million people died during the war and two hundred and fifty thousand women were raped. In addition to the violence, torture, murder, and rape characterizing the war of West and East Pakistan, the Pakistani army targeted and killed thirty-five thousand Bengali intellectuals, leaders, and students beginning on 26 March, many of whom were Hindus (Lewis 2011). From an administrative perspective, the country found itself without many of its intellectuals and experienced civil



FIGURE 1.4. Silted-up river turned into a canal, 2014. Photo by author.



FIGURE 1.5. Embankment and raised banks due to siltation, 2014. Photo by author.

servants, while most of the administrative records from Calcutta remained in West Pakistan.²⁸ Bangladesh needed to create a new civil service after having lost a considerable degree of institutional memory and experience. Many of Bangladesh's state institutions were, quite understandably, fragmented and weak.²⁹

By the time of its independence in the 1970s, Bangladesh's rivers had increasingly silted up. Forty-five miles of the Gorai—a main freshwater tributary of the Ganges—was unfit for navigation, while many reaches of the distributary rivers were also no longer navigable (Government of Bangladesh 1976, 3–4).³⁰ The once great Bhadra River, where large steamers once passed, was now a silted canal referred to as the Dead Bhadra (Dewan, Mukherji, and Buisson 2015).

Figure 1.4 shows how the Bhadra “river” has silted up to no more than a canal, and the land inside the CEP embankment built in the 1960s and '70s is lower than the bank outside the embankment that is raised through annual silt deposits.

Not only did the obstructed floods cause siltation of water bodies, but by depositing on the riverbeds outside the embanked floodplain it raised the water level outside the polder to be higher than that inside (fig. 1.5), trapping water inside the embankments and leading to drainage congestion (FAO 1985). The problems of the northern tracts of previously embanked Bengal in the 1880s had finally reached the coastal Sundarbans. The CEP embankments extended the problem of *jalabaddho* floods to the southwest coastal region as water was unable to drain out from inside the embanked floodplain out to the river. By the 1980s and 1990s *jalabaddho* resulted in more than one hundred thousand hectares being permanently flooded, inhibiting cultivation, damaging crops, and preventing crop rotation (Adnan 1994), taking a much more dangerous turn than monsoon *borsba* floods (Iqbal 2010).³¹

It was perhaps unsurprising that local people in some places continued the practice described by Willcocks (1930) of intentionally breaching parts of the embankments through what Sklar and Dulu (1994) refer to as “public cuts,” which are used to drain the fields of stagnant water. This may refer to *jowar-bhatar kbelano* (free play of tidal flow)—a concept used by local people to remedy *jala-baddho* floods and which became institutionalized as Tidal River Management (TRM). This bottom-up grassroots movement was gradually taken over by the Bangladesh Water Development Board—funded by the Government of Bangladesh and the Asian Development Bank in a project known as the Khulna-Jessore Drainage Rehabilitation Project—which ignored local solutions in favor of top-down and structural engineering solutions (Dewan 2012, 20–21).

The problems of *jalabaddho* floods in the 1980s were further exacerbated by low-frequency damaging *bonna* floods related to tidal surges and cyclones. These brought international attention and significant funds for flood protection in Bangladesh mainly through the Flood Action Plan (FAP; Adnan 1994). The FAP consisted of several donor-funded studies on how Bangladesh could best manage floods. Like climate change today, flood protection was at the receiving end of a significant portion of Bangladesh’s development funding. Large-scale and high-tech flood protection projects, supported by donors like the World Bank, the Netherlands, and relevant state agencies, favor capital-intensive and technical solutions. The Ershad regime was enthusiastic over the prospect of expanding large-scale flood control and irrigation embankments as it provided a “lucrative” opportunity (Shaw 1992).

However, the existing CEP embankments had proven ineffective when it came to controlling floods, worsening sedimentation and *jalabaddho* instead. This motivated Bangladeshi civil society to come together to protest against

the FAP as they expressed doubt that similar investments would prove more effective.³² Strong civil society protests, combined with the endorsement of an independent review team funded by the UN and the Norwegian government, ensured that the Flood Action Plan was not implemented—illustrating the competing interests and activities of the diverse actors and donors active in Bangladesh’s development industry (Wood 1999).

The Coastal Embankment Project, the Flood Action Plan, and the Coastal Embankment Improvement Project highlight the ways in which donors such as the World Bank engage in the same type of “simplification” as the colonial state of the British Raj: both maintain ignorance of complex ecological contexts and the ways in which embankments exacerbate siltation. The CEP, the FAP, and the CEIP are internationally funded and capital-intensive projects using “modern” technologies and highly paid Western experts that downplay the expertise of local Bangladeshi scientists. James C. Scott (1998) argues that state officials collude with capitalist interest to bring high modernist ideas into being. From railways to the CEIP, these large-scale, capital-intensive infrastructure projects provide lucrative opportunities (Shaw 1992) and bring various coalitions of capitalist interests and state officials together to implement these designs. However, though these ideas of “state simplification” and “high modernist ideology,” state collusion and a weak civil society, may fit the examples in this chapter, there are also limits to Scott’s theory.³³ The disputes between the Company Salt Department and the Magistrate, the Military and Revenue boards, Cotton’s critique of railway expansion in Bengal and Ingles’s warnings about embankments, and the protests against the Flood Action Plan highlights how there are often competing knowledges in the field of “development,” where some narratives are better at harnessing support than others by furthering economic, (geo)political, or administrative agendas. Narratives of improvement, whether through railways, flood protection, or climate change adaptation, have the potential to enable simplification in ways that increase the financial interests of particular actors, both within state administrations and within international organizations.

Development schemes do not fail only because the state and capitalist interests collude to use high modernist ideologies to promote their interventions. Rather, the state, as well as the World Bank, are composed of actors with diverging agendas and beliefs who ally themselves with capitalist actors with specific interests. Thus, the prevailing dominant narrative represents the outcome of internal organizational struggles regarding what is accepted as knowledge or science. This is particularly relevant today since state simplification can be

combined with climate reductionism to put forth interventions that might be at odds with local experience and knowledge, such as the construction and maintenance of embankments. Though using climate change allows for connections between ideas and events to justify project funding, it creates expectations of causality that do not match the current physical realities. This highlights the importance of looking at the actors and networks shaping—and contesting—specific (water) interventions, including that of flood-protection embankments.

Conclusion: How Simplification Exacerbates Climatic Vulnerability

Embankments were built long before climatic change was identified as a development problem for Bangladesh. Deforestation of the Sundarbans was different than elsewhere in British India as the lands cleared for rice cultivation required temporary earthen embankments. These were constructed in the dry season to stop saline tidewater from ruining crops. Cultivators then breached these embankments during the monsoon to facilitate *borsha* floods that inundated the land with silt-laden river water mixed with rain. The silt fertilized the soil and naturally raised land levels, while the floods irrigated the rice fields and provided a breeding ground for fish.

However, the annual cost of repairing these breaches before the start of each dry season was high. The British Raj's push for centralized administration and reducing annual maintenance costs saw a shift toward watertight embankments that stopped the *borsha* floods. Over time, such embankments paved the way for roads and railways to replace the water carriage that was once so characteristic of the Bengal delta. These watertight embankments, based on "imperial science," prevented floods and thereby confined the silt to the rivers and raised riverbed levels, so that the rainwater during the monsoon could no longer drain into the river—causing damaging *jalabaddho* floods (waterlogging). Over the years, such silt filled many rivers and canals, causing them to disappear. The East India Company's view of silt and monsoon *borsha* floods as a blessing of fertility was superseded by the British Raj viewing all floods as damaging to life and property. However, despite continuous dissent at the expansion of embankments and their negative ecological consequences for Bengal—from the Military Board in Orissa and Sir Arthur Cotton to Bentley, Willcocks, Lahiri, and White, among others—colonial embankments went from being viewed as protection against floods to their current status of protection against climate change, despite centuries of experience that indicates how such infrastructure exacerbates *jalabaddho* floods.

Capital-intensive embankment infrastructure ignored voices about the complexities of local history and ecology, from colonial railway embankments to the postindependence World Bank–funded Coastal Embankment Project and the Flood Action Plan. This is currently the problem with the World Bank–funded Coastal Embankment Improvement Project, which does not explicitly engage with the historical experience of how flood protection exacerbates siltation, waterlogging, and rising riverbeds. A project narrative built around the idea that only climate change causes flooding—while not acknowledging the ecological complexities of different types of floods and how embankments exacerbate them—is arguably an example of “climate reductionism” (Hulme 2011). Climate change as an idea thus rearranges events to create expectations of causality that legitimize particular development interventions (Mosse 2005), and climate reductionism can be harnessed in ways that enable narratives suited to specific economic, political, or administrative goals—in this case, building more embankments.

Translating Climate Change

In December 2011, I was working on a water-governance research project in coastal Bangladesh. My interpreter Sanvi and I were making our first visit to a study site that was only reachable by ferry. We went down to the riverbank and waited for the low-profile yellow vessel to chug across the murky brown river and take us to the Dhanmarti *ferrighat* (ferry landing). As we were crossing, the loud engine, leaking black oil into the river, muted all conversation. When the ferry arrived, one of the crew members jumped up onto the landing with a rope, hauling the boat closer and securing it. Waves of people carrying bags of goods alighted, many of them boarding the bus to Shobuj town, the administrative headquarters of the *upazila* (subdistrict).¹

Sanvi and I walked up the pathway to the stand of motorcycle drivers and hired a young man, Babul, to take us to Dhanmarti Union's local government office. The large-seated motorcycle transported us across the uneven surface of the Nodi embankment, the walled boundary separating the floodplain of Dhanmarti Union from the freshwater Ganges tributary we had just crossed. When we remarked on the rich green vegetation surrounding us, our motorcycle driver Babul praised the Dhanmarti Union Parishad chairman and Shobuj town's municipal mayor for spearheading the local movement to stop tiger-prawn cultivation in their communities.² He pointed out every place where there was lush vegetation—years ago there had been none at all. He also showed us the many dead canals (*mora khal*) where there had once been deep waterways connecting the river to the fields, but which had gradually filled up with silt due to the lack of regular excavation. In some cases, landowners had filled canals with silt on purpose to extend their cultivation area.

I spent the day learning about people's perceptions of local water problems, from the Dhanmarti Union meetings with various government officials and the many local NGOs working in Nodi to the village meetings organized by a rights-based organization. The issues ranged from crumbling embankments due

to riverbank erosion and the scarcity of safe drinking water to the poor state of the rivers and canals. This trip to the coastal zone with Sanvi served as a basis for the qualitative questions used in a survey contracted to a local NGO partner: they conducted individual interviews and focus group discussions across the coastal zone of Bangladesh. I analyzed the resulting two hundred transcripts that described a dying delta with silted waterways and a strong local demand for regular excavation of canals to improve coastal water management. This research highlighted how local anthropogenic activities, particularly the construction of flood-protection embankments, degrade the environment (Dewan, Mukherji, and Buisson 2015; Dewan, Buisson, and Mukherji 2014). It inspired my later research to understand the lived concerns of people in the coastal zone.

The construction of embankments is not a new strategy for addressing climate change, but a continuation of state simplification that colludes with capitalist interests through capital-intensive projects. However, in the postcolonial period the construction of flood-protection embankments was not pushed by a state like the British Raj, but by assemblages between Western donors, state ministries, NGOs, and other local actors using “narratives of improvement” where large-scale flood-protection embankments promised modernity, agricultural revolution, and prosperity. Such actors in Bangladesh’s development industry broker their own environmental knowledge about the complexities of an embanked delta to legitimize projects casting this very same infrastructure as a form of climate adaptation.

An ethnography of Bangladeshi development professionals in various climate projects reveals how they participate in the technical game of the global development industry. This technical game strips out context in order to resolve differences and carry out transnational negotiations between diverse actors with different interests, beliefs, and knowledge backgrounds. To participate in the technical game, these development actors must use a code that appears neutral and universal in order to provide a space for resolving differences and carrying out transnational negotiations—a metacode (Rottenburg 2009, xxvi). Climate change is used as a metacode by development brokers—social actors that actively build social, political, and economic roles rather than simply following normative scripts (Bierschenk, Chauveau, and de Sardan 2000; Mosse and Lewis 2006).

Gilles Deleuze and Felix Guattari (1987, 69) in *A Thousand Plateaus* conceptualize “assemblage” (*agencement* in French) as relational—arrangements of different entities linked together to form a whole. Extending this idea, Bangladeshi development brokers can be viewed as partaking in “development assemblages”

constituting of multiple, heterogeneous development actors (donors, NGOs, state units, consultants) that come together to create a common development project. It is the particular characteristics of each development assemblage that shape how a broker may use the metacode of climate change in distinctively different ways.

The way that Bangladeshi development brokers use climate change as a spice to attract donor funding for projects captures how development is a performative and collaborative practice that requires a joint meaning-making—a translation—of what climate change means for specific development actors. Bangladeshi development professionals supporting the World Bank’s CEIP project strategically code-switch between the public transcripts of projects in English and the hidden transcripts of contextual knowledge in Bangla, suggesting that their use of climate change as a spice risks reproducing silences on pressing environmental issues. However, this does not mean that all climate-related projects may necessarily increase social or environmental vulnerabilities.

The concept of “climate reductive translations” draws on approaches to brokerage (Mosse and Lewis 2006; Bierschenk, Chauveau, and de Sardan 2000) and metacodes (Rottenburg 2009) in the anthropology of development. Translation here refers to the processes by which development brokers “produce coherence” (make projects real) by generating and translating interests, mutually enrolling supporters, and stabilizing interpretations and representations so as to match causal events to the prevailing project logic (policy theory) (Mosse and Lewis 2006, 13; Mosse 2005, 9).³ The policy theory in Bangladeshi climate change projects tends to be climate reductive: the country will drown because of rising sea levels caused by global warming. Climate reductive translations thus help conceptualize how different climate projects produce coherence—that is, create causal narratives linking development interventions to the policy theory of climate change. The use of translations enables an explanatory framework for the diverse ways in which the climate change metacode is used by distinct assemblages of development brokers to mean different things—where some interventions are more aligned with coastal needs than others. This brings attention to the importance of deconstructing the knowledge production of climate change wherever there are considerable funding streams.

Khulna Frustrations: Embankments, Siltation, and Dying Rivers

I returned to Bangladesh for fieldwork in August 2014. Three years had passed since my last visit to Khulna District with Sanvi. I stayed with relatives in

Dhaka for the first month and carried out more than forty-five semistructured key-informant interviews with development professionals in the capital. In doing so, I gained insights into the official narratives of development projects and the many hats that Bangladeshi professionals wear as employees of aid-funded projects, while also obtaining practical information for the rural part of my fieldwork. I continued to meet former colleagues, and our repeated meetings turned into informal conversations. When I spoke in Bangla with interlocutors, I found that statements or opinions would shift depending on the language used. When speaking in English—the language of international development projects—they tended to regurgitate official aid narratives, whereas when speaking in Bangla, they revealed personal reflections and opinions that often were at odds with the official narrative of their respective development interventions. This linguistic code-switching illustrated the current reality of a Bangladeshi development professional working in English-dominated development projects. Conducting most of these interviews or conversations in Bangla was often rewarded with very honest and blunt statements about the reality in which the local people live and the “golden handcuffs” of their comfortable and well-paid jobs (see also Mosse 2011b).

In 2014, Bangladesh was frequently affected by national strikes (*hartals*) and my former colleagues recommended that I travel to Khulna on a Friday (by air) as the opposition party would not call for a general strike on the prayer day. When I arrived at the domestic terminal of Dhaka airport it was quiet and orderly, a stark contrast to the roads subject to national strikes characterized by burning cars and buses. The boarding process was quick, and it took only half an hour to fly to Jessore, followed by a two-hour drive on the airline’s private bus to Khulna. I arrived late at night and was met by the driver from my former sister-organization, who drove me to my designated guesthouse. At that point I felt that I was still working under the guise of a development consultant. The expensive flight, the private air-conditioned-bus, the private car, and the guesthouse were perceived as the most time-effective and safest means for development professionals from Dhaka to work in Khulna. Living only a short walk from my former interpreter Sanvi in Khulna, however, enabled me to immerse myself in the perspective of residents. I soon arranged to stay with local Bangladeshi families in Khulna city during the weekends away from Nodi.

I visited Sanvi frequently, both at her office and at home, often talking on her family’s rooftop, which was filled with various plants, fragrant flowers, and trees (banana, henna, papaya). On World Rivers Day, I joined Sanvi and her colleagues in a workshop organized by a grassroots environmental movement

(GEMOB) in southwest coastal Bangladesh. We walked along the wide streets of Khulna, shaded by trees, and reached the venue located at the ground level of an NGO office. The front gate was open and the basement parking area was filled with several rows of plastic chairs facing a table. Above the table was a large poster with the words “Save our Rivers” written in Bangla. The main panelists, all Bangladeshi, sat at the table—a woman activist and development professional at a rights-based NGO, a lawyer at an environmental NGO, and a professor from the local university. There was no fan, no air-conditioning. The conditions were like many places in Bangladesh, and so fundamentally different from the air-conditioned, mosquito-proofed bubble of Dhaka’s development industry. For the first time working in Bangladesh, I attended a “development” meeting conducted entirely in Bangla with no presence of international “experts” or donors. It was fully independent and autonomous from development-project funding as the GEMOB network does not depend on, nor seeks to attract, donor funding. Thus, rather than an official performance of narratives emphasizing how project activities are needed and successful so as to legitimize them to donors and relevant stakeholders (Mosse 2005; Green 2003; Heaton Shrestha 2006), it proved to be a space for frank discussion among Khulna citizens. All participants worked on issues related to development and environment in this coastal region and voiced their personal views on pressing environmental problems.

The discussions ranged from embankments, siltation, and industrial pollution to transboundary water conflicts such as India’s Farakka and Tista barrages, as well as India’s new river-linking project that would worsen the already poor state of the Ganges. Rather than speaking about the virtues of a specific project, the speeches were filled with context: with history, environment, politics, and societal issues. An NGO worker named Amir spoke about the long history of the silted delta and the environmental degradation caused by the Coastal Embankment Project in the 1960s, of which Nodi is one:

Every year, more than a billion tons of sediment is not depositing on the land, but on the riverbed, so the fertility of agricultural land is decreasing. By depositing outside the polders [the Dutch word for embankments], the silt is raising the riverbed. During the monsoon, the water inside the embankment cannot drain out into the river. This increases the risks of *jalabaddho* floods [waterlogging and drainage congestion] and tidal surges. Since the creation of embankments, the river’s sediment has nowhere to go and our rivers and canals are silting up—they’re dying. Embankments

are causing riverbed rise and waterlogging; these issues have no link to sea level rise. Even Bangladesh's most famous "water specialist" never mentions sedimentation because of pressure from international donors. We [in Khulna] are not able to do anything. We may continue this movement for the environment, but we are all voiceless against those [who hold the real power] in Dhaka.

In his speech, Amir eloquently captured a key concern regarding how embankments exacerbate siltation and worsen damaging *jalabaddho* floods—a concern shared by several applied researchers, government officials, and Khulna activists with the rural people inside the embanked floodplains. He also pointed to the perceived hegemonic status of donors in "dictating" development in Bangladesh via the power-wielders in Dhaka (the donors, government agencies, and larger international NGOs run by fellow Bangladeshis of the upper-middle classes). In his view, the fact that they continue to promote the construction of embankments despite the devastating siltation they cause highlights how the elites in Dhaka do not understand the local environment.

When I stayed in Khulna city during the weekends, I often visited Professor Hossain and his family. He is active in local academia as well as in development research for various donor-funded projects. Sitting in his living room, we often discussed the various questions arising from my fieldwork. While we discussed the ever-increasing number of climate change projects in the Khulna District and the reflections made at GEMOB, Professor Hossain revealed how development professionals feel compelled to reproduce donor narratives: "People don't believe in science, but they believe in their own idea. Donors have a presumption: if ice caps are melting, Bangladesh will drown. For the rest of us, we [Bangladeshi development professionals] must communicate in a way that relates to the ideas of donors; it becomes difficult if we do not conform to their climate change story."

Through Professor Hossain, I met Gaurav, who works at a well-connected Bangladeshi NGO. At the end of my stay in Khulna, I went to Gaurav's office with a box of chocolates as symbolic thank you for all his help with my fieldwork. His organization was quite adept at attracting donor funding for development projects and, as always, he was very busy. He mentioned that he was helping another UK researcher who worked on a collaborative project on "climate resilience."²⁴ A quick glance at their survey revealed that the questions were phrased in a way that villagers would tailor their answers to ensure that they are targeted as project beneficiaries—as they initially tried to do with me. I found it strange

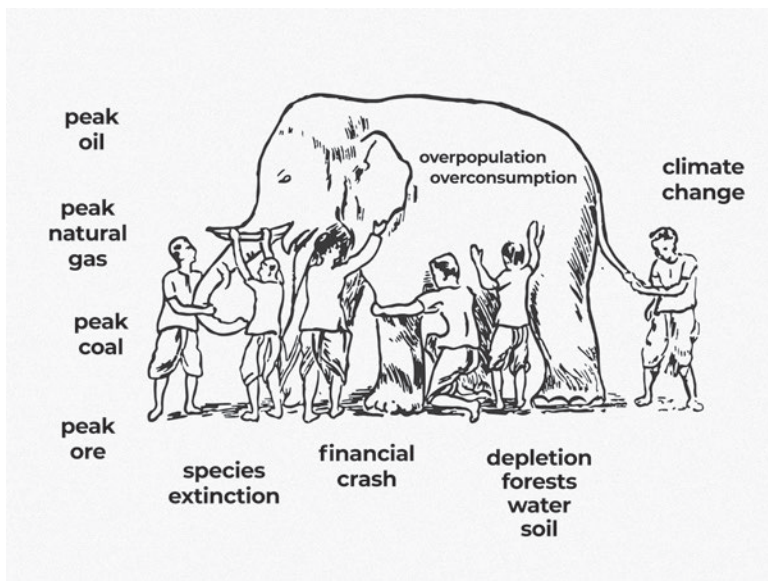


FIGURE 2.1. Donors like blind men examining an elephant. Adapted by Mark Robinowitz, base image ©Word Info. Line art modification courtesy of Ata Mojlish.

that, although climate resilience toward floods was the key issue, none of the questions appeared concerned with embankments, the main flood-protection mechanism, or damaging *jalabaddho* floods. Though Gaurav agreed with this, he did not offer any feedback on the questionnaire: “the formal agreement is on ‘climate resilience’ so my hands are tied.” He was increasingly weary of conforming to donor narratives: “*Apa* [sister], I want to work with research. I’m dissatisfied with this [NGO] work. None of the projects are looking at the holistic picture. It’s all about ‘climate change and disaster.’ Few [donors] understand the ecology as a whole.” Gaurav showed me a cartoon (fig. 2.1) and stated that donors are like blind men thinking they are holding the answer, but they are missing the big picture. He continued: “A lot of problems in the coastal zone are natural phenomena that have existed for a long time. But now everything is about climate change and disaster risk reduction.”

Arturo Escobar (1995, 7) argues that Western discourses of development have become hegemonic in “underdeveloped” countries. He and James Ferguson (1990) use Foucauldian discourse analysis to illustrate the inequality in knowledge production in international development. Their postdevelopment theory of a dominant development discourse imposing itself over actors in the

Global South may help explain the frustration Amir and his colleagues express over the power donors hold. An underlying assumption of the hegemonic discourse argument is that donors intentionally exert their power over Southern partners. Based on my previous water management research in such a Western development organization, I thought that a Foucauldian lens of internalizing this discourse could be used to understand climate change as a development discourse, a development governmentality, a power that works to “render invisible,” with varying degrees of success, critiques of anthropogenic environmental degradation such as obstructed sedimentation caused by flood-protection embankments.

While Amir, Professor Hossain, and Gaurav criticize the pressure they feel from donors to neglect siltation, they and their Bangladeshi colleagues also knowingly participate in—and thereby reproduce—these narratives that ignore the multifaceted environmental challenges facing Khulna’s rivers. Over the course of my fieldwork, it became clear that there is not a single dominant hegemonic discourse exerting agency and power in a way that could render other issues invisible, nor have Bangladeshis uncritically internalized donor narratives. Instead, I found a dynamic landscape of development as a practice occurring through complex and interacting processes of funding, translation, and brokerage, which often produces unintended effects (Mosse 2014). Mr. Shahid made this poignantly clear at the GEMOB workshop through the following metaphor of climate change as a spice (*masala*): “Climate change *shobche darun masala* [is the most amazing spice]. Add climate change, poverty alleviation, and gender and you will have a recipe for success for your development project [funding application]. But will this recipe help save the river?”

Mr. Shahid’s critique of how he and his colleagues use development spices to secure project funding for their organizations and staff payroll, even though this may not necessarily help “save the river,” struck a chord with me. Like Shahid, I used climate change as a *masala* and obtained several funding offers for my research. However, at times I felt that my own strategic use of climate change to attract donor funding deflected attention away from the very environmental problems I sought to investigate.

The use of climate change as a spice highlights the importance of examining the relationship between the simplifying rhetoric used to mobilize support in international development and the world as experienced within the lives of development actors (Mosse and Lewis 2006), where one must distinguish between the intentions of those working in the aid industry and the effects of their work (Gardner and Lewis 2015). It thus involves performativity and diversity, enabling

an analysis of the actors and networks—their incentives and motivations—required to form, shape, and interpret development actions and interventions, including how they engage with, and participate in, the production and reproduction of dominant donor discourses.

Development professionals (including international agency and donor staff, consultants, fieldworkers, NGO workers, applied anthropologists) have to secure their place within particular and complex institutional and social contexts. Development practice is thus embedded in social relations. “They [development professionals] work hard to maintain relationships, to negotiate their presence within foreign bureaucracies or NGOs for access and influence and manage interfaces within and between agencies. There is the messy, practical, emotion-laden work of dealing with contingency, compromise, improvisation, rule-bending, adjustment, producing viable data, making things work, and meeting delivery targets and spending budgets. In doing so, they must negotiate national identity, race, age or gender. They have to manage personal security, family relations, loneliness, stress, and anxiety.” To negotiate both access and influence, development professionals must make themselves bearers of context-free ideas with universal applicability (Mosse 2011c, 16).

In this case, Gaurav must reproduce climate change as a context-free notion that corresponds to donor ideas of rising sea levels as the main causative agent for environmental problems in the coastal zone. Like Ghanaian NGO workers, Gaurav is not embracing these institutional and political structures uncritically—as local development workers they are “aware that the institutional apparatus and discourses through which development interventions emerge can be as much part of the ‘problem’ as part of the ‘solution.’ At times they profess getting ‘caught’ in the process: that their own actions and thoughts are carried by ideological influences beyond their control and at tangent to their beliefs” (Yarrow 2011, 162).

The sense of feeling caught resonates with the fact that these development practitioners are also actors embedded in the same institutions and projects that reproduce such narratives (Bierschenk 2008; Arvidson 2008; Yarrow 2011). Despite their local knowledge and expertise, Bangladeshi development professionals like Gaurav and Professor Hossain participate in development interventions that they deem ineffective, but by doing so they also contribute to the incontestability of Western models (Rottenburg 2009). Thus, the issue is not only one where donors and policymakers in Dhaka simply exert a hegemonic power over development projects in Khulna. The picture that emerges is far more complicated.

Climate Reductionism: Embankments as Adaptation Infrastructure

A few weeks after the GEMOB workshop and my initial meeting with these Khulna civil society members, I returned to Dhaka to attend the closing conference from my prior research project and to present the project findings. My last project had fully funded this trip. It covered airfare and several nights at the conference hotel in one of Dhaka's upscale neighborhoods. Entering the marble-clad lobby of this cosmopolitan hotel, I felt that I could be anywhere in the world. The air-conditioned room itself was furnished with a Western spring mattress, an impeccably clean Western-style tiled bathroom, and a flat-screen TV. It was a starkly different experience compared to the humble simplicity of an isolated embanked polder like Nodi where there were hardly any brick houses, let alone electricity or indoor plumbing. Participants flew in from all over the world to attend this workshop. I could hear Professor Hossain's words in the back of my mind:

All these projects—all these research programs—have large overhead costs, perhaps up to 15 or 20 percent. They are flying in international “experts,” paying them per diems at Western rates. It's not free. These experts are not CEOs of profit-making companies or working in high-income countries, they are coming to work here in Khulna or Dhaka! Is it then right that these consultants—Germans, Americans, Dutch—are getting such high salaries? There are so many consultants, hundreds of consultants, but no one has the right background to understand the context. When they hire people, they only look at the organizations and degrees, not what they did or what they know. What is the point of this? We have plenty of educated, knowledgeable Bangladeshis, *but in this system we are not experts*. Instead, a sizeable amount of money is spent on foreign consultants and on projects that replicate each other and spend vast amounts of money on overhead. If I can do a study on how much of the total amount of project funding is actually used for field-level training and providing food at these events, you would be astonished! The costs . . . disappear with all these middlemen: so little money reaches the field. With only a fraction of this [development] money you could do one issue at a time and resolve it once and for all!

Bangladeshi researchers are, despite their excellent qualifications, undermined and discredited among certain pockets of donors and consultancy firms, illustrating how they are not experts in this system (Hanlon 2020). This illustrates a wider tendency that the most important beneficiaries of development

live in the North and not in the Global South (Goldman 2005, xi), where thanks to the large budgets of technical cooperation, expatriates profit more from aid than tribal villagers (Mosse 2005, 126–30).

Furthermore, Professor Hossain expressed frustration over the fact that those Bangladeshis who are able to profit and initiate themselves with large-scale development projects with sizeable budgets are often based in Dhaka or abroad. They, in turn, only subcontract smaller contracts to people working in regions like Khulna.

The morning after my arrival, an air-conditioned microbus transported my recently arrived international colleagues and me from the hotel through the congested roads of Dhaka to the venue—a majestic red-brick building characteristic of the Bangladesh government offices. The headquarters of all of Bangladesh’s ministries and their agencies are in Dhaka, along with all the main offices of donor embassies and private consulting firms. The great domed air-conditioned meeting hall was filled with hundreds of people from Dhaka’s development industry and foreign “experts” who had flown in from all over the world.

The conference targeted international donors to showcase both old and new projects. All the conference speeches were thus in English, the donor language. The performative aspects of development brokerage in maintaining such narratives of legitimacy and coherence was illustrated by the minister of water resources who opened the conference. Like the participants of the Khulna environmental meeting, he started off talking about how the flood-protection embankments built in the 1960s under the Coastal Embankment Project resulted in damaging siltation. He, like Amir, brought attention to how these embankments obstruct more than 1.5 billion tons of sediment deposition in the delta, causing many of Bangladesh’s rivers, tributaries and canals to silt up. The top tier of the Ministry of Water Resources in Bangladesh clearly recognized the consequences of embanking four thousand kilometers in the coastal zone and how it had resulted in a widespread problem that necessitates substantial maintenance to support agrarian livelihoods. Contrary to their Khulna colleagues’ beliefs, these policymakers in Dhaka do understand the environmental problems at stake.

Nevertheless, the minister later dismissed the role of embankments in causing siltation and instead stressed that the sediment in the delta requires regular excavation of canals and rivers: “The fault is not with the polders [embankments], but with us. We should have excavated the rivers and canals, which we did not do. The problem is that we lack funding.” This is problematic since the CEP’s extensive embanking of floodplains in coastal Bangladesh was, and still is, unsuitable to the local conditions of the Bangladesh delta with its eroding rivers, heavy

monsoon rains, and complex relations between siltation and flooding. Indeed, this unsuitability is the result of modeling the embankments after Dutch dikes (polders) in the Rhine delta, which sees only 1 percent of the sediment in the Ganges-Brahmaputra delta (Hanlon 2020, 30). This illustrates how the historical counterparts of the World Bank, USAID, and the Netherlands implemented the project according to the technical blueprints designed by international consultants. This foreign solution did not translate well into a heavily sedimented, tropical monsoon delta and has resulted in longstanding—and difficult to overcome—problems of siltation and waterlogging.

The existence of polders now restricts the types of solutions available. Bangladesh cannot simply remove embankments as they are used as roads and people have built their homes atop or outside of them. These embankments replaced the old practice of temporary earthen embankments while efforts to remove parts of the embankment to enable flooding and silt deposits through Tidal River Management failed because of the institutional inability to provide monetary compensation in a complex landscape of tenure and under-tenure holdings. Bangladesh must therefore deal with the fact that the extensive embanking of now 139 coastal floodplains requires large sums of money to mitigate the negative ecological effects of donor-funded infrastructure: repairing (and relocating) continuously eroding embankments, excavating canals, and dredging rivers. Even though such maintenance arose in the first place to address negative ecological effects of donor-funded infrastructure, donors like the World Bank refuse to fund periodic maintenance—seeing it as the responsibility of Bangladesh through the Ministry of Water Resources (Dewan, Mukherji, and Buisson 2015). By doing so, the World Bank avoids taking responsibility for the negative effects of projects they themselves supported.

Furthermore, donor-prompted structural adjustment policies, including the downsizing of the Bangladesh Water Development Board (BWDB), exacerbated the state's inability to meet the regular maintenance demand of the silting and eroding delta (MoWR 2005). They lack both staff and a regular budget for maintenance. The Ministry of Water Resources is therefore highly dependent on donor projects in order to excavate canals and repair embankments (Dewan, Buisson, and Mukherji 2014).

In light of this, it is perhaps not odd that the minister—after having spoken about embankments causing the problems of siltation and stressing how this necessitates regular excavation of canals and rivers in the delta—concluded the speech by casting these very same embankments as a form of climate adaptation: “Polders are necessary, especially in the light of climate change. We

must thoroughly redesign our polders; we need to address the threat of rising sea levels. The southwest coastal zone is the most backward region of this country because of salinity, tidal surges, cyclones, and sea level rise. I don't believe climate change will destroy Bangladesh. We can fight our way. Bangladesh will survive and it will survive very well."

Not only does this remark illustrate that not all adaptation projects capitalize on ideas of Bangladesh sinking, it also highlights how climate change can be used as a spice even here. In this case, like many official speeches I have observed in Bangladesh's development industry, it reiterated the project rationale and project goals in the conclusion (polders as climate adaptation), irrespective of the preceding content (polders cause siltation). This highlights the importance of seeing development as a practice that requires joint coherence-making and the rearranging of causal events to legitimize the success of projects (Mosse 2005)—in this case, the introduction of the World Bank's newest technical intervention, the Coastal Embankment Improvement Project (CEIP).

Yet not all stakeholders were concerned with maintaining this translation, and a joint interpretation must be successful in enrolling supporters (Mosse and Lewis 2006). The following speaker, Dr. Samir, the minister's colleague at a policy department tasked to coordinate all water issues in Bangladesh, spoke about the problem of heavy siltation outside the embankments. He argued: "We are currently not allowing sedimentation inside the polder, we need to correct this error." In contrast to the minister, Dr. Samir, whom I later interviewed, did not attempt to make any link to climate change. His organization is rarely involved in donor-funded or capital-intensive infrastructure projects, like embankments.

These remarks about siltation, however, were notably ignored by the next speaker, part of the World Bank's CEIP, which is implemented by the BWDB. In his speech, this Bangladeshi water professional did not mention siltation. Instead, he focused on the link between the rationale of climate change and his own project: "Due to this region's vulnerability, the World Bank is spending US\$400 million [in] loans to improve the coastal embankments."

The CEIP casts higher and wider embankments as a technical solution to Bangladesh's vulnerability to climate change (Government of Bangladesh 2013). It proposes that existing embankments are ill-equipped to help Bangladesh adapt to climatic change and the project would therefore "improve the coastal embankments to increase climate resilience toward natural disasters and rising sea levels" (World Bank 2012). Such a translation of the metacode of climate change connects and legitimizes embankments as a way to deal with rising sea

levels. However, since this translation also casts floods as *caused solely* by rising sea levels, this arguably constitutes a climate reductive translation.

As Dr. Samir emphasized, and as detailed in the preceding chapter, the sedimentation outside the polder and the consequent heightened riverbeds are a much greater threat to Bangladesh's coastal zone than the predicted rise of sea levels (Auerbach et al. 2015; Brammer 2014). So why was it that the problem of embankments—so well-known to Bangladeshi development professionals in the wake of the 1960s polders as well as documented since colonial times—came to be repackaged as climate change adaptation?

Colonial watertight embankments and railways supported the state and capitalists in many ways: for the state it reduced annual repair costs and served a military function that outweighed environmental concerns and expanded the business and profits of railway interests. Coastal embankments promoted by the World Bank since the mid-1950s allowed a similar deflection from the environmental problems that they caused. How could this similar deflection continue today under the guise of climate adaptation?

Code-Switching: Climate Change as a Metacode

After the conference, I wanted to understand how development brokers who were connected to the new World Bank embankment project legitimized it, considering the problems of an embanked and silting delta. I met Mr. Kazi, one such development professional, in an air-conditioned office in an affluent part of Dhaka. This was our first meeting and I introduced myself as a researcher from a Western university. He pitched the project to me in English—as if I were a donor—and stressed that embankments can protect against rising sea levels. I then asked, this time in Bangla, whether the project is a way of obtaining maintenance funds for the silting delta to excavate canals and repair eroding parts of the embankment. Mr. Kazi switched the conversation back to English: “The current polder system is fully functioning and is in no need of maintenance. However, if we consider climate change: sea levels will rise, cyclones will increase, and floods will turn into permanent waterlogging with increased and erratic rainfall.”

I persisted in Bangla, asking whether there are other problems with embankments beyond global warming. This time he replied in Bangla, providing an in-depth, historical account of the negative ecological effects of embankments, highlighting his long work experience on water issues in Bangladesh.⁵ I questioned the benefits of the project in light of this, and Mr. Kazi reverted back to

English: “The World Bank is funding this project to improve coastal embankments. They are funding this project due to climate change; this is a climate change adaptation project.” This explanation reiterated and emphasized the legitimacy of this internationally funded project and its links to global warming, conforming to the paradigm-maintenance and the policing of knowledge production characteristic of the World Bank (Broad 2007).

Not only did Mr. Katz switch between a public and hidden transcript of the project (Mosse 2005), he also alternated between languages. His switch from Bangla to English when changing narratives is arguably an example of code-switching (Bullock and Toribio 2009), a strategy used by Bangladeshis to negotiate their multivocal identities to maintain a “strategy of neutrality” (Wilce 1998), in this case to balance between identities as an internationally funded project employee and a locally knowledgeable Bangladesh.

Mr. Kazi’s code-switching demonstrates the high degree of agency and strategic maneuvering that Bangladeshi development professionals do to maintain official narratives that can attract funding and make the project appear coherent, and thereby successful. They compartmentalize knowledge to maintain the organizational need for ignorance about what is going on locally (van Ufford 1993). Here, climate change acts as a metacode—an official script (Rottenburg 2009) or a public transcript (Scott 1998) that strips out context to appear neutral and universal. In this case, it glosses over the context of how embankments worsen siltation. Such an acknowledgment of contextual knowledge would require engaging with issues beyond the scope of the project. To discuss long-term solutions often enters into political ground, where donors will not pay for maintenance, such as regularly excavating canals or solving the siltation problem caused by embankments (Dewan, Mukherji, and Buisson 2015). Thus, the metacode is a tool to make development projects appear free from politics.

Knowledge or technologies claimed as universal—such as climate adaptation, as the conversation with Mr. Kazi illustrates—are not context free at all: they are “embedded, albeit in unacknowledged ways, in the particular prejudices and structures of the originating policy-making institutions, and has to lose (or hide) its context and history to become relevant as international development policy” (Mosse 2014, 518). The avoidance of context through the metacode helps resolve differences and enables cooperation between heterogeneous development actors, with differing—and sometimes conflicting—agendas (Rottenburg 2009). The thoughts and actions of Bangladeshi development actors are thus not automatically shaped by an external discourse that they have internalized (cf. Nijbroek 2012). Competing environmental knowledge contained within the same person

illustrates that epistemic politics of differing knowledges are not necessarily divided between different groups of “experts” (Vaughn 2017): for example, “scientific” versus “indigenous knowledge” (West 2005), “early adapters” versus “local activists” (Paprocki 2016b), or even different segments of the population (coastal community, project employee, government official). Rather, such a strategy to broker environmental knowledge in a way that helps perform ignorance of local context, by separating public transcripts from hidden transcripts, is particularly useful for ensuring the continued coherence of a project linked to one’s professional survival.

In Bangladesh’s development industry, English is the main language of donor-facing communication and “development performances,” while hidden transcripts are more safely spoken (and written) about in Bangla.⁶ By taking the opportunity to speak frankly in Bangla about the complex environmental problems and then switching to English to reiterate the formal project narrative, these brokers are able to sustain “the need for ignorance” to stabilize representations of events so the project and its activities appear coherent. They must balance their identities as internationally funded project employees who must provide for their families, and that of locally knowledgeable Bangladeshis.

The Fear of Speaking Out: Paradigm Maintenance and Blacklisting

The active avoidance of context, as clearly illustrated in the code-switching between Bangla and English, arguably forms part of paradigm maintenance, the policing of knowledge and ideology, within and between interlinked organizations (Mosse 2011a; Broad 2006, 2007; Uchiyama 2004; Woods 2006; St. Clair 2006). This is particularly the case for the World Bank, which has consistently funded embankments following Bengal’s independence from the British Raj. Bretton Woods institutions like the World Bank and the International Monetary Fund are embedded in transnational structures of power, knowledge, and capital that—through their links to US–British geopolitics—generate “the project of development” that fuels highly uneven and unstable relations of capitalist production (Goldman 2005, xvi).

Yet, as ethnographers show, the World Bank is not a monolithic global actor with a singular agenda, but is made up of elite networks that depend on collaboration with a diversity of different actors and institutions both in the Global North and South (Goldman 2005, 11). The different hierarchies of power are also visible within the institutional structures of the World Bank. Anthropologists

working with social issues for the World Bank highlight how the organization is dominated by economists and how its publications in development economics are cited more often than those in academic journals (Goldman 2005, 102). The dominance of the economics paradigms, even when bundled with social and environmental sustainability, provide the ontological backdrop for framing goals, definitions, and measurement of development “success” and “progress” (Broad 2006; St. Clair 2006; Mosse 2011c). These form part of a grander “assembly line of knowledge production” inside bank headquarters that is carefully controlled (Goldman 2005). For example, its research department plays a central role in “policing” certain paradigms through incentives in hiring, promoting, and publishing, as well as selectively enforcing rules, discouraging dissonant views, and manipulating data (Broad 2007; Goldman 2005, 148–49) with career incentives, or “golden handcuffs,” that reward “right thinking” (Mosse 2011b).

The careful control and self-policing of World Bank knowledge is evident in *Climate Change Risks and Food Security in Bangladesh*—a World Bank–funded study that casts embankments as critical “protective infrastructure” (Yu et al. 2010, 105). The report itself is an interesting compilation of contradictions. In the first chapter, the authors acknowledge the distinction between annual monsoon (*borsba*) floods essential for agriculture and low-frequency, high-magnitude floods (*bonna*) that are highly damaging to agriculture and rural livelihoods (Yu et al. 2010, xvi, 10). However, in the remainder of the report, they do not specify which type of floods they are referring to. This is particularly problematic when they state that embankments have played a major role in reducing flood risks, but without indicating which type of flood (Yu et al. 2010, 82). Moreover, in certain passages the authors explicitly recognize that (1) substantial information on the local context of Bangladesh is missing; (2) predictions are difficult; (3) the competing processes related to sedimentation and accretion are “largely unknown”; and (4) this is an area for future research. The complex matters of siltation, active river morphology, and transboundary water sharing are omitted from an otherwise sophisticated analysis owing to “resource limitations,” or because they have been slated for “future research.”

Nevertheless, the report creates a climate reductive translation linked to rising sea levels in order to recommend adaptation measures in the form of economic access and support, combined with technical solutions such as irrigation efficiency, which are directed toward individual farmers (Yu et al. 2010, 105). Such solutions are easily incorporated into the current paradigm and institution in which both the authors and the report are embedded. Arguably, this illustrates how development professionals and applied researchers act as brokers

between their own organizations, donors, and particular development interventions. This also highlights that the reproducing silences or ignorance of complex environmental issues is not simply a matter of “corruption,” but of negotiating institutional politics of knowledge production.

The political economy of development captures how much of the capital lent by the World Bank passes through the hands of Southern governments and travels directly to firms in the Global North, the main actors who carry out development projects, and who supply the capital goods and services. These dynamics of politics and capital may help explain why the latest embankment project—similar to both the 1960s CEP and 1990s FAP—is passed off as a climate project, with its original critics seemingly jumping on the bandwagon.⁷ Mr. Balam is a research consultant at a private research organization specializing in GIS modeling in Dhaka. Technical studies are awarded large budgets in the age of climate modeling and assessing climate risk in Bangladesh. His organization has conducted research on water problems in the coastal regions for several decades. When Mr. Balam expressed a critical opinion regarding increased Chinese involvement in Bangladesh, I asked why they are working with them on projects. He then replied: “We [Bangladeshis] only think about our own *shorir* [health, bodies]; if there’s money we’ll pursue it.”

During our conversation, which was entirely in Bangla, he criticized flood-protection embankments for silting up Bengal’s rivers and lamented how experiments to mitigate the problems have been nearly impossible to implement. I was therefore surprised when he revealed that his organization was in the process of bidding for a research component in a climate change project intended to expand polders and thus further obstruct sedimentation processes. He mentioned their collaboration with various Western companies and top-tier Western universities for a project worth more than US\$150 million.

In Africa, Asia, and Latin America, a World Bank consultant earns more than thirty times that of an equally qualified economist, making it much harder to say *no* to the World Bank (Goldman 2005). At first glance, one could write off Mr. Balam as “greedy” and participating in development to “extract development revenue” (Bierschenk, Chauveau, and de Sardan 2000). However, when I asked him what the project will achieve, he replied: “More studies, and very little implementation. Implementation is difficult.” He then began to tell me about his involvement in tidal river management to deal with the problem of siltation in the 2000s:

We tried a project where we purposefully broke the embankment during the monsoon to get rid of *jalabaddho*. The problem with this is the issue

of compensation: does it go to the absentee landlord or cultivator? This has not been resolved in terms of how we compensate those that are affected. The main thing is that water needs to be allowed inside the polder. The riverbed is rising, and it is rising rapidly. This was highlighted in previous studies as well. In a large study a few years ago, they had initially only looked at polder management but realized that they also must look at drainage which is connected to siltation: the sluice gates stop working due to siltation. But building higher embankments as the World Bank suggests is not sustainable. It will only increase the risk by imbuing a false sense of security. Our embankments are not built like Dutch dikes. The construction itself is vulnerable.⁸

This is at the crux of paradigm maintenance and technical solutions: it is too difficult to implement what is required. By participating in the technical game with climate change as a metacode, Mr. Balam can earn considerably more than if he had openly criticized donor projects. Yet, perhaps even more importantly, considering his previous experience of attempts to resolve siltation, there was also a self-realization of the difficulty of implementation and that short-term projects cannot resolve the vast problems of the coastal zone. He ended our conversation with the following words: “There is no real democracy in Bangladesh. It is limited, an imported model from the UK. The right to speak exists formally in Bangladesh, but people are afraid to speak.”

The decision to accept donor projects, regardless of misconceived ideas, is not only about financial and career *incentives*. Nor is it simply a matter of “corruption.” As Mr. Balam points out, there is a fear of openly criticizing projects. A focus on development as profit gained through collusion could analytically miss the importance of understanding that to not participate in this game may entail blacklisting and losing one’s livelihood that sustains not only oneself, but also one’s wider family network. Like one of my interlocutors pointed out: the development industry is an important employer for middle-class, educated Bangladeshis and for aspiring rural youth. To maintain their professional careers, to enable the survival of their organizations and the paychecks for their staff, to support their families, they choose to reproduce these donor narratives in their translations of climate change. This reflects the wider issue of structural constraints in the development industry, as several Bangladeshi development professionals, consultants, and researchers that I interviewed stated that there was no point in discussing how another embankment project might be futile or make things worse. They stressed the fear of being “blacklisted,” that their work

would be dismissed and discarded for mentioning local realities that jeopardize state politics or project legitimacy.

During our discussion of riverbank erosion and sedimentation, I asked Mr. Manzur, who once held a leading position at BWDB, why new and higher embankments are being built when all parties involved know it is ineffective and does not resolve the siltation of canals. He replied: “*Rajar kono dosh nei* [the king is never at fault]. The donors are the ones with money; thus, they are above criticism. A few years ago, I published an article in an English-language newspaper publicly criticizing the World Bank. I asked why the World Bank will not bear the yearly maintenance costs of the Jamuna [Brahmaputra River] as the embankment is damaged in several places and it was part of their project. I was promptly blacklisted; this was over a decade ago.”

Manzur draws attention to how his open critique in an English-language paper entailed publicly violating the technical game and the resulting consequences. He lost his current position and was no longer able to find equivalent positions, as others feared that association with the blacklisted individual would reduce their own chances of participating in similar projects. In this sense, Manzur was no longer able to participate in the technical game as his capacity to sustain his networks was heavily reduced.

The efforts to maintain certain project narratives (paradigm maintenance) could be interpreted as a top-down exertion of World Bank power, silencing those opposing the dominant narratives. Large-scale coastal embankments have been controversial since the Krug Mission Report of 1957, long before discussions of embankments as climate change adaptation. The Coastal Embankment Improvement Project, like the Flood Action Plan (FAP) of the 1990s and the colonial railways of the 1880s, is a capital-intensive infrastructure project. The CEIP, in addition to the costly infrastructure component, also entails the execution of several well-paid studies. Powerful financial interests who stood to profit lobbied for both the construction of railways and the FAP—development interventions that saw strong opposition from civil society and those with local knowledge, like Sir Arthur Cotton (chap. 1).

In the Flood Action Plan, several (though not all) Bangladeshi and international construction firms, research consultants, and development organizations sought to take advantage of large-scale infrastructure projects funded by international donors that would “maximize the flow of funds” (Hossain, Islam, and Saha 1987, ii; Shaw 1992; 2014, 232). Those not agreeing with the formal narrative of the FAP were also blacklisted. For example, an “expatriate” team for a USAID study for the FAP suggested that Bangladesh ought to live with floods rather

than attempt to control the unruly and dynamic delta through costly embankments (Rogers, Lydon, and Seckler 1989). Their nuanced analysis and clearly engaged understanding of the complex environmental processes of the Bengal delta explicitly identified the problems of low-frequency and high-magnitude floods (*bonna*) and the necessity of regular monsoon floods (*borsba*). The study infuriated then Prime Minister Ershad for its “defeatist tone” and led the US ambassador in Dhaka and other US officials to distance themselves from the report (Boyce 1990). The authors and their report were dismissed and were not even invited to attend the final workshop meetings of the FAP (Boyce 1990).

The team’s dismissal highlights the link between blacklisting and paradigm-maintenance—that is, the policing of knowledge production—as these dissidents and their research unresponsive of (profitable) large-scale embankments were in effect boycotted. The debates and concerns on flood-protection infrastructure in the 1990s contain important parallels to today’s discussions on climate change adaptation. Government officials, NGOs, and donors work together to adopt climate change as a metacode for their projects. If one does not participate in this technical game, the development professional and his or her organization may become blacklisted and end up completely outside the development industry. Nevertheless, by participating as brokers in this aid game, Bangladesh’s development professionals run the risk of reproducing silences over important problems such as obstructed sedimentation, which in turn results in deteriorating rivers, *jalabaddho*, and increased vulnerability to climatic risk.

Translating Climate Change Adaptation in Nodi

The World Bank’s CEIP project actively avoided the issue of siltation and erosion in the Bengal delta, but by no means are climate change projects in Nodi part of an all-powerful development discourse that seeks to render siltation invisible. Rather, power is dispersed and reinforced through the strategic tactics of development actors that belong to widely different development assemblages. Climate adaptation projects shaped by development assemblages more aligned with local interests, such as Nodi’s poorer constituents, can be bottom-up and locally relevant.

Water and Sanitation

I was sitting on an earthen veranda with several Dalit women, who were teaching me how to weave a mat made of dried date-palm leaves, when a young NGO fieldworker came by to conduct a household survey for a climate-related

water-and-sanitation project in a freshwater village in the north of Nodi. After we chatted for a bit, she arranged for me to meet her senior colleague Badrul. So the next day I went to their simple two-story building in Shobuj town. After we were introduced, Badrul pitched his project to me in English as if I were a prospective donor, even though I had already explained I was an unaffiliated researcher. He emphasized how the internationally funded project aims to improve livelihoods in “climatic vulnerable areas” through safe drinking water and latrines. When I asked him in Bangla why they had *climate* in their project title, and how was it linked to water and sanitation, he replied in Bangla:

To be honest with you, there’s no real link between climate change and WaSH [water and sanitation] but we need to put “Climate Change” on everything. You see, the total amount of global development funding has not increased, but climate change is getting more funds diverted to it. For us to continue with the work that still needs to be done, we need to change our *masala*. Hygiene has been an important part of the international development agenda for a long time, but to continue with it, we need to twist the way we sell it.

Like Mr. Shahid observed, Badrul used climate change as a *masala*. For NGOs to survive, they must adapt to donors changing funding priorities—highlighting how players in the technical game cater to actors adopting their metacodes (Rottenburg 2009). The scarcity of safe, accessible, drinkable water is a widespread and pressing problem in Nodi, which suffered from high levels of arsenic, salinity, and iron in its groundwater. Translating water and sanitation into being climate relevant helps acquire funding for problems that this particular NGO is equipped to solve. In this instance, the institutional assemblage’s agenda matched the needs and preferences of the people it is seeking to help: of the more than four hundred household surveys I carried out, most people in Nodi worried about the lack of safe drinking water as many ponds were silting up, and tube wells were either going dry or found to contain arsenic.

Caring for Dying Canals

My interlocutors in Nodi consisted of female and male landless agricultural day laborers and farmers. They viewed the canals as public goods for irrigation and for catching wild fish; most expressed concern over the many dead canals (*mora khal*) where there had once been deep waterbodies connecting the river to the fields. For example, Nitesh spoke about the once great Bhadra River where steamboats could pass, but which is now merely a silted canal: “The Bhadra River



FIGURE 2.2. Canal excavation in Nodi, May 2015. Photo by author.

is now the Dead Bhadra [Mora Bhadra]. Siltation caused the canals to die. Riverbank erosion damages the embankment and might wash away our homes any time. We can no longer catch fish from the canals or irrigate our crops.”

Several people in Nodi emphasized that if these public canals were excavated every five years (even excavated canals silt up over time) they could grow more crops locally while retaining more water from the monsoon for the water-scarce dry season. This was in response to a highly praised climate change adaptation project entitled *Enhancing Resilience to Disasters and the Effects of Climate Change*, which was funded by the World Food Program (WFP) together with “new donors” such as Brazil and Japan. This cash-and-food-for-work scheme provided rural training and work to women and men in the coastal communities in Bangladesh.

Nodi experienced the first phase of the project, when it hired around two to three hundred people to excavate large canals that had silted up across the polder (see fig. 2.2). It thus provided income opportunities to local families, including landless day-laboring single mothers without husbands. By widening and deepening the heavily silted canals, the project envisaged a greater absorption capacity of monsoon rains—expected to increase with climatic variability—while allowing for water storage from the monsoon, thus providing a space for fishing and irrigation as a public common. This labor-intensive project saw the main cost of wages deposited to the private bank accounts of locally hired

labor and also distributed food grants through a local NGO. Unlike the (inter) national research bids for embankment research in Dhaka, the project was designed to be bottom-up, where local government officials, community members, and NGO staff discussed and identified which of these activities to implement (World Food Program 2012). Whether climate change adaptation projects can benefit local populations or not depends on how climate change adaptation is translated in the shaping of a development intervention, which itself depends on the constitutions of donors and their implementing partners in specific development assemblages.

Badrul's project used climate change adaptation funds to install wells and latrines in rural areas and was locally relevant and valuable, as was the World Food Project's interventions that both excavated canals and provided local employment opportunities. The different activities of these two projects—safe drinking water and canal excavation as a remediation of siltation—complicate ideas of climate change as an adaptation regime causing agrarian dispossession (Paprocki 2018).

A Diversity of Project Outcomes

The diversity of projects in Nodi demonstrate how the metacode of climate change is actively translated and how the final intervention will depend on the specific assemblage of development brokers with different agendas, priorities, and knowledge backgrounds who come together to create a joint and mutually relevant translation. Thus, the widely different translations of the very same metacode of climate change will depend on the composition of the development assemblages who work together to create development interventions that vary greatly: from local benefits to the continuation of longstanding environmental problems. This may explain why there is a stark difference between a World Bank-funded embankment project that is focused on technical studies and infrastructure development versus one where food, local needs, and rural livelihoods are in focus.

The diverse ways in which the very same *metacode* can be translated into a wide variety of different project interventions indicate the high degree of calculation and agency of development professionals who act as brokers embedded in specific institutional and social contexts. The World Bank's focus on technical embankments illustrates a failure to translate the metacode into locally relevant ways, perhaps suggesting that the brokerage between coastal populations and those gaining from infrastructure and modeling projects is missing, that their interests are not commensurate, and that their institutional flexibility for

translations differ considerably. The various development professionals located in Nodi, Khulna, Dhaka, and global organizations are not distinct brokers with some being worse or more imposing than others. They each form a layer of social worlds with complex hierarchies consisting of distinct and mutually constituted social networks. Seeing these layers as distinct assemblages of heterogeneous actors, institutions, and interests may help explain the diversity of translations represented in the variations of climate change adaptation projects in Bangladesh.

Conclusion: Why Critique Climate Reductionism?

In his 2004 article “Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern,” Bruno Latour—a key figure in the social construction of science and the lack of scientific certainty—reflects on skeptics appropriating critical studies of science for their own agenda (2004, 227). He laments: “Why does it burn my tongue to say that global warming is a fact whether you like it or not? Why can’t I simply say that the argument is closed for good?” For Latour, to understand the social construction of climate change science is to renew empiricism and to get closer to the facts. Even something as real as global warming can also be socially constructed. This is why the distinction between material *climatic* change and discursive *climate* change is useful. Focusing on a better understanding of climate reductive translations illustrates how distinct assemblages of development brokers come together to make a climate-related development project exist and how they actively work to maintain its existence. Global warming is a serious cause for concern, but the way in which it is translated into everyday politics and economic activities is one that is embedded in social context.

Climate change as a spice, or metacode, not only attracts donor funding, but provides a space for resolving tensions of actors and agencies with different agendas. Bangladeshi development brokers compartmentalize their context-specific environmental knowledge by code-switching between the public transcript in English and the unofficial, hidden transcript in Bangla. This enables them to participate in the technical game and maintain ignorance as they recognize that a long-term strategy is unachievable within a development professional’s short-term project tenure. In the World Bank’s Coastal Embankment Improvement project, climate change adaptation was translated into a seemingly neutral and technical metacode that removed local context and rearranged the causal reasoning that legitimized the project. By doing so, it neglected the problem of how embankments exacerbate siltation and damaging *jalabaddho* floods that may worsen the livelihoods of coastal people.

The translation of climate change depends on specific assemblages of brokers and multiple heterogeneous development actors to highlight how the translation of embankments as adaptation does not necessarily form an antipolitics machine or an adaptation regime. When actors with different agendas, priorities, and knowledge backgrounds come together, they form a distinct assemblage of socially embedded relations that will jointly create a shared translation—linking their project activities to the metacode of climate change—that will be different from assemblages consisting of other brokers with a different set of diverse agendas. It is the composition of brokers and donors in these assemblages, their various institutional agendas and mandates, that shape whether the final interventions fit the needs of the populations they are seeking to assist. Thus, the lack of benefit to local people in the World Bank project may illustrate that this specific assemblage of brokers is too far removed from rural perspectives to partake in the act of translating climate change to the latter's benefit. It may also illustrate that the officials involved in World Bank projects are better at harnessing dominant narratives for their own particular agenda. Furthermore, the assemblages of capitalist interests and state capitalists that benefit from capital-intensive projects and studies may not be interested in a translation of climate change that creates benefits for the rural poor.

Climate change is one of the most pressing issues of our time, and it is important to critically scrutinize the official scripts of development projects using climate change as a metacode. In this way, those who pursue old agendas under the guise of climate adaptation and resilience may exacerbate Bangladesh's climatic vulnerability now or in the long-term—as embankments inevitably do.

Assembling Fish, Shrimp, and Suffering in a Saltwater Village

Mr. Jones is a Western development professional at a leading aquaculture research organization in Bangladesh. During our meeting in the city of Khulna, while discussing the grassroots movements against brackish aquaculture and tiger prawns, he stated: “Climate change is a fact. [All of] Bangladesh will become saline; it is inevitable. Bangladesh should accept this and focus on cultivating saline-tolerant species such as tiger prawn and [foreign] tilapia and export them. This is its comparative advantage. Why grow rice when Bangladesh can import rice from Myanmar? If you ask me, this *is* the future.”

His words stunned me. Nodi is part of the Ganges tidal floodplain and is classified as a subregion “ebb”: mixed Ganges River and tidal floodplains, where rivers are nonsaline except for the dry season, from January to June (Brammer 2012). Thanks to embankments, such salinity incursion from tidal rivers originating from the Bay of Bengal is prevented from salinizing the soil (chap. 1) and agriculture is possible in the monsoon season. Indeed, following the Coastal Embankment Project, dry season agriculture was also possible. However, starting in the late 1980s, tiger-prawn cultivators cut and breached embankments to *bring in* saline water in the dry season—reversing the very purpose of embankments in the Bengal delta. Purposeful salinity intrusion by tiger-prawn cultivators is well-documented for its violence and contention that also made embankments structurally vulnerable during cyclones (Guhathakurta 2003; Deb 1998; Paprocki and Cons 2014a; Adnan 2013). Yet Mr. Jones, a capitalist tiger-prawn promoter, rephrased salinity as a form of adaptation to climate change despite his knowledge of the seasonal and human-made nature of salinity.

Mr. Jones’s remarks reflect the beliefs of the “adaptation regime,” where the threat of climate change and its associated migrations are reframed as an opportunity for development and growth through the production of export

commodities such as frozen shrimp (Paprocki 2018, 955). It also illustrates how development actors translate funding buzzwords in ways that fit their agenda (chap. 2). Mr. Jones's statement demonstrates how actors interested in promoting high-value tiger prawns for export can engage in climate reductive translations through the following policy theory: sea levels will rise, salinity will inevitably increase, and Bangladesh should therefore adapt to this salinity by cultivating brackish *bagda* (*Penaeus monodon*, or tiger prawns). He is by no means representative of all development professionals in Bangladesh, but his words indicate how particular development assemblages seek to legitimize a further expansion of tiger-prawn cultivation.

This reframing of adaptation further shows how what counts as adaptive is always political and contested, and that which is seen as positive to some may be seen as maladaptation to others (Eriksen, Nightingale, and Eakin 2015, 523; Paprocki and Huq 2018). Parsing out supposedly climatic drivers of changes in salinity, as Mr. Jones does by attributing it solely to rising sea levels, not only leads to an impoverished understanding of the ways in which environmental change is embedded within social change (Nightingale et al. 2020, 2), but also furthers ignorance of the complex causal drivers of salinity and their reversibility in particular parts of the Bengal delta.

What problems arise when tiger-prawn cultivation is translated as a climate adaptation intervention? There are specific and complex causes of salinity in the southwest coastal zone that problematize this narrative of inevitable salinity. Embankments and silt management strategies such as Tidal River Management are important in countering seasonal salinity, and an examination of the specificities of salinity in tidal rivers highlights how tiger-prawn cultivation is an unsuitable adaptation measure in areas where freshwater cultivation is possible in the monsoon season.

Another misreading of this translation is how it misses the socioeconomic inequalities of this export-oriented mode of brackish aquaculture, which is deeply entangled with environmental degradation. Combining theories of primitive accumulation and accumulation by dispossession with political ecologies of water grabbing—that is, the contested control of water resources (Mehta, Veldwisch, and Franco 2012)—illustrates a long history of violence caused by brackish aquaculture in the southwest coastal zone. “Canal grabbing” (*khal dakal*) refers to the privatization of once public (state-owned) canals. This dispossession of commons was integral to facilitate export-oriented cultivation profits starting with the 1980s Blue Revolution that deprived local people of their customary rights to wild fisheries and recreational uses of wetlands. In addition, the purposeful

salinization of once freshwater bodies came to have negative embodied and gendered effects. A critique of brackish aquaculture that incorporates the importance of a healthy environment for well-being also helps capture the affective and embodied experiences of socioenvironmental inequalities.

Contextualizing Salinity in the Southwest Coastal Zone

Mr. Jones, by attributing all changes in salinity to climate change, engages in climate reductionism. Such a narrative not only ignores the coercive and purposeful ways in which salinity is brought into coastal areas in the dry season for tiger-prawn cultivation, but also the various other causes of increased salinity in the coastal zone. As a local environmental scientist from the Khulna region said, “Do not relate everything to climate change, it blinds against the role played by embankments and the environment. How much of salinity is due to climate change? And how much is due to polders and/or groundwater withdrawals with naturally saline aquifers? How much is due to brackish tiger-prawn cultivation?”

Most importantly, salinity is seasonal and *bagda* cultivation is reversible. After the meeting with Mr. Jones in Khulna, I went downstairs where Hassan—my motorcycle driver and local guide—was waiting to take me back to Dhanmarti in northern Nodi, where I had a meeting with met a group of rice farmers. I repeated Mr. Jones’s words to them. The atmosphere in the small tin room changed; the men were furious. Murad, a vocal forty-year-old farmer, responded:

People are eating *bideshi* [foreign] tilapia, *bideshi* poultry, *bideshi pangash* fish: this is poisoning people. The person who said this is a *shaitaner hardi* [devil’s bones]. Saline *bagda gbers* [tiger-prawn ponds] destroy nature. Nothing grows when *bagda chingri* [tiger prawn] is cultivated. We had it here until eight years ago when we [local people] fought to end it. Now we have fruit trees—mango, dates, and we can grow vegetables and freshwater crops, our rice yields have increased—though the soil has still not fully recovered from decades of salinity. *Bideshi* [foreigners] introduced *bagda*. It was, it is, a *bideshi* idea. Selling *bagda chingri* to *bidesh* [abroad] brings money into Bangladesh, but local people are not getting anything from this. The salt kills our ability to grow local foods; it reduces the quality of our lives. *Apa* [sister], I know you are not bringing in a project yourself. But please make sure that no saline fish project comes here. We want freshwater fish projects, like *rui*, *katla*, *golda chingri* [giant freshwater prawn], even crab. Please do not let *bagda* come here again.¹ We refuse it.

The remaining men nodded and agreed with Murad, stating that though their incomes have declined since the end of tiger-prawn cultivation, their living costs have also gone down, they can access different types of water, and they feel happier and at peace (*shanti*) with a higher quality of life. Brackish aquaculture is reversible; ruination is not inevitable.

Nodi's particular location in the Ganges tidal floodplain makes it suitable for freshwater (rice paddy) cultivation, though salinity levels increase during the dry season when the salinity and tidal limits in rivers moves northward (Brammer 2012, 246). Low salinity starts with the monsoon in mid-June when rainwater and the Himalayan runoff in the rivers combine to push out tidal brackish water from the Bay of Bengal. The force of this freshwater is reduced by mid-January, enabling the salt tides to encroach inward and turn the rivers saline. During this time, the sluice gates of coastal embankments, situated at the mouth of canals as they merge with the river, can be closed to prevent saltwater from coming in to the inhabited floodplains and agricultural fields (mimicking the function of *aushtomashi bandhs*), or they can be opened to facilitate brackish aquaculture. Salinity fluctuates throughout the year and is regulated through (sociopolitical) control of embankments and their sluice gates.²

The monsoon rains thus play an important role. They fill the rivers with freshwater, as this colonial account describes: "We find the force of the freshwater sufficient to overcome the strength of the tide, and the influx of saltwater from the sea. And down the very mouths of the river here, freshwater (often for hours in the day flowing over a basis of saltwater beneath) can readily be procured" (Dr. Oldham, cited in O'Malley 1908, 5). The capacity of the delta to retain such a "force of freshwater" has unfortunately been reduced. A century ago, there were thousands of canals that retained monsoon water and the freshwater flowing down from the Himalayas to the Bay of Bengal. After the construction of polders that obstructed the natural monsoon floods from depositing sediment on the floodplains, the silt, now confined to the rivers and canals, clogged up several of the canals so that only a limited number of them are able to retain the monsoon water into the dry season. This reduced freshwater availability permitted brackish tidal water to seep further into the interior: "Salinity intrusion used to reach up to Satkhira, and now salinity reaches Jessore," Bakul (whom we met in chapter 2) explained. The Gorai River, the main tributary of the Ganges in Bangladesh, supplies freshwater to the Khulna region and Nodi. However, the extreme amount of sediment has resulted in the Gorai disconnecting from the Ganges in the dry season (Z. Khan et al. 2015a, 20).

Bangladeshi scholars, activists, and local farmers have argued that much of the reduction of freshwater in the Gorai and its reduced ability to temper salinity encroachment from the Bay of Bengal is due to India's unilateral construction of the Farakka Barrage in 1975, resulting in Bangladesh receiving less water during the dry season (Swain 1996; Hill 2008, 179).³ Historical government documents such as *Deadlock on the Ganges* shows that following the construction of the Farakka Barrage, salinity increased heavily from the annual average and penetrated 132 kilometers further into Bangladesh from the normal incursion limit. Within a year of construction, Khulna's thermal power station had to be shut down because its boiler feed from the Bhairab River had become too saline and caused corrosion (Government of Bangladesh 1976, 3–4). Prior to 1975, salinity was below one ppt at Khulna and the river water was used for drinking, agriculture, and industrial purposes. By 2015, river water salinity at Khulna had increased to more than fifteen ppt during the dry season, making it unsuitable for most purposes (Z. Khan et al. 2015b, 35).⁴ The delta's ability to retain freshwater into the dry season is vital in preventing long-term salinization.

*Ruination and Removing Embankments:
Differences between India and Bangladesh*

Mr. Jones's narrative overlooks the complex factors behind seasonal salinity, including how silted rivers and canals reduce the capacity to retain rainwater to counteract tidal saline flows in the dry season. His claim that Bangladesh will drown in rising sea levels illustrates how shrimp aquaculture is integral to the dynamics of "anticipatory ruination," a discursive and material process of social and ecological destruction in anticipation of real or perceived threats (Paprocki 2019, 295). Anticipatory ruination is seen as a legitimizing discourse for depolderization—that is, removing the embankments to allow tidal waters to inundate the area within, either completely or partially during certain times of the year or for an extended period of several years.

Thus, removing the embankments today would likely cause complete inundation of entire islands, and the necessary displacement of the communities that inhabit them. Depending on the scale of depolderization, the populations affected could be tremendous. . . . Wherever depolderization is discussed (by consultants, donors, and practitioners), it is talked about as an integral component of a broader vision of development for the region. That is, the anticipation of climate crisis combines with and brings about a normative vision of developed futures. These imagined futures entail the

end of rural livelihoods in the delta, replacing them with a highly stylized (and age old) vision of development where the rural population transitions into an industrial labor force (Paprocki 2019, 306–7).

Depolderization illustrates the materiality of discourses of ruination used not only by the tiger-prawn adaptation regime, but also conservation and tourist interests (WWF and World Bank) in West Bengal seeking to remove populations from southern Sundarbans forest islands (Paprocki 2019). This is an important point considering West Bengal public debates about “planned retreat” and moving mostly Bangladeshi migrants away from areas deemed more worthy of conservation to attract high-end tourism (Mehtta 2019; Bhattacharyya and Mehtta 2020).

Such planned retreat interventions in India, which involve removing embankments and stopping human habitation, would result in year-round, permanent salinization. As such, depolderization is different from Tidal River Management (TRM) in southwest coastal Bangladesh. TRM is a silt management strategy to solve embankment-caused siltation by strategically cutting the embankments at the mouths of canals and rivers to allow sediment into the floodplain with the tides. Bringing sediment onto the floodplains would reduce silt choking up rivers and in the long-term helps increase freshwater retention capacity. TRM started as a bottom-up people’s concept known as *jowar bhatar khelano* (free play of tidal flows): to cut embankments as a response to extensive waterlogging. This was then formalized by the Bangladesh Water Development Board and the Asian Development Bank in the 1990s Khulna-Jessore Drainage Rehabilitation project—a project that was heavily criticized (ADB-OED 2007; Kibria 2006; Tutu 2005; Pasha 2010). When I conducted fieldwork in Bangladesh in 2015, there was little hope that TRM could be implemented because of the institutional constraints of compensation to polder communities when the embankment is temporarily breached. However, there appears to be a paradigm shift in terms of trying to deal with siltation management in the southwest coastal zone. TRM is now accepted by those working in Bangladesh’s water sector as effective in managing the delta’s silt problem (Hanlon 2020, 31), and more attention is directed toward how to compensate and engage local community ownership through experiments with NGOs such as Uttaran (Ahmad 2020; Gain et al. 2020).

The Benefits of Tidal River Management

A meticulous review of changes in Bangladesh’s water policy highlights the possibilities of TRM as a hybrid solution: it departs from existing engineered

embankments, but is distinctly open in regard to the temporary restoration of tidal flood dynamics in the wetlands. Researchers highlight how dealing with tidal flood dynamics is not about closing down rivers in the face of twice-daily rising water levels; it is also about occasionally opening up a river for its suspended sediments (van Staveren et al. 2017).

A study of Polder 32, where Cyclone Aila breached the embankment in several places in 2009, highlights the sediment starvation inside embankments. Within the two years that it took for the embankment to finally be repaired, the sediment had considerably raised land levels inside the embankment (Auerbach et al. 2015). Rather than complete inundation, breaching embankments helps raise land levels so that longer agricultural lives can be sustained in the southwest coastal zone, revitalizing water bodies and futureproofing against damaging *jalabaddho* floods. Contrary to depolderization as anticipatory ruination, such a silt management regime impedes the activities of tiger-prawn *ghers* as they are unable to operate. Furthermore, depolderization and planned retreat for the southern West Bengal Sundarbans islands, with their year-round saline tidal rivers, constitutes both a different political and socioenvironmental context compared to Bangladesh's southwest coastal zone, where agriculture was (since the 1800s) and still is possible because of freshwater rivers.

TRM has the potential not only to sustain freshwater agriculture and local livelihoods, but also to resolve siltation and raise land levels, as well as ensure higher retention of freshwater to counteract salinity—all needed to increase Bangladesh's capacity to deal with climatic change (Hanlon 2020). However, institutional mechanisms for its implementation must ensure compensation to all affected (e.g., universal basic income) and provide alternative livelihoods (e.g., rural employment schemes such as pond and canal excavation projects) so that TRM does not end up also being a case of dispossession by development (Makki 2014; Ahasan and Gardner 2016).

The Blue Revolution: Expanding Brackish Aquaculture through Water Grabbing

Sandip, who is from the Khulna region and works as a researcher at an international NGO, was outraged by Mr. Jones's suggestion. Like Murad, he describes the introduction of tiger-prawn cultivation during his childhood as a *bideshi* (foreign) donor-backed project: "The Bangladeshi government promoted the shrimp industry since the 1980s with *bideshi* funds in the name of *sada sona* [white gold]; children even had to write essays on *sada sona* in school. . . .

The primary beneficiaries were *gher* owners as a lot of *khas* [public-or government-owned land] was converted into *ghers* [enclosed dikes for aquaculture], or what were called *jal mahals* [water palaces]. Before it was introduced, environmentalists and scientists advised against *bagda* cultivation and tried to stop it. But *bideshi* projects destroyed our environment, our biodiversity.”

Salinity in Nodi is not permanent or inevitable; it is linked to the use of embankments. Tiger-prawn cultivators purposely draw in tidal water from rivers when they are saline in dry season, thus degrading the environment and reducing local food production and quality of life in these coastal areas. The violence of salinization extends debates on land grabbing to water: tiger-prawn cultivation constitutes water or wetlands grabbing, where “powerful actors are able to take control of, or reallocate for their own benefits, water resources already used by local communities or feeding aquatic ecosystems on which their livelihoods are based” (Mehta, Veldwisch, and Franco 2012, 197). The violence of salinization by influential elites entails *khal dakal* (canal grabbing) and has serious implications for people’s livelihoods.

The exponential expansion of shrimp aquaculture in coastal areas of the Global South (from Thailand and Vietnam through Bangladesh and Sri Lanka to Honduras) in the 1980s and 1990s was part of the Blue Revolution. By the 1990s, 72 percent of shrimp was farmed in Asia; the majority were exported to the United States, Europe, and Japan (Stonich and Vandergeest 2001). Similar to “adaptation” today, this “revolution” was promoted under narratives of improvement such as “feeding the hungry” (Saidul Islam 2014), “reducing poverty,” and relieving pressure on wild fish stocks (Thornton, Trent, and Williams 2004; Stonich and Vandergeest 2001).⁵ While implementing actors may have sincerely aimed for these goals, the narratives also legitimized the implementation of Structural Adjustment Policies (SAPs). By producing tiger prawns for export, “developing countries” could accumulate foreign exchange to repay their loans (Saidul Islam 2014), loans shaped by the conditionalities of trade liberalization required by the International Monetary Fund and World Bank (Mansfield 2011; Muhammad 2003; Pokrant, Reeves, and McGuire 2001; Stonich and Vandergeest 2001).⁶

As Sandip mentions, foreign funds played an important role in the name of white gold. The World Bank, the Asian Development Bank, and USAID provided support for aquaculture through substantial support and incentives. By the early 1990s, the export of shrimp had become a major growth area of Bangladesh’s economy, but it was also highly controversial (Lewis 2011, 151). The export of tiger prawns increased from US\$90.8 million in 1986 to US\$280 million in

2002 and 2003, while during the same period more than 350,000 acres of agricultural land in the coastal districts of Bangladesh were turned into *bagda ghers* (enclosed tiger-prawn farms; M. Rahman and Wiest 2003).⁷ The most dramatic example is how the Chakoria Sundarbans, a vast mangrove forest protecting the southeast of Bangladesh from the Bay of Bengal, was irretrievably destroyed to give space to this new mode of export—in a project funded jointly by the Asian Development Bank and World Bank in 1982 (Deb 1998).

In the southwest coastal zone, tiger-prawn cultivation prompted further deforestation, leading to *bagda ghers* encroaching on the mangrove forests and pushing their boundary farther southward (Thornton, Shanahan, and Williams 2003)—highlighting the similarities of mangrove grabbing elsewhere in the Global South (Veuthey and Gerber 2012). Notably, the World Bank's first, second, third, and fourth fisheries projects in the 1990s explicitly created more sluice gates in the embankments to expand aquaculture under the guise of poverty reduction while being at odds with the interests of freshwater paddy farmers (Hasan 2012). The conflicts between freshwater farmers and brackish *bagda* cultivators remains today and creates tensions between different organizations and government agencies (agriculture and environment versus fisheries and aquaculture).

Furthermore, this expansion was characterized by resistance and violence (Islam 2014). While Sassen (2014, 86–87) suggests that SAPs weakened developing economies and made their governments willing to “sell vast amounts of land and expel whole villages from their land to do so,” thus provoking an imagery that land is suddenly and violently seized, Gardner and Gerharz (2016) point to how the transfer of land from one group of users to another is often incremental, shifting over time according to complex political processes. In Bangladesh, the promotion of export-oriented aquaculture increased the price of land and resulted in a new lease system (A. Rahman 1994, 510). Poor smallholders leased out their land to large farmers or nonlocal shrimp businessmen for six months during the saline dry season and regained the land for paddy cultivation before the start of the monsoon. To maximize profits, tiger-prawn cultivators retained salinity in the fields instead of returning the land back to rice farmers, thus negatively affecting the latter's crops (M. Rahman and Wiest 2003, 17; M. Rahman 2003; Guhathakurta 2003).

Such purposeful salinization of wetlands formed part of larger patterns of violence. These shrimp businessmen-cum-powerful elites often employed local *mastaans* (armed gangsters) to open existing sluice gates in the dry season and to breach the embankments with unauthorized pipes and private sluice gates in order to increase the amount of saltwater within the *ghers*.⁸ Not only did

the *mastaans* breach the embankment—making it structurally weak and more prone to collapsing during cyclones, such as Aila in 2009 (de Silva 2012)—they forced saline water into the beels and made whole areas unsuitable for paddy cultivation.⁹ Many smallholders who had not yet leased out their lands saw their crops devastated by salinity and were forced to lease out their land (Deb 1998; A. Rahman 1994) or convert their land into a *gher* and give it up completely (Paprocki and Cons 2014a; Hasan 2012). The transition to tiger-prawn cultivation was fraught with human rights violations, such as torture, threat of police arrest, physical assault, kidnapping, intimidation, rape, and murder (Paprocki and Cons 2014b, 3; Thornton, Trent, and Williams 2004).

Water Grabbing and the Loss of Commons

This violence was also connected to water grabbing. *Gher* owners not only illegally appropriated public land intended for state distribution to landless people (*khas jomi*), but also public canals (*khas khal*) (M. Rahman and Wiest 2003, 17; M. Rahman 2003; Guhathakurta 2003). This process of accumulation was very much characterized by canal grabbing (*khal dakal*)—the appropriation of *khas* canals and the imposition of private fishing rights in public water bodies. This was a major problem in embanked floodplains such as Nodi, a wetland ecology. Many of these leased *khas* canals have “private” nets that compartmentalize and obstruct the free flow of canals and migratory routes of fish, reducing both the access to fish as well as the fish’s ability to breed (Hasan 2012). Neither fish nor people could now move through these canals.¹⁰

Canal grabbing is intrinsically connected to the expansion of brackish shrimp aquaculture, as Bakul pointed out: “Entire rivers and canals are blocked and used as *ghers*. You will not be able to differentiate between a river, paddy land, or land grabbing; all these processes are linked together.” In this context, water grabbing, or taking control over water resources, entails salinizing freshwater bodies and altering their seasonal properties by reversing the original purpose of embankments. Local people were no longer able to travel by boat in the canals, nor were they able to fish for their own consumption in the deltaic commons, which were now privatized to produce tiger prawns for export. The recreational use of the canals for play and swimming was also taken away, and the salinity of the rivers made the nearby areas desolate and unfit for lush and green vegetation. Dispossession here is thus one both of violent land grabbing and the reduction of labor opportunities (Paprocki 2019, 305), as well as one where the salinization of wetlands and canals is coupled with the loss of social and reproductive spaces.¹¹ This highlights how it is the brackishness of tiger-prawn aquaculture,

rather than the capitalist activity itself, that contributed to the affective and socioecological dimensions of dispossession.

The appropriation of previously open-access wetlands and canals for *bagda gbers* resulted in the poorest of the poor losing access to fish. Ahmed Kaka, an eighty-year-old man, describes how the leasing system to outside *bagda* interests prevented locals from fishing in canals, while the conversion of fallow fields into saltwater ponds entailed a loss of grazing lands for cows. Since the 1793 Permanent Settlement Act, public navigable rivers were defined as state property and the public had every right to fish in them, unless the state leased out part of the river (Pokrant 2014, 96). The practice of leasing out *kbals*, even for a period of ninety-nine years, thus deprived local people from common resource pools for fisheries, resulting in de facto privatization.¹² This illustrates how the transformation of multiple-use coastal resources into privately owned single-purpose artificial and regulated *ghers* for profit-driven brackish shrimp cultivation (Pokrant, Reeves, and McGuire 2001; Deb 1998; A. Rahman 1994; Adnan 2013; de Silva 2012; Hasan 2012) deprived coastal communities of access to *khas* water bodies in a “fake Blue Revolution” (Deb 1998, 81).

Capitalist Relations in a Fluid and Seasonally Saline Delta

In practice, *bagda gbers* privatized the open-access commons of wetlands, canals, and mangrove forest. Yet what enabled the state-owned canals to be leased in the first place? Is this loss of land and access simply a case of “primitive accumulation” (Marx 1976, 500–502)¹³ or “accumulation by dispossession” (ABD; Harvey 2005)?¹⁴ These influential concepts have shaped the analysis and conceptualization of land grabbing in the Global South (Kelly and Peluso 2015; Makki 2014; Sassen 2014; Walker 2008) and act as powerful correctives to liberal narratives that see markets solely as spheres of voluntary, mutually beneficial exchange (Hall 2012). However, several empirical studies highlight that a significant flaw with both primitive accumulation and ABD is the way in which the concepts dichotomize and homogenize the actors into the state versus the dispossessed (Adnan 2013; Levien 2011, 457).¹⁵ For example, Gardner (2012) shows that land loss among the local population is “not a simplistic tale of exploited peasants resisting development.” In contrast to ideas of the state simply clearing the way for multinational corporations (MNCs), the corporations were found to have negotiated with different local and national political groups with contradictory interests (Ahasan and Gardner 2016, 12).

Similarly, Shapan Adnan (2013; 2016), in his case study of the shrimp industry in the southeast coastal zone of Bangladesh, criticizes primitive accumulation

and ABD for being unable to explain complex processes of capitalist development. He points to the diverse coalitions between foreign aid funders and domestic actors (World Bank, NGOs, private businesses, governments, and powerful elites) involved in promoting (and opposing) the *bagda* industry, including local (wealthy) landowners. Through their own relations of political support and patronage, tiger-prawn cultivators use violence with impunity (Finan 2009). Such capitalist assemblages are linked through class and power that favor the relatives of army officers, bureaucrats, bankers, and businessmen, where there is an inherent inequality of access to the technology and capital necessary to adopt aquaculture (Deb 1998, 81).

As Marx noted, a distinguishing feature of capitalist relations is the ironic combination of an ideology that stresses freedom, but with material relations that simultaneously restrict it (Li 2014, 3). Cash crops require an ability to mobilize capital and land, meaning that not everyone can benefit from their introduction (Li 2014). Large landowners in Lonanodi are those that are most able to participate in the capitalist relations required for tiger-prawn cultivation, while poor landless people's capacity to survive is governed by rules of competition and profit that dismantled their rights to the commons. Furthermore, tiger prawns were heralded as "white gold," and many poor families indebted themselves as a result, dreaming of wealth and prosperity. Those able to engage in these capitalist relations were able to benefit, while those who could not, like the landless, lost out.

The structure of capitalist relations, and the way they produce new forms of poverty, is invisible in liberal accounts that advocate the expansion of the market as the route to increased productivity and wealth (Li 2014, 7). This is illustrated in Bangladesh's *bagda* industry where these capitalist relations are obscured in narratives of both "poverty reduction" and climate change. Rather than a straightforward case of primitive accumulation or ABD, tiger prawns were expanded through capitalist relations between various coalitions of domestic actors, including local landowners and assemblages of development actors, of which Mr. Jones is one.

Thus, forced salinity intrusion is not simply a case of a sudden land grab or "ex situ displacement"—that is, a decisive expulsion of people from their homes, communities, and livelihoods. The long-term salinity intrusion of the coastal land- and waterscape has resulted in local people losing their life-support services over a prolonged multistage process of removal with a slow-motion loss of entitlements from previous rights and identities. This could be referred to as "in situ displacement" (Feldman and Geisler 2012, 974). The concepts of *in situ* and

ex situ displacement shed light on the processes of land dispossession, and how shrimp aquaculture reduced labor opportunities and increased indebtedness and greater rates of migration in Polder 23 in the Khulna District (Paprocki and Cons 2014a), a few hours north of Lonanodi. These problems of underemployment, debt, and migration are also common in the freshwater villages of Dhanmarti. Ending brackish aquaculture through social protests—characteristic of dissent against accumulation by capital—involves a return to freshwater cultivation. Yet, this may not help address the problems of out-of-pocket expenses and indebtedness for rural Bangladeshis that motivate migration (chap. 5).

In addition, Marxist concepts such as primitive accumulation and ABD are inherently “land-centric,” as nature is reduced to land as a “fixed stock” of the means of production in a given location (Adnan 2013). Yet Lonanodi belongs to a monsoon-dependent delta. “Land,” as Bakul pointed out, “merges with rain, rivers, and canals,” making any demarcation or boundary fluid. Thus, enclosures do not capture the fluid entanglements of deltaic ecologies. Indeed, the focus on land grabbing may be Western-centric in its very conceptualization of nature and the environment. Furthermore, the difference between Lonanodi and Dhanmarti highlights that the problem is not that of accumulation for capitalist production alone. By producing capitalist commodities in a freshwater environment, not only would the environment be saved from salinity, but women could more easily carry out reproductive tasks.¹⁶

Lonanodi: Salt and Barren Desert

What are the lived experiences of living in areas where freshwater cultivation was once possible, and where *bagda gbers* now dominate the waterscape? How does living with salinity help us grasp the everyday realities of economic theories of “dispossession” and “poverty reduction” and their consequences? Ethnography can help us understand not only the social aspects of everyday life and the private domains of households and families, which sustain social reproduction across generations (Narotzky and Besnier 2014), but also the affective importance of a healthy biodiverse environment for making life worth living. By focusing on the affective dimensions of suffering in a saltwater village and contrasting it with a village that has returned to a freshwater environment, it is possible to examine what kinds of embodied experiences of anxieties arise when embankments are repurposed to bring in salinity during the dry season and how this is tied to the loss of agroecological and species diversity. Furthermore, Marx described social reproduction as a free good, while natural resources were “free gifts of

nature” (*Capital*, vols. 1 and 2; Harvey 2017). Marx did not discuss them other than stating that they provided contextual conditions for capitalist processes. Women in Lonanodi are affected most by changes to saltwater production, as it makes their unpaid, noncommodified (social) reproductive labor much harder to do, as Noshima and my household survey with Lonanodi women painfully makes clear.

The Emotional Suffering of Saline Water

Noshima lives with her son Sohel, his young wife, their baby son, and her adolescent daughter Nisha in a half-broken hut—part crumbling mud, part sticks with ragged cement bags as cover—next to the embankment. She has had a hard life from the onset. Her parents were landless and moved to Khulna city in the 1990s when tiger-prawn cultivation was first introduced to the area. She worked as a *kajer meye* (child maid) and was married off at the age of fourteen. When her daughter Nisha was only three months old, her husband brought her to Lonanodi and left her there. He then went on to start a new family with a new wife. She describes how it felt to return:

I returned to a *lona desh* [saline land] without vegetables. The salt is even in the air, eroding the walls of the houses so they crumble. Everything is *lona* [saline]. Everything dies. There are no fruit trees; the few date and coconut trees here do not bear fruit. Goats and chickens are too expensive to buy, and they often die due to the saline water. We need to buy all [our] cooking fuel, there are no trees or cow dung for us to use. There is no grass for livestock, the ponds are too saline for bathing, clothes washed in saltwater do not get clean and ruin quicker. We need to buy everything and because of this we cannot afford to buy fruit, eggs, or meat. . . . The canals are gone; we used to bathe in canals that are now no more. During this time, we must bathe in the saline river. Salinity is the worst problem in our area. Our eyes sting, our skin itches and becomes dark. Our ponds are now saline. We used to drink pond water filtered with *fitkeri* [alum stone], now we must drink tube well water that we collect from far away. We suffer now, but the rich do not care.

Noshima’s statement captures not only the loss of food sovereignty caused by shrimp aquaculture’s saline and barren deserts, but also the emotional suffering that saline lands bring about.¹⁷ Rice is harvested in January, after which dry season salinity intensifies, making the situation in Lonanodi increasingly worse. From mid-March to mid-June, the salinity levels in the rivers are at their



FIGURE 3.1. Cracked soil in Lonanodi during the dry season, March 2015. Photo by author.

highest. The freshwater that filled the rivers during the monsoon had receded, and is unable to stop salt tidewater from creeping upward from the Bay of Bengal. Cracked mud fields (fig. 3.1) illustrate how tidewater penetrates the soil and makes it dry and less fertile.

During this time, ponds and canals slowly dry up and tiger-prawn cultivators open the embankment sluice gates during high tide to bring in salt tidewater for their *ghers*. Embankments, originally envisaged to protect fields from dry-season salinity, are now serving the opposite purpose. By May, there were brackish *ghers* as far as the eye could see.

Reproductive Suffering

It was during this saline dry season, after having spent several months regularly visiting Noshima, that I asked her whether she could take me around Lonanodi village to conduct a *gorib* (household survey), so I could better understand how other local people in Lonanodi experienced living in a brackish aquaculture village. Through oral histories, they described how replacing the fallow period with tiger-prawn cultivation reduced the number of livestock that

landless day-laboring families kept for fertilizer, meat, and milk. It also reduced the availability of, and access to, fish, and brought on lower rice yields, dying fruit trees, nonexistent vegetable gardens, the loss of grazing lands, and the loss of by-products from paddy cultivation such as *kurte* (rice grains left over after the paddy harvest) and *nara* (paddy straw used for roofs, as cooking fuel and livestock feed).¹⁸ *Nara* and *kurte* are some of the foods and materials that the poor (*garib*) in Lonanodi, particularly women, can no longer freely access. Large landowners prohibit others from entering their monsoon season rice fields, and keep *nara* so that it decomposes and becomes fertilizer, prompting people like Noshima to buy *nara* for their roofs, buy fuel for cooking, and buy feed for the cows and goats given to the poor by NGOs.

Bakul noted: “When *bagda* is cultivated, the land turns to salt. Nothing else can grow. The cows and milk, chicken and eggs, are no longer produced in these *gher* areas. We cannot just look at how much money it brings in per kilo.” The costs of rice, fish, vegetables, cooking fuel, fodder, and other items, exacerbated by environmental degradation caused by salinity, are seldom considered when the “profit” and monetary value of shrimp is calculated, nor is the personal suffering and anxiety of living in a barren, saline environment. Bakul highlighted the importance of how the income of the rural poor (the landless and the near-landless) consists of two components: exchange income (primarily wage income) and nonexchange income obtained directly from nature without monetary exchange. This includes wild fruits, wild animals, firewood, building and thatching materials, water from tanks, streams and ponds for growing vegetables and fruit (mainly for domestic consumption), free-ranging poultry, and grazing or fodder for livestock, including sheep, goats, and cattle. These nonexchange sources of income depend to some extent on common access or low-cost access to natural resources (Alauddin and Tisdell 1991, 161).

As the “market” develops, everything required to engage in capitalist production becomes a commodity, including the food to be consumed (Li 2014, 7). The salt reduces the health of the soil, resulting in a wilted environment that makes survival difficult for all forms of life. In addition to reduced livability for livestock, freshwater fish, rice and fruit trees, reproductive labor is impeded by the lack of vegetation to collect for cooking fuel for earthen stoves (I spent a day with Noshima trying to collect fallen leaves from the few saline-tolerant trees). Furthermore, for the people of Nodi it is not just calorific intake that matters. The quality of food, particularly sensory experiences of freshness and taste, plays an important role in well-being and social interactions. Drawing on emotional political ecologies—that is, affective realities that have direct bearing on how

resources are accessed, used, and fought over (Sultana 2011, 163)—sheds light on how the struggle for resources is not only economic, social, or rational choice issues centered on food sovereignty, land control, and labor.

The intense salinity that accompanies tiger-prawn cultivation is felt most severely by marginalized, landless families who rely on agricultural labor opportunities to sustain their livelihoods. Nowhere was this as visually stark as in Lonanodi. In the days I spent in the barren earthen homes of Rozina and Noshima, looking at large enclosed mansions with their own water systems and tall lush trees peeking above the high walls, it became clear that the burden of living with salinity was unequally borne by the poorest. Large landowners—those most able to participate in the capitalist relations required for tiger-prawn cultivation—do not feel the environmental cost of their lucrative practices. Noshima expressed her bitterness: “Rich people live comfortably in these saline lands. We do not have access to our own saline-free enclaves with rainwater tanks, ponds, and tube wells in our own homesteads, isolating our orchards and vegetable gardens from saline water. We must live in this saline environment; we have no choice but to live with it. . . . It’s better for the rich people with leases [to do tiger-prawn cultivation]. Will they listen to me? I’m poor. What’s the point in complaining?”

The results of the survey showed that a clear majority of the landless poor stated a clear opposition to brackish aquaculture. Small tiger-prawn farmers and their families, meanwhile, argued that there are no other means of cultivation when everyone else is bringing in saltwater—they favored a collective return to freshwater cultivation—thus contesting Saidul Islam’s (2014) claim that tiger-prawn cultivation is now “normalized” and accepted in southwest coastal Bangladesh.

Most notably, all women—including those married to small tiger-prawn cultivators—emphasized how they suffer, whether it be because of a lack of drinking water and water for rinsing rice, the difficulty in washing clothes, the lack of cooking fuel (cow dung, wood, leaves), the complications involved in cooking food, or the amount of time it takes to fetch usable water. They also worried about skin diseases from bathing in saline rivers, damage to their hair, and the increased darkness of their skin, which makes them less attractive as future brides and daughters-in-law. They described the experience of living in the barren saline villages as *ashanti* (unrest, worry, turmoil, anxiety): an ambiance that was simultaneously suffocating and draining with an embodied heaviness that brought out the negativity in people through *tension* (anxiety). Whenever I left the arid shrimp deserts of Lonanodi and entered into Shobuj town and

Dhanmarti union with their lush vegetation, I instantly felt that a weight had been lifted from my chest as *ashanti* dispersed and I could breathe easily.

When I described this feeling to Hassan as we rode into Shobuj town under the thick tree cover, he replied: “Dhanmarti was once like Lonanodi. The barren desert, the dryness, the *ashanti*, this was the same here in Dhanmarti.” Hassan, who had once cultivated tiger prawns on his five *bigha* (traditional unit of land area), noted: “Our incomes are less now, but our costs have reduced. Our lives are much better now. We no longer need to buy rice. Local people can gain shares of the rice harvested locally and get more vegetables and fruit trees. We feel *shanti* [peace].” In contrast to the rich *gher* owners in Lonanodi, who are able to diversify risks through owning several large *bagda gher*s, small *bagda* cultivators in Dhanmarti like Hassan felt the losses of failed tiger prawn harvests keenly and they played an important part in ending *bagda*.¹⁹

For many women, the end of tiger-prawn cultivation heralds the rejuvenation of the land. Hassan’s neighbor Sayma is a widow with four daughters who benefited from the noncommoditized food and fuel in a freshwater environment:

Everything grows here now, sunflower, *boro* rice, sesame. There is more work for day laborers. We can excavate canals and repair roads. We can grow vegetables and rice, keep goats, chicken, and cows. There is much rice and *kurte* [residue rice] from the harvest. I spent a month going through the fields collecting *kurte* and managed to get two to three *mon* [eighty to 120 kilos] it will last us a good few months and helps me save money from buying rice. Now with the *gher*s gone, *shojna* [moringa] trees are lining the roads. Its delicious fruit are available to all of us. Sometimes, my youngest daughter manages to catch some fish from the canal that we eat, or neighbors like Hassan share fish he has caught with us. During the monsoon rice season, the fish moves freely, anyone can catch fish from these inundated lands. Once the rice is harvested, I can collect *nara* [residue rice straws] to use for fuel and for thatching the roof. Hundreds of cows will freely graze on the green pastures and eat what remains of the tall *nara* and the quickly growing grass. Many women like myself collect the cow dung and make *bori* [used for cooking stove fuel] that we can also sell to other households. I am lucky that there is no *bagda* here.

Sayma’s account of living in freshwater village (see figs. 3.2 and 3.3) stands in stark contrast to Noshima’s life in a saltwater environment that undermines livelihood strategies—both paid and unpaid. To make ends meet, Noshima also works for people in the villages as a *kajer mahila* (working woman, maid). She brings her



FIGURE 3.2. Woman fishing in a field of rice, 2014. Photo by author.



FIGURE 3.3. Woman making cow dung sticks, 2015. Photo by author.

employers water from afar, washes dishes, engages in sporadic earthwork, and works in *ghers*. The latter entails standing up to the neck in saline water contaminated with chemicals to remove aquatic weeds (*sheula bacha*), an activity that often results in skin disease. However, with a transition to herbicides in the *ghers*, this has resulted in less work for Noshima. Noshima and other landless women unable to migrate also collect tiger prawn fingerlings from the river: "It's the easiest available income for us. On a good day, I can catch thirty to forty fry, but generally I end up only getting ten to twenty taka per day. One kilogram rice costs twenty-eight taka." Catching tiger prawn fry provides an important, albeit small, source of income in an area where other opportunities are sparse.²⁰ Noshima takes any job as it comes, each day filled with uncertainty. Ultimately, women's work in Lonanodi is irregular, and where local labor opportunities are limited, any means of income is essential for buying rice and other food items.

Salinity and Mourning the Loss of Fish

People in Lonanodi also missed the taste of freshwater fish, which were no longer available in local ponds or beels. The way in which tiger-prawn fingerlings are caught in the wild contributes to the bycatch of several fish species that are thrown away, reducing their availability in the wild.²¹ Furthermore, freshwater species are unable to thrive in saline *ghers*. Thus, tiger-prawn fry collection contributes to the reduction of the number of fish in the rivers and poses a major threat to the long-term sustainability of wild fisheries (Deb 1998; Thornton, Trent, and Williams 2004).²² Ahmed Kaka recalls how before embankments and *bagda gher*s there were many canals and an abundance of fish: *bhetki, tengra, shoil, koi, golda, bagda, chela, chingri, rui, katla, mrigal*.

The canals were *khas* [public] and there were no restrictions because there was so much fish. Everyone could eat fish all year and several times a day. . . . We can no longer freely access fish; the canals have also been leased. We must buy fish now. Once, *bagda* cost one taka per kilo, now it's two hundred taka per kilo. Months pass before we can eat [larger] fish. When we buy fish, we can only afford cultivated *bideshi* fish and they do not taste as good as wild fish. They are filled with lime, pesticides, and fertilizer to keep the water clean and to make the fish big. It's like soap, how can eating soap be good for us? Cultivated fish is *bhejal* [impure, adulterated], but they don't care. They only care about profit.²³

This lived experience of the loss of fish highlights not only the importance of food sovereignty, but also the affective entanglements between food and

well-being. The frequency and quantity of fish pre-*bagda* is reflected in the Bengali proverb: *Maach-e, Bhaat-e Bangali* (rice and fish makes a Bengali).²⁴ The taste, freshness, and quality of the fish matters for all classes of people in Nodi—it was my first time seeing people preparing live fish—and they were all notably suspicious of *mora maach* (dead fish). *Desi* (indigenous) fish are seen as filled with *shakti*, and small indigenous fish species in Bangladesh—consumed whole—are an important dietary source of vitamin A and calcium in rural Bangladesh (Roos, Islam, and Thilsted 2003). *Bagda*, in contrast, is not even available for the poor to eat. Instead, it takes six kilograms of wild fish to produce one kilogram of farmed shrimp (Reinertsen and Haaland 1995, 73), calling into question the claim that export-oriented *bagda* cultivation helps “feed the hungry.” With the introduction of export-oriented *bagda*, fish became a commodity to be owned and sold for profit, available to those that could afford it.

The leasing and subsequent salinization of *khas* canals and wetlands produces a range of emotions and experiences of loss and suffering. These conflicts of salt-water versus freshwater, and *khas* versus leased waters, illustrate how broader social relations of power are (re)negotiated and (re)produced in water–society relations (Sultana 2011, 171)—illustrated also by Ahmed Kaka’s skepticism toward poor quality farmed fish. Taking seriously the everyday affective dimensions of food and eating illustrate the processes through which political and economic forces take shape and are coconstituted (Hayes-Conroy and Hayes-Conroy 2013, 88). The structural political and economic forces of *bagda* production that produce these socioecological inequalities are made explicit through Sayma’s and Noshima’s contrasting experiences. Ahmed Kaka’s longing for wild-caught indigenous fish and his dismissal of farmed fish as *bhejal* captures a critique of the current aquaculture regime, an experience highlighted by how Sayma feels fortunate to have regained access to fresh fish from local ponds and canals. This highlights what emotions *do* rather than what emotions *are* (Ahmed 2004, 4). In addition, attention to the embodied experiences of *shanti/ashanti* (peace/suffering) help us to critically question what constitutes “well-being,” the “good life” (Elmhirst 2015), and what makes life worth living across generations (Narotzky and Besnier 2014).

Export-oriented shrimp aquaculture forms part of global capitalist systems of accumulation (Paprocki and Cons 2014b). Juxtaposing the different affective responses to well-being in a saline versus freshwater environment further highlights that global capitalist production in itself may not be uniformly dispossessing in ways that reduce income or food sovereignty. Both freshwater *golda* prawns (*Macro brachium rosenbergii*) and brackish tiger prawns are cultivated

for export-oriented profit, but farmers organize against *bagda* in favor of *golda*. *Golda* can be cultivated together with rice crops and freshwater species, thus enabling crop diversification and biodiversity (Ito 2002).

The forced salinity intrusion of *bagda ghers* causes great anxiety and inhibits socioecological entanglements of social reproduction. Thus, people in Dhanmarti are happy to fish for crabs in the Sundarbans and cultivate freshwater *golda* prawns for export, but they do not want saline aquaculture that negatively affect their lived environments. These concerns are not limited to food but also extend to trees; earthworms; drinking, bathing, and cooking water; cooking fuel; freshwater fish; and earthen homes that do not crack as a result of salinity.

Reversing Salinity

The benefits of freshwater land use practices are clearly visible and valued in local communities. How is it, then, that Dhanmarti Union managed to stop tiger-prawn cultivation while the people of Lonanodi continue to suffer? During my previous work in the coastal zone, the popular narrative among development organizations I worked with was that farmers could not stop with tiger prawns because it would take seven years for the soil to recover—how could people survive during that time? Hassan's elderly neighbor Fupu, however, stressed that it is possible to reverse salinity: "Our fruit trees—coconut, betel nut, mango, *jam* [*Syzygium cumini*], *jamrul* [*Syzygium samarangense*], jackfruit, lychee—they all died when they started leasing out land to 'outside' tiger-prawn businessmen [in the late 1980s]. Now, slowly, the trees are returning since we stopped with *bagda* here. They are weaker with less fruit than before, but each year, the salinity during the monsoon is washed away by the rainwater and the trees grow stronger."

The importance of the monsoon in returning lush vegetation to saline deserts was new to me. The reversibility of salinity was rarely mentioned by those promoting tiger-prawn cultivation and I wondered how this was possible in Dhanmarti when several grassroots movements consistently failed to stop *bagda ghers* in the 1980s and 1990s. Hassan arranged for me to meet Dr. Amit, a key figure in the movement, at his office in Shobuj town. Dr. Amit mentioned how he had been arrested many times for organizing protests, and that people were afraid of the *gher mastans* (gangsters) and the powerful politicians that backed them. It was only in 2008 that they were able to stop *bagda* cultivation in Dhanmarti:

Our movement gained ground in 2007 when there was no proper government in power.²⁵ The national cabinet was defunct, while Sheikh Hasina

and Khaleda Zia [the leaders of the two main political parties] were arrested and charged for corruption. The *bagda* cultivators had no powerful politicians to protect and support them. Instead, the military were in power and they had a temporary camp with one hundred military officers based in the *upazila* [subdistrict]. I spoke to them about our movement and the camp leader said that if we provided the time and place of our protests, they would ensure that the police do not use unlawful brutality or illegal arrests. The “Dhanmarti” sluice gate belonged to the most powerful *ghers* and the biggest *mastaan* engaged in torture and killing. In December 2007, we were almost five hundred people, mostly women, trying to break the gate so it could no longer be used for saline intrusion. When the police tried to attack us, the military questioned them. We sealed the sluice gates with cement during the six saline months and opened it for paddy cultivation during the monsoon. We closed a total of six thousand *ghers* but were unable to close the remaining four hundred *ghers* in the southern parts of Nodi, like Lonanodi. Two of the MPs did not have *ghers* at the time and supported us; it made them popular.

According to Dr. Amit, the combined role of the military and the suspension of power of both major political parties were the main reasons they could stop brackish aquaculture in so many places. Under the interim caretaker government, local people were able to override local configurations of power facilitated by political connections; the networks of political patronage were made void and the collusion of impunity broken (Adnan 2013; Finan 2009). The *andolan* (people’s movement) in Khulna with the poor and landless can therefore be seen as closely linked to the “environmentalism of the poor” (Guha and Martínez-Alier 1997; Guha 2000; Veuthey and Gerber 2012).²⁶

Dr. Amit explained that the movement did not have enough support for the anti-*bagda* movement in Lonanodi: “The main difference between Lonanodi and Dhanmarti was that in Dhanmarti Union the landowners *wanted* to stop *ghers*, while in Lonanodi Union only a few landholders own most of the land and they preferred *bagda* and were part of drawing in saline water from the river.” Noshima added that the Lonanodi Union Parishad chairman owns large-scale tiger-prawn farms throughout Lonanodi: “They [powerful elites] don’t care about the poor, they only think about money, not the poor and not the environment. The rich stay rich and the poor are left to die. The Lonanodi Union Parishad chairman doesn’t come to the village to speak to us, he doesn’t listen to what people want.” The Dhanmarti Union Parishad chairman, on the

other hand, sought to stop tiger-prawn cultivation. The different outcomes in the grassroots movement against brackish tiger-prawn cultivation illustrate how this land-use practice is linked to processes of political power, patronage, and economic status where landholding patterns have visible effects. Any discussion of zoning for aquaculture that claims that these lands are unsuitable for agriculture must therefore critically engage with these political realities, so that landless people's preferences for freshwater cultivation are not undermined by development assemblages that represent particular places as unsuitable for agriculture when they are not.

Conclusion: Capitalist Assemblages and Saline Suffering

Brackish aquaculture in Lonanodi is characterized by ideas of profit and monetary value. While fish were once a public resource and an essential protein in people's diets, they have now become a private commodity available only to those who can afford it. Common wetlands were leased out to tiger-prawn capitalists who through their social and political alliances were able to take control over *khas* (public) commons such as canals, thereby complicating theories of primitive accumulation or ABD focused on land as a fixed resource. The fluidity of the delta and the inseparability of land and water further highlights how water grabbing for brackish aquaculture entails salinizing previously freshwater environments.

Bringing in saltwater through the embankment during the dry season not only structurally damages embankments and increases local vulnerability to tropical storms and cyclones, this also salinizes the soil and local water sources in ways that prohibit the environment from supporting many forms of life, thereby further weakening the livelihood capacities of the rural poor. "Rice and fish make a Bengali," yet saltwater *bagda* impedes the growth and availability of both in areas like Lonanodi. The meaning of food in this context goes beyond local food self-determination, and rural people hope to see a return to freshwater living and be free from the suffering and anxiety of barren saline landscapes. These embodied and affective experiences in two starkly different areas so geographically close but ecologically different convey a deeper understanding of the struggles inherent in the political ecology of water grabbing—where water is not only privatized but salinized. As the movement in Dhanmarti shows, reversing salinity is possible and can be combined with export-oriented crab fishing and *golda* cultivation that also form part of global capitalist food regimes. While alliances of rural landless farmers, government officials, and NGOs may sometimes

be successful, corresponding alliances of those vested in the tiger-prawn industry may also be able to thwart such attempts.

Salinity in Bangladesh is not an inevitable outcome of climatic change, nor is it irreversible as the returned vegetation in Dhanmarti demonstrates. As Tidal River Management gains ground as a possible means of addressing Bangladesh's dying rivers and canals, resisting the narratives of *bagda* cultivators who claim that certain areas will never be fit for agriculture remains a priority. Debates on southwest coastal water management should pay more attention to the ways in which saline intrusion in the dry season can be stopped so that soils are not salinized when implementing TRM.

Entangling Rice, Soil, and Strength in a Freshwater Village

Back in Dhaka, I was invited to present some preliminary fieldwork findings at a donor office located in the luxurious Gulshan 2 embassy area. During the presentation, I shared the concerns of my interlocutors regarding the overuse of fertilizers and their damaging impact on the soil, the lack of nutrition in high-yielding rice, as well as the prevalence of toxic pesticides that harmed the soil, multiple species, water, and people. As soon I finished, the donor's climate and environment representative dismissed these statements as "nostalgic anecdotes." He argued that "to ensure the food security of Bangladesh's 160 million population, the higher yields offered by high-yielding variety seeds and agrochemicals are essential." The focus on population growth and quantity of food was similarly emphasized in a World Bank modeling study of the economic cost of yield loss under different climatic scenarios; it ultimately recommended high-yielding rice and agrochemicals as a form of climate change adaptation (Yu et al. 2010, 116).

In several donor countries, citizens, states, and businesses all acknowledge inefficiencies in, and the unsustainability, of "conventional" agricultural production. Indeed, a growing movement for sustainable practices is taking place in many donors' home countries in the West. However, agricultural interventions in the Global South continue to be based on narratives of "feeding the hungry" (Cullather 2010, 3), where Bangladesh, with its large population, is referred to as a "modern-day Malthusia" in ways that legitimize technologies to increase crop yields (Orr 2012, 2). Donors reframe concerns for climatic risks and a growing population to legitimize and promote "food security" projects that are essentially for-profit interventions that include intensified cropping patterns and high-yielding and high-value crops dependent on agrochemicals (US Agency for International Development 2017; Yu et al. 2010). Like embankments as protection against rising sea levels and tiger-prawn cultivation as a response to salinity, increased agricultural output for "food security in a climate risk future" also constitutes a narrative of improvement that maintains an ignorance

of how these very same technologies (groundwater irrigation, agrochemicals, monocultivation) have been damaging both in Bangladesh and throughout the world. Agrochemicals are based on finite fossil fuels and contribute to global warming (Kahrl et al. 2010). Their overuse also results in soil acidification and reduces the long-term food production capacity of the soil (Mulvaney, Khan, and Ellsworth 2009).

The translation of capital-intensive agricultural technologies as adaptation to climate change is a continuation of activities pushed on Bangladesh throughout the Cold War and through donor imposition of Structural Adjustment Policies. Examination of critical histories of colonial famines and the Green Revolution allow us to rethink Bangladesh as Malthusia where food supply must be increased to feed growing and starving Asian populations.¹ Looking at how the Green Revolution was introduced to Bangladesh—spawning resistance, contestations, and criticisms—helps contextualize the long-standing and unresolved problems caused by these interventions seeking to “modernize” and enrich a “poor” Bangladesh. Sadhu Kaka’s song *bigganer lorai* (the struggle fought by science) is an example of a local critique of modernization that brings together two key concerns of intensive agriculture in Bangladesh today: the loss of *shakti* (strength, soil fertility, energy) and increased *bhejal* (adulterated, corrupted) foods. People in Nodi believe high-yielding rice causes the loss of *shakti* in soil, food, and humans, and highlight the loss of taste and nutrition in food and the loss of multiple species in the environment. The Bengali concept of *shakti* resonates with how environmental anthropology is increasingly concerned with the entanglements of organisms whose lives and deaths are linked to human socioecological worlds (Kirksey and Helmreich 2010, 545). The emic concept of *shakti* further captures the material effects of the overuse of synthetic nitrogen: both on the soil and the multiple species that live within it. This includes, among other things, the micronutrients and microorganisms necessary for human health. Anthropologists have long been urged to resist a positivist reflex to empirically validate ethnographic insights through “the blinding lights of western science” (Comaroff and Comaroff 2003, 158). However, the multispecies turn in anthropology today is an effort to take seriously material understandings of the entanglements of environment and bodies (Daly and Shepard 2019, 17), thus helping us to better understand the concept of *shakti* as something that captures physical and not only social or symbolic change.

Bangladeshi concerns over *bhejal* food encompass extensive and illicit pesticide use as well as widespread practices of food adulteration. *Bhejal* food exemplifies Polanyian critiques of the self-regulated market: the intensification

of commercial agriculture has made food into an anonymous commodity and thereby disrupts local understandings that view soil, food, and humans as entangled. The translation of yield-centered agriculture as adaptation—like embankments and tiger prawns—thus ignores a longer history of how these proposed interventions are unsustainable and fails to address an acute problem of the overuse of chemicals that risks both human health and long-term soil fertility. This toxic agroindustry has brought on ecological disruption by dumping unwanted chemicals in Bangladesh (Gregow and Gain 2002), which together contribute to unknown and multiple extinctions of organisms in the soil, resulting in the loss of *shakti* and growing health problems.

Rethinking Bangladesh as Malthusia: From Famines to the Green Revolution

Malthus regarded the food supply as fixed and an inevitable check on the growing population and wealth of each country. Malthusian discourses establish hunger as related to a country's size and the amount of food it can produce and was at the forefront of discourses of famines in colonial times (Davis 2007). With the growth of neo-Malthusian convictions that agricultural technological innovation is our only hope to save billions of lives from hunger, it remains a powerful discourse today (Stone 2019). Critically examining such colonial discourses and that of the Green Revolution helps us to rethink Bangladesh as a modern-day Malthusia (Orr 2012).

Areas that were not cultivated in colonial times were considered unprofitable wastelands. In the 1860s, the newly created British Raj promoted the process of agrarian “involution”: intensified cultivation of two to three crops per year (Van Schendel 2009).² Colonial efforts to increase agricultural productivity focused on export-oriented commercial cash crops with high-market value—cotton (before 1820s), indigo (1820–1870s), jute (1850s–1930s), and staple food crops—rather than local food security (Caird 1878). Different parts of Bengal experienced varying degrees of capitalist agriculture during the British period. The Sundarbans region of what is now southwest coastal Bangladesh was not exposed to intensive rice cultivation: seasonal migrants planted rice in the monsoon and returned in the winter for the harvest (Lahiri 1936, 21).³ Large areas of cultivated rice fields were left without a trace of human habitation for the rest of the year (37).

During the 1870s famine, the Indian Famine Commission—despite its avowed aim to protect its Indian subjects from famine—neglected the role of

colonial grain export policies in undermining local food supplies and threatening food security (Caird 1878).⁴ Similarly, the Bengal Famine of 1943 occurred in the wake of the colonial Churchill administration exporting grain out of Bengal to feed British soldiers abroad during WWII. The famine was compounded by the lack of food for domestic consumption. In total, 1.7 million people died, the majority of whom were landless agricultural laborers, fishermen, artisans, the permanently workless, destitute, and beggars (Iqbal 2010). Stockpiling food from the subcontinent for postwar Britain and Europe—with advice from Malthusian scientist and eugenicist Lord Cherwell—resulted in the deaths of around three million South Asian people (Mukerjee 2010). This highlights the important insight that famines are always human made and the outcome of mismanagement (Sen 1981; Drèze and Sen 1989).

While donor-dependent Bangladesh continues to evoke an image of masses of poor, starving people, the issue of food availability is one anchored in a socio-political reality of inequalities within Bangladesh. This is poignantly illustrated by the difference between the overweight and diabetic urban upper and middle classes versus the poorer and physically active rural populations. Thus, a narrative of improvement that insists on increasing yields to ensure food security does not engage with the problem of food (mis)distribution, which has been persistent since colonial times.

The Green Revolution: Yields to Feed a Hungry World?

The goal of the Green Revolution was to enable year-round cultivation. It promoted short-term maturing crops and horticulture, high-yielding seed varieties, agrochemicals, and mechanized plowing, harvesting, and irrigation. The premise was that modern agricultural technologies could save billions of lives through the application of scientific innovations. In the past decade, critical histories of this Cold War experiment provide a fundamental rethinking of the many key aspects of this movement, the motivations behind it, the merits of the agricultural sciences in South Asia that it replaced, and whether new seeds actually led to increased food production (Stone 2019).

The Green Revolution was essentially an American Cold War project based on the Malthusian narrative of balancing food supply and population to avoid hunger resulting in communist revolutions. It was also a modernizing project that aimed to inculcate “progressive” (capitalist) values to “backward peasants” and inspire them toward broader social change. In this context, agriculture was a way of reshaping nations well beyond US borders (Cullather 2010).⁵ The Green Revolution emerged in most of the Third World in the mid-1960s. In 1966, the

American Ford Foundation and the Rockefeller Foundation created the International Rice Research Institute (IRRI) in the Philippines to breed a “miracle rice”: a high-yielding variety that required artificial irrigation, pesticides, and synthetic fertilizer to sharply increase crop yields—known as IR-8—in a “big jump” to compete with the many different rice-breeding stations in the Philippines and greater Asia (Cullather 2010, 167). During this period, IRRI and the Ford Foundation established the Pakistan Academy of Rural Development in Comilla, East Pakistan, which became known as the “Comilla model of rural development.” Enabled by the Ford Foundation’s aim to “modernize peasants through science and development,” the laboratory became a frontline in the Cold War, promoting the superiority of US capitalism with its irrigation technologies, American agrochemicals, and “scientifically bred” miracle rice (Cullather 2010).

Although the Comilla experiment ultimately failed to spread in East Pakistan (Lewis 2011), war-torn Bangladesh received substantial funding to modernize agriculture from USAID, the Asian Development Bank, and the World Bank (Alauddin and Tisdell 1991). Groundwater irrigation and the cultivation of *boro* (spring) rice during the otherwise fallow dry season expanded during the 1970s. In 1972 there were only 1,237 deep tube wells in the country; by 1979 the government had installed 9,329. In Khulna district, deep tube wells went from zero to forty-four in between 1973 and 1979. Similarly, the area irrigated with shallow tube wells and power pumps increased in the late 1970s in the Khulna area, while the area irrigated with canals dropped from twenty-six thousand acres in 1977 to nine thousand acres the next year (Bangladesh Bureau of Statistics 1980, 194–200). The use of tube-well water for dry-season irrigation and drinking water contributed to falling levels of groundwater, which increased salinity and arsenic levels in tube wells.⁶ This, in turn, contributed to widespread arsenic poisoning in both drinking water and irrigated crops.⁷

Increased food production in India and Bangladesh was due to the development of shallow and deep tube wells for artificial irrigation, rather than high-yielding rice (Subramanian 2015). Irrigation enabled the addition of a new winter crop and the expansion of crops to areas that were previously fallow (Alauddin and Tisdell 1991). Bangladesh’s deep-water rice demand made HYV miracle rice only possible as an irrigated spring (*boro*) crop. The Bangladesh Rice Research Institute worked for a decade to release rainfed *aman* variety BR-11 in the 1980s (Orr 2012). The development of a deep-water rice variety combined with structural adjustment policies (chap. 5) resulted in Green Revolution technologies spreading only in the mid-1980s. Longstanding public-sector agricultural research and extension were now supplemented by privatized agricultural

input provisions to promote high-yielding seeds, mechanized plowing and irrigation, chemical fertilizers, and pesticides (Lewis 2011).

Bangladesh has gone from producing twelve million tons of rice in the 1970s to thirty-six million tons in 2019, meaning that it is more than self-sufficient in grains and can export rice. Many believe that the Green Revolution was the key factor in this increase in production (Jensen 2020). The government of Bangladesh, through donor-funded development interventions, actively subsidized and promoted synthetic fertilizers and pesticides to expand agricultural land and increase output per acre. Bangladesh's first fertilizer factory began to produce urea (synthetic nitrogen) in Ghorasal in 1970 and 1971 (Ministry of Agriculture 1973). Promotional activities include significant subsidies that more than doubled pesticide use from 7,350 tons in 1992 to 16,200 tons in 2001 (Development Economics Research Group 2013). Urea is now the most widely used fertilizer in Bangladesh and the use of synthetic nitrogen per hectare is one-third higher than in the rest of Asia—and double the world average (Qureshi 2002, cited in Rasul and Thapa 2003). In 2008–9, Bangladesh spent US\$758 million on urea support to farmers (Huang et al. 2011; FAO 2011, 88). Such modern seed-fertilizer-irrigation technology is import intensive; by the early 1990s Bangladesh had become heavily import-dependent on agrochemicals (Alauddin and Tisdell 1991, 279).

To maintain the same amount of crop yield, farmers have to apply significantly more chemical-based fertilizer per year.⁸ Since the 1990s, agricultural scientists have warned that the imbalanced use of fertilizer for cultivating high-yielding rice varieties has increased soil acidity in Bangladesh (Conway 1990; Alauddin and Tisdell 1991, 274; Hossain, Salam, and Alam 1994). The Green Revolution and its focus on yields exemplifies how capitalist exploitation of the land as an extractable resource is unsustainable, which Marx described as “blind desire for profit” that “exhausted the soil” (Marx 1976, 348). The loss of soil fertility plays an important part of the lived experiences of agrochemicals and HYV seeds in Nodi—an area where the Green Revolution came late. An attention to local people's conceptualization of the loss of *shakti* in the soil in Nodi supplements scholarly analysis of the violence of the Green Revolution (Shiva 1991; 1993).

The Struggle Fought by Science

Despite the implementation of Green Revolution technologies in central and northern Bangladesh, the southwest coastal regions, including Khulna district, still grow a single, low-yielding rice crop during the wet season using tall, photo-period-sensitive traditional varieties. Much of the land remains fallow for three to seven months every year (Mondal et al. 2015). Agricultural scientists suggest

that this region has largely “missed out” on the adoption of “improved” and “progressive” agricultural technologies and management (Yadav et al. 2020, 333). Increasingly, the region’s vulnerability to climatic risk is hailed as a reason to scale up and intensify agricultural production that will lead from poverty and hunger to prosperity. Despite the Green Revolution’s contested legacy and its poor results on both social issues and the environment, the development industry has invoked it for the past few decades to expand global capitalist flows of agriculture into Africa and beyond—where hunger, along with climate change, are subject to technical fixes that avoid historical responsibility (Cullather 2010).

This is similar to maintaining ignorance in schemes to improve the human condition, where particular parts of the state simplify agriculture by drawing on narratives of improvement and a high modernist ideology that venerates high-yielding variety seeds, artificial irrigation, petroleum-based capital-intensive inputs, and year-round cultivation. The coalition between state and capital includes global corporate networks of the agrochemical industry (Monsanto, Syngenta), certain donors, and specific research organizations. Yet at both the state and institutional level one can find internal contestation—between fisheries and agriculture, export-oriented aquaculture and indigenous wild fisheries, and import-heavy agricultural technologies and indigenous rice varieties as well as local practices of irrigation and fertilization. The hegemony of a “state” narrative is therefore not uniform or uncontested and reflects different institutional agendas.

For example, the framing of traditional versus progressive agriculture is driven by American agroiinterests, echoing how the Ford Foundation’s Comilla experiment saw farmers as backward (Yadav et al. 2020). The American-funded Pakistan Academy believed that it was Muslim peasants’ religiosity that contributed to their unwillingness to embrace technologies and practices that would result in farmers being deeply entangled with the market (T. Ali 2019, 446). Yet, objections to tube wells, though couched in religious terms, were responses to the commodification of water. As a farmer stated to an academy official: “[Water] is the Gift of God and everybody has the right to use it free of cost. Why should we spend money for such a Divine Gift?” (445).

Spirituality in South Asia has a long history in resisting foreign and colonial interventions of modernization. In crafting a link between diet and nationalism, Mahatma Gandhi used food as a potent symbol of the value of the particular, the local, and the individual under assault from the homogenizing logic of science (Cullather 2010, 31). Progress, science, and modernity thus became a tool for the colonizer that also helped create the category of *undeveloped* (Gupta 1998). The Green Revolution was also a modernizing project: to change the mindset of

Third World farmers through science to make them modern and ensnare them into the global capitalist market. This science favored heavily deductive models over “more inductive local ones” (Sillitoe 2000b, 7)—casting “indigenous” agricultural practices (including those of *ausbtomashi bandhs*) as “traditional” and therefore backward and inefficient (Sillitoe 2000b, 3). In such a context, religion and spirituality remained spheres in which to contest and resist foreign high-yielding capital-intensive agricultural technologies.

Sadhu Kaka lives in southern Dhanmarti (“rice paddy soil”). He is an eighty-year-old farmer who studied to the age of nine (class four) in the 1940s and keeps abreast of local, national, and global news through newspapers and the radio. Sitting in his earthen home, he described how the construction of embankments reduced soil fertility. “Now we must grow IRRI rice that needs *sarh* [synthetic fertilizer] and *kitnasak* [pesticide].” Sadhu Kaka asked if I wanted to hear a song he had written. He sang:

The Struggle Fought by Science

This world is engulfed by the struggle fought by science
 There are no longer elephants, horses, boats, and canoes
 Now paddy is made through technology
 While people are becoming *sangkar* [hybrids, impure]
 With the pure knowledge of Science we can breed children without men
 Now we can hear of terror, robberies, and rape
 We talk through telephones, sending news abroad
 The breeze from electric fans and the light of lamps help soothe
 physical fatigue
 We see far away through telescopes
 We find answers through computers
 Mechanical plows cross the fields
 Men are flying to the realm of the moon
 The atom bomb was invented
 Seeing signs of the world’s destruction
 Oh, *dada bhai* [brothers, Hindu and Muslim]
 Seeing signs of the world’s destruction

People are cut up and stitched up again
 Seeing people we run and flee because of fear
 Now God took the opportunity to dive into the ocean
 With tidal surges he seeks to drown the earth

Tornado, cyclone, and thunderbolt cause lives to be lost
 I see death all around me
 Everyone says let's pray once more
 Then the world's chaos will be diminished
 Let us die now
 Arun says "Krishna, offer your blessings at the end of the game"

Bigganer Lorai—original Bangla (transliterated)
Cholchey e jogotey bigganer lorai
Hati, ghora, nouka, dingi, kono kichur nei balai
Ar projuktitey dhan holo
Manusher bhitor shongkor jonmilo
Bigganer shuddho gayaney purush bhinno shontan pai
Eybar shontrash ar rahajani dhorshoner o kotha shuntey pai
Telephoney bolchey kotha, bideshetey pathai barta
Fan, light er alo batashhey deber klanti durey jai
Durbin er durodrishtie
Computer ey uttor pai
Koler langol ghurchey mathey
manush urchey oi chondralokey
Srishti holo atom bomber
Bishsho dhongsher ingit pai
Oh dada bhai
Bishsho dhongsher ingit pai

Manush ketey manush jorey
Manush deykhey bhoey palai
Bhogoban eybar shujog bujhey dub dieychey oi shagor soliley
Uthoniya jolochchashe prithibi dubatey chai
Tornado ar ghurnijhorey bojraghatey pran harai
Choturdijey deykhi mrittur role
Shobey ekbar horibol
Nibhey jabey bhober gondogol
Cholo eybar morey jai
Arun boley kheyelar sheyshey choron dio pran kanai

Sadhu Kaka's song is a nuanced and evocative critique of technology that draws on divine powers and their wrath to highlight the dangers of human hubris. By

making both paddy and humans through technology, rice and people are *sangkar* (hybrid). High-yielding IRRI rice is also locally referred to as hybrid rice. Sadhu Kaka suggests that hybrid rice is turning people into hybrids, mixed of two different substances. The use of *hybrid* can be interpreted as an expression of local cultural contestations that critique the fragmentation of agricultural knowledge and how it has become divorced from its sociocultural context (Vasavi 1999). In India, like in Bangladesh, hybrid impurity is transferred from rice to humans and transforms people who produce and consume them into “hybrid people,” where *hybrid* is associated with increased disease and destruction, symbolizing the erasing of duties, traditions, and charitable work (Vasavi 1994; 1999).

However, Sadhu Kaka describes how the struggle fought by science has both bodily and wider environmental consequences. Rice and people becoming *sangkar* captures how IRRI rice—produced through synthetic fertilizer rather than with cow dung—is said to lack *shakti*. His reference to people being cut and stitched up again was a common local reference to organ snatching. Several of my interlocutors described this as a growing problem, because so many people suffer from liver and kidney problems caused by *bhejal* foods. Sadhu Kaka’s critique not only reflects social change but also captures material and physical changes to (socioenvironmental) well-being. Agricultural technologies based on heavy use of synthetic nitrogen and toxic pesticides reduce biodiversity and ecological resilience captured through the loss of *shakti* in the soil, plants, and people, as well as the loss of species (birds, frogs, earthworms).

Tasting Shakti: Microbial Soil Assemblages

While I was visiting different villages for my household survey, my motorcycle driver Hassan would often return home to Dhanmarti village in the middle of the day to bathe, pray at the mosque, and have lunch. I often accompanied him and sat with his wife, Bhabi [“brother’s wife”], in their earthen kitchen, trying to learn how to prepare the fish that Hassan caught moments earlier from their pond. This became a relaxing space as I immersed myself in the daily routine of preparing food and eating and chatting with them and their neighbors, particularly with Fupu. Fupu was in her seventies and extremely thin, her skin leathery with wrinkles and her short stature further accentuated by a hunched back, yet she would often smile with her kind eyes.⁹ During one of our conversations she described how the remaining salt residue in the soil from tiger-prawn cultivation necessitated a continued cultivation of high-yielding variety rice. She mourned the loss of *desi* [local] rice varieties and the loss of *shakti* [life force] in the soil and in rice.

The soil lacks *shakti* after the salinity of tiger-prawn cultivation and we must continue to eat *IRRI dhan*. This rice makes me cry; it has no taste. It needs a lot of salt and spices to make it edible. There were so many types of *mota dhan* [thick rice, used interchangeably with *desi dhan*]: *kachra*, *moglai balam*, *chapshoil*, *bashmoti*, *hargaza*, *hoglapata*, *dudiaktail*, *bashful balam*, *bohora*, *moinamoti* before *bagda gher* started here. I no longer remember them all. These were such fragrant rice varieties; it was heaven to eat the grain just on its own with some salt and nothing else. We even drank the starch water. You can't do that with *IRRI* rice, it doesn't have the same taste. We eat it [*IRRI*] so that we do not feel hunger, but there is no *pushti* [nutrition] and no *shakti* [strength] in *IRRI* rice. We did not have these chemical pesticides and fertilizers when I was young. There was so much *shakti* in the soil, we got high yields and the rice was filled with taste, *pushti*, and *shakti*. Now that we use all these chemicals there is no *shakti* in the soil or in *IRRI* rice.

Why do people perceive *IRRI* rice as lacking *shakti*? What issues are there with synthetic nitrogen as a fertilizer and what is its impact on the soil and the multiple species contained within it? People in Dhanmarti state that they can *taste* the difference of food with, and without, *shakti*. Attention to the materiality of this sensory experience, rather than seeing it as symbolic of changes in social relations, may help us better understand these questions.

Fertilizer Sucks the Earth Dry

In Nodi, more than thirty different *desi* rice varieties were extensively cultivated during the monsoon season until the 1980s when tiger-prawn cultivation was introduced. Sadhu Kaka and Fupu mentioned *patnai*, *baktoolshi*, *sylhet*, *dhalabogra*, *balam*, *kalajira*, *salbang soru*, *rupsail*, *rampsail*, *dalpi*, *bankchure*, *kamal bhog*, *dad khani*, *kalo bogra*, *rani pagal*, *kanakchura*, *sorpati*, *tirasail*, *malapati*, *puno-aush*, *pan-kalosh*, *darpotruui*, *baneshwar*, *bonachal*, *paysha-rai*, *kalarai*, *jingasail*, *harimati*, *kapilbhog*, *bharabri*, *hamai*, *lilabati*, *oratsail*, *chadansail* and *katicsail*. Few farmers today cultivate the rare and expensive *desi* varieties *benaphol*, *bashful balam*, and *kachra*, and if they do, it is for their own household consumption and not for sale. Most of these *desi* varieties have been replaced by a handful of *IRRI* rice varieties, mainly BR-23 (*IRRI teish*)¹⁰—highlighting how the search for higher yields has also resulted in a loss of biodiversity and plant species (Shiva 1991; 1993).¹¹

Desi paddy plants are tall, grow slower, and their leaves “bitter,” while *IRRI* paddy plants are shorter, mature much faster, and their leaves and stems are “sweet” and succulent in a way that attracts insects.¹² This, my interlocutors

explained, is because IRRI rice is grown with synthetic nitrogen (*sarh*). Fupu connected this to greed: “When people grow food to sell [in the market], they use too much *sarh* so that they can grow faster to make a profit. But there is no *shakti* in *sarh*.”

Urea lacks *shakti*. This results in less *shakti* in the soil (reduced soil fertility). Saanchit, a small farmer from Dhanmarti who often acts as a broker between his fellow villagers and different development projects, explained his concerns:

Before these modern technologies [HYV seeds, agrochemicals], our main sources of fertilizer were river silt (*polli*) during the monsoon and from cow dung. We used to learn how to cultivate from our fathers, but this use of IRRI *dhan* that is dependent on synthetic fertilizers like urea, this is new knowledge. Every year we must increase the amount of urea. It [urea] is such a damaging thing that it sucks the earth dry; the actual *shakti* of the soil is consumed by urea to strengthen itself to give to the plant. I’m not sure if it is possible to grow rice in ten years, the capacity of the soil is weakening.

Bangladeshi agricultural professionals like Mr. Golam, a Department of Agricultural Extension official, describe soil infertility as arising from nutrient imbalance in the soil due to farmers overusing synthetic macronutrients:

We [DAE] promote organic manure, but farmers prefer to use urea, TSP, potash. There are a lot of microorganisms in the soil. Overusing nitrogen without adding the other nutrients results in microorganisms dying in the long term, rendering chemical fertilizers less and less effective. The land is becoming barren and we have known that this is a problem for the past twenty to twenty-five years. Both chemical fertilizers and red-listed pesticides are still in use, because farmers do not want to listen if you don’t have any project.¹³

Such a narrative ignores the ways in which coalitions of state actors, NGOs, and research organizations have “experimented” with rural development in Bangladesh through subsidies and credit to start this mode of agriculture in the first place. Mr. Das, an agricultural research officer at a different institution, pointed out how various agriculture projects and extension services imparted the importance of yield and profit on the Bangladeshi farmers, adding: “Urea [synthetic nitrogen] is inexpensive and helps farmers grow their crops quicker and make them look attractive. Micronutrients, on the other hand, are expensive and the effects are not visible to the eye, so farmers prefer to use urea as it will help their

profit. Farmers are overusing macronutrients, particularly overusing nitrogen. Too much macronutrients results in a nutrient imbalance in the soil.”¹⁴

Lifegiving Cow Dung

Could it be that the lack of *shakti* in the soil and food is equivalent to the lack of micronutrients? People in Nodi described *desi* rice varieties as rich in *shakti*—*shakti* was used to describe not only soil fertility and plant resilience, but also strength, nutrition, and good health. *Desi* rice, at least in Nodi, continues to only be fertilized with organic matter such as fermented cow dung and decomposed plants (from monsoon inundation) These substances are deemed to be filled with *shakti*, in contrast to IRRI rice cultivated with synthetic fertilizers, which does not contain *shakti*. This lack of *shakti* was denoted through the embodied experience of taste. Food with less *shakti* also has less *shaad* (taste), as Salma expressed: “*Mota dhan* is so tasty that you can eat it with only salt, while eating IRRI *dhan* with salt brings tears to my eyes. . . . There is so much *sarh* used in IRRI to make the rice grow faster, but it makes the taste disappear. Rice cultivated with cow dung tastes nice.”

Recent plant ethnographies highlight the importance of sensory experiences to understand how plants communicate. They mediate information of the environment and of their own health (Boke 2019), where phytochemicals, chemosensation/biosignals of tastes and properties such as “bitter” and “strong,” transmit information within plants themselves, to one another, and to fungi, animals, and the biosphere (Daly and Shepard 2019). That *desi* rice—fertilized with organic matter like fermented cow dung, which is filled with microbial life—*tastes* better is an indicator that it too is filled with *shakti*. Indeed, in South India, farmers refer to dung from *desi* cows as a “nectar of life” (Münster 2018; 2019).

Cow dung is still essential in Nodi, where not all land is cultivated during the dry season. Instead of being “unproductive” (Yadav et al. 2020), this fallow land enables people to access common grazing land for their cows and provides several important benefits to local families. As Fupu described: “Before tiger-prawn cultivation [in the 1980s], we had so many buffalos in this area. The buffalos were great. We used them to plow the fields. Their manure, filled with *shakti*, fertilized the fields and replenished the soil with *shakti*. We drank their milk, there is a lot of *shakti* in buffalo milk. But now we do not have enough cows to fertilize the fields.”

However, as machines have increasingly replaced animals in tilling the land, there is now less incentive to keep them. Furthermore, once dry season crops (tiger prawns, *boro* rice, sunflower, maize) are introduced, they replace the fallow



FIGURE 4.1. Cows grazing in a fallow field, 2015. Photo by author.



FIGURE 4.2. Rare view of men plowing rice fields with *desi* cows and a *langol* (indigenous plow), 2015. Photo by author.

period, and local families are then pressed to buy feed for their livestock. In Nodi today, very few households can afford to keep cows, as fodder has turned into a commodity to be purchased. The number of livestock has dropped drastically due to these expenses; most of my interlocutors in Nodi were unable to provide their children with fresh milk as they did not own cows, and buying milk was too expensive.

When the number of buffalos and cows drop, so does the availability of manure. Consequently, farmers, through the DAE, are encouraged to use *sarb*. Fupu described how earthworms (*kechu*) thrived in soils fertilized with cow manure. She lamented the death of earthworms in recent decades: “We used to have earthworms that acted as a natural form of plow (*prakritik langol*) and they increased *martir shakti* [soil fertility, life force of the soil]. The salt from *ghers* killed them, but even with monsoon rains removing the salt from the soil, synthetic fertilizers and pesticides continue to harm them. Without earthworms, the soil loses its *shakti*.” The loss of earthworms indicates that soil health is suffering. Synthetic nitrogen is proven to negatively affect earthworms, enchytraeids, microarthropods, and nematodes, which all contribute to declined soil fertility (Postma-Blaauw et al. 2010). We still do not fully understand the ecology of soil organisms and how they are connected, how biodiverse soil ecosystems may be, or what ecological roles this diversity plays (M. Smith 2011). We do not know all the life present in the soil, with at least half a million species of bacteria in a single soil sample site. We do not know the soil’s relations with various microbes, soil mites, nematode species, vascular plant roots, algae, insects, fungi, earthworms, and mammals, all of which are creating and consuming soil particles, decaying organic matter, and aqueous solutions. We therefore cannot know to what extent the loss of micronutrients, microorganisms, and *shakti* may be connected as many soil-inhabiting species have become extinct before we even identified them.

Loss of Shakti: A Material and Ecological Critique

Shakti is not only a critique of a new mode of agriculture, or solely related to soil fertility. *Shakti* is strength, power, force, capacity, and potency.¹⁵ Fupu argued that less *shakti* in the soil means less *shakti* in food, which ultimately means less *shakti* in humans. *Shakti* is a vital energy, a substance, transmitted from nature (soil, plants) to humans. Such a view of substance exchange belongs to a long tradition of Ayurvedic thought. Ethnologists of India interpreted this as a cosmology where people are “dividuals” who constantly exchange parts of themselves with what is in their environment: that material substance and spiritual essence interact and that these bodily substance-codes are repeatedly transformed

through material transfers and transactions (Marriot 1976; 1989; 1990). Rather than directly analyzing environmental change and its impact on the body, the anthropological theories of dividual, substance code, and person-centric categories were used to make sense of social organization, notions of purity, and caste hierarchies.¹⁶

However, symbolic interpretations of local cosmologies were rife with misinterpretations. For example, McKim Marriot translated *doṣa* (biological energies in Ayurveda) as humors (*vatta* [air, wind], *pitta* [bile], and *kapha* [phlegm]) even though “due to the ‘inseparable blending’ of the ‘physical’ with the ‘metaphysical’ *doṣa* should never be translated as wind, bile and phlegm, but the bio-motor force, the metabolic activity, and the preservative principle of the body” (Langford 2002, 151). The inseparability of *doṣa* from the environment is thus connected with the idea that the body cannot be separated from the world.

Such ideas of inseparable blending can also be found in Marx’s *Early Writings* on *stoffwechsel* (exchange of substances, metabolism) as “a process by which man, through his own actions, mediates, regulates, and controls the *stoffwechsel* between himself and nature” (Foster 1999, 141). Marx wrote: “Nature is man’s *inorganic* body, that is to say, nature in so far as it is not the human body. Man *lives* from nature, i.e., nature is his body, and he must maintain a continuing dialogue with it if he is not to die. To say that man’s physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature” (cited in Foster 1999, 72).

Here Marx’s use of nature resonates with the Ayurvedic concept of *prakṛti* [nature, constitution, disposition], where a person’s *prakṛti* can change slowly due to influences of medicine, food, and climate: it is a feature of the relationship between the patient and her environment (Langford 2002, 151). Land and labor were not separated within Europe prior to the twentieth century: “labor forms part of life, land remains part of nature, life and nature form an articulate whole” (Polanyi 1957, 187). From South Asia and preindustrial Europe, a similar idea of sharing substances between humans and the environment is also found in Amazonian personhood where the indigenous Makusian concept of *ekaton* [soul] is the vital essence that “brings life to things” (Daly and Shepard 2019). Like *shakti*, *ekaton* unites plants, animals, and humans in an integrated web of cosmic sociality that defies Cartesian duality as the transmission of a plant’s *ekaton*—manifested in its taste, odor, and coloration—and infuses the body of the person consuming it.

Such cosmological and spiritual processes may not simply be part of “local beliefs.” Our understanding of the biological world has always been fundamentally

linked to how we are able to perceive it, and what we can perceive is tied to the technologies we have for seeing. Today, with greater power, resolution, and visual analyses, transmission electron microscopes have sparked several new biological insights (McFall-Ngai 2017). Darwinian ideas of autonomous species and single, individual organisms have proven to be significantly flawed as the latest biological research shows that individuals are not particularly individual at all (Gilbert 2017, M71). Instead of bounded entities made up of preexisting bounded units, “organisms” have turned out to be complex assemblages (McFall-Ngai 2017, M52). Human beings through our skin, gut, and genomes are entangled with multiple species, our bodies interdependent with the trillions of beneficial microorganisms dwelling inside us (Schuller 2018). They are a medley of microbial becomings (Haraway 2008, 31; Kirksey and Helmreich 2010), containing more bacterial cells than human ones (Gilbert 2017). Human personhood thus constitutes a “microbial self” emerging from a network of interdependent interspecies relations (Schuller 2018) and symbiotic assemblages in complex systems (Haraway 2017; Rosenberg and Zilber-Rosenberg 2016).

Multispecies ethnography has helped anthropology move beyond interpreting human-environmental relations as symbolic of social relations (Kirksey and Helmreich 2010). By incorporating cross-disciplinary insights, anthropologists are increasingly able to conceptualize the importance of symbiotic makings (sympoiesis, making-with) in the comaking of living things (Haraway 2017). Such research has caught up with the inseparability of bodies and environments captured through concepts such as *dividual*, *doṣa*, *stoffwechsel*, and *shakti*. *Shakti* can thus be seen, if translating it into multispecies terms—as sympoiesis. The symbiotic relations in the soil, in cow dung, and the vital role of earthworms are entangled with microbial and plant life, which transmit to the human gut through food—where plants communicate their properties through chemosensory signals such as taste (Boke 2019; Daly and Shepard 2019). Thus, *desi* rice filled with *shakti* tastes better than IRRI rice lacking *shakti* and indicates how sensory experiences (taste, smell, vision, and touch) mediates information of plant and soil health (Boke 2019).

Could it also be the case that this taste is linked to microbial life and soil biodiversity? Our enteric nervous system is inseparable from the rich microbial life within our guts (Schuller 2018). Without intestinal bacteria we cannot digest our food; if our gut bacteria becomes ill, so do we. The metabolic products of gut bacteria interact with our entire bodies in complicated ways that we are just beginning to explore—they also have significant impacts on our brains, affecting the ways we think and feel (McFall-Ngai 2017, M64). Thus, the difference

between *desi* and IRRI rice, what they are fertilized with, and what makes them grow could potentially affect gut bacteria and human health.

This brings us to the importance of soil and personhood. One of the first questions Bengalis ask each other is *Apnar desh kothay* (Where is your home/district/land)? *Desh* signifies a regional identity, where people of the same soil share similar characteristics, similar to the Tamil word *ūr*, that Daniel (1984) proposes is a “person-centric category.” However, engaging with insights of the microbial self, could *desh* entail more than a category of social identity? Bangladeshis often remarked that each *desh*, each soil, produces regionally specific foods, where the same seeds when grown elsewhere taste different. This resonates with how indigenous microflora convey the taste of a particular locality, where “terroir taste” describes a sense that climate and soil create distinctive pastures that generate flavor components transmitted to milk—although how this happens is a mystery (Paxson 2008). Similarly, microbial life may—potentially—also create distinctive tastes of plants in the different *deshs* of Bangladesh if we (one day) could measure sensory experiences and view complex symbiotic assemblages of (invisible) microorganisms.

The Anthropocene entails the loss of complex microbial worlds both within and beyond organismal bodies (McFall-Ngai 2017). It captures decades of capitalist expansion and the extraction of profits (through yields) from nature, exhausting the soil and polluting the waters. *Shakti* highlights the importance of understanding how food is also about taste, nutrition, and health not just of humans, but the soil that we depend on. Species influence each other in open-ended assemblages (Tsing 2015) as captured in the concept of sympoiesis (Haraway 2017). Rather than delineated organisms, species are like fungi, entanglements of organisms and nature that interact in a multitude of ways (Ingold 2008). Thus, the use of agrochemicals may have several implications for the assemblages of interdependent species relations contained within it, where scientific hubris of increasing yield will only worsen (in)visible species extinction, risking further vulnerability in a climate uncertain future.

Bhejal Foods: Profit as Ethics in Agriculture

It was December, and the monsoon rice paddy was already ripe when I went to visit Sadhu Kaka again. He sat on a wooden bed covered with a simple straw mat. He was in poor shape, his hands shaking. I asked what ailed him, and he replied that he had harvested paddy (*IRRI teish*) all day. Despite his weariness, he asked for me to sit down while his wife brought me water and a banana from their

own tree. We spoke for a long time about his cultivation plans, and I asked him about the new project he had joined, which chose to cultivate foreign-produced sunflower seeds in the dry season rather than *boro* rice or sesame. He replied that they received the seeds for free as part of the first year of a development project he recently joined.¹⁷ Furthermore, he added, this allowed them to refine their own cooking oil to avoid buying *bhejal* oil from the market: “All food today is *bhejal*. Today people are eating *bhejal* foods and are themselves becoming *bhejal* [*khabar bhejal*, *manush bhejal*]. Everyone participates in this: the farmers, the food sellers, the state. We are making each other and ourselves sick. *Bhagbhan* [God, Divinity] will destroy humans for their sins.”

Bhejal food is contaminated with external substances that diminish the quality of the food itself. IRRI rice is subject both to the overuse of synthetic fertilizer and pesticides banned elsewhere. More than half the rice in Dhaka is contaminated with lead and cadmium through exposure to phosphatic fertilizers and industrial effluents in irrigation water (M. R. Islam 2013). Furthermore, food items bought at local markets in Bangladesh suffer from high levels of pesticide residue, resulting in people eating foods bought from the market that are essentially still toxic (M. W. Islam et al. 2014; A. Z. Chowdhury et al. 2014).¹⁸

In addition to synthetic urea and toxic pesticide residue, cultivated fish is perceived as *bhejal* as it is grown with lime, soap, and other chemicals used to increase yield and profit, but which also make it *bhejal* (as Ahmed Kaka points out in chap. 3). Food sellers lace fruit and fish with formalin to prevent them from rotting—during my fieldwork in Nodi, a child died after eating mangoes filled with formalin. These sellers also use ripening chemicals for early maturation of fruit, brick powder to fill out spices, motor oil to dilute cooking oil, and uncertified colorings to make fruit look more attractive. Whether speaking to landless day laborers, small farmers, researchers, academics, lawyers, or NGO workers, concerns over food safety and the potential dangers of consuming *bhejal* food bought in domestic markets preoccupied everyone from Dhaka to Khulna and Nodi.¹⁹

Local experiences of the toxicity of pesticides for both humans and other living beings in Nodi is linked to poor enforcement and global systems of agrop capitalist production. For decades, Bangladesh has been a dumping ground for unwanted waste from the Global North. The intensification of commercial agriculture and the commodification of food has shifted food away from being embedded in a social context to an anonymous commodity sold in a depersonalized market by nameless sellers. People have experienced health effects of eating *bhejal* foods, where *bhejal* points to the ways in which things are allowed to

become adulterated. Such food adulteration includes the overuse of uncertified fertilizers, the use of banned and toxic pesticides, as well as the injection of various of chemicals into food sold at markets. These are practices that all center on increasing profit, reflecting how food is now part of the capitalist market so long resisted by “backward peasants.”

Depending on a Poisonous Environment

The “simplifications” of industrial farming on a particular target species (be it tiger prawns or rice cultivation) disrupts symbiotic assemblages, creating “monsters” (Swanson et al. 2017, M6). Not only does synthetic nitrogen kill earthworms and reduce *shakti*, it also makes IRRI paddy plants “soft,” “sweet,” and “juicy.” By doing so, this type of rice attracts more pests than bitter local *desi* varieties. I asked Fupu whether farmers used pesticides before the introduction of *IRRI dhan*. She replied:

The trees of Bangladesh did not get sick before; there were very few insects on them. Now there are too many insects: without pesticides, the trees become sick. In 1971, the state urged farmers to use these pesticides, but we never needed them earlier. We didn’t need it because we had so many more birds and frogs that ate these pests. We even ate some of these birds such as *dbaner pakhi*, *boki*, *angalti*, *kbori*, *kora*, and *dbunho*, but the young ones they have never seen or heard of any of these. There are barely any of them left. Even fish like *patari*, *shoil*, and *taki* ate insects. The pesticides killed our freshwater fish. *Puti*, *koi*, *bhedi* have disappeared from the *beels* [wetlands] and canals due to these synthetic chemicals. Livestock are eating grass and becoming ill. *Paribesh bishakto hoyeche* [the environment has become poisonous, toxic].

Fupu highlighted how the introduction of pesticides disrupted an ecological symbiosis where various species helped keep pests at bay.²⁰ The use of pesticides caused such species to disappear while essentially making the environment toxic.

Sadhu Kaka pointed out that after decades of state and donor advocacy of intensifying yields through agrochemicals and the subsequent decline of pest-eating species, farmers have become dependent on pesticides to avoid crop failure:

We cannot abstain from pesticides because if ours is the only field without pesticides, the pests from other sprayed fields will attack our crop. So, we use pesticides such as Endrin and Dimacron [see table 4.1]. We tried to not use pesticide on the sunflowers we cultivated this year because we will be

eating this ourselves. If we were to use the pesticide, it would go straight into the seed. Now we're paying the price, the sunflowers are suffering from *nera poka* [bald beetle].

Sadhu Kaka's example highlights the problem of small-holder farmers (below five *bigha*, 165 decimals). To cultivate even one crop of IRRI rice, small farmers must buy high-yielding variety seeds, fertilizer, and pesticides, hire wage labor during the harvest and pay for fuel-driven irrigation for dry-season cultivation.²¹ They often use credits to pay for these inputs. If a crop fails due to pests, the farmers become indebted and put their livelihoods at risk. Cheap pesticides are therefore extensively used as cost-effective insurance against crop failure.

Spraying Poison

In using pesticides to protect crops, farmers may also endanger human health. During one of my trips in Nodi with Hassan, we saw two young men in the middle of the fields carrying plastic tanks on their backs. They were clad only in *lunghis* [cotton fabric wrapped around the waist] and handkerchiefs over their mouths. The smell of the pesticides was pungent and nauseating even from a kilometer away. Hassan stopped the motorcycle and we went toward the field to meet the two men, Emmad and Bilal, hired by the landowner to spray the *aman* rice fields with pesticides. They stood barefoot and knee-deep in the contaminated water. "Does such close contact with these chemicals affect your health?" I asked. Emmad replied: "This is *bish* [poison]. It kills many fish that otherwise is naturally occurring in *aman* rice fields. When we work in these sprayed fields, we get rashes and scars, but we shower afterward and wash it away. The women who work in these fields to remove weeds also complain of skin problems."

The pesticides used are seen as poison and several surveys have noted how toxicity affects pesticide applicators, but these surveys focus on the lack of protective equipment and clothing (Dasgupta 2013). Pesticide applicators without protective equipment are cast as individually responsible for their own health problems; there is no discussion about environmental contamination in the landscape (Greco 2016, 16).

I asked Hassan to take me to a pesticide shop to learn more about why people willingly and knowingly use poison. One market day in Shobuj town, we walked toward a small shop that gave off a pungent odor. He introduced me to the shopkeeper, Mr. Mitra, who showed me the various toxic pesticides he believed that the state would eventually ban. He also showed me one that is "safe"

TABLE 4.1. Pesticides used by interlocutors

Pesticides used by interlocutors	Official Availability	Manufacturer and origin	Chemical name	Class	Local toxicity description	WHO Hazard Class
Endrin	Not sold in shops, but still available to farmers	Unlisted for Bangladesh, but banned globally	Endrin	Organochlorine	“Kills everything”: insects, fish, frogs, worms, rats, snakes, birds	O: Obsolete as pesticide, not classified
Dimacron	Sold in pesticide shops	Unlisted for Bangladesh	Phosphamidon	Organophosphate	“Kills everything”: insects, fish, frogs, worms, rats, snakes, birds	Ia: Extremely hazardous
Hildon	Sold in pesticide shops	Unlisted for Bangladesh	Phosphamidon	Organophosphate	“Kills everything”: insects, fish, frogs, worms, rats, snakes, birds	Ia: Extremely hazardous
Bijli	Not sold in shops, but still available to farmers	Unlisted for Bangladesh, Deva Pesticides Ltd., India (?)	“herbal product”	Unlisted	For rice	N/A
Virtako	Yes	Syngenta	Chlorantraniliprole 20% + Thiamethoxam 20%		Does not kill fish, but does cause illness in grazing livestock	U: Unlikely to present acute hazard

Shobicon	Yes	Syngenta (Singapore)	Profenofos (40%) + Cypermethrin (2.5%)	Organophosphate + Pyrethroid	Kills insects and arachnids (ticks, mites); used on vegetables	II: Moderately hazardous
Kung fu, Karate	Yes	Syngenta	Lambda-Cyhalothrin	Pyrethroid	Does not kill fish	II: Moderately hazardous
Damdama	Yes	Intefa	Profenofos (40%) + Cypermethrin (2.5%)	Organophosphate + Pyrethroid	“Kills everything”: insects, fish, frogs, worms, rats, snakes, birds	II: Moderately hazardous
Selection	Yes	Bangladesh Agricultural Industries	Chlorpyrifos (50%) + Cypermethrin (5%)	Organophosphate + Pyrethroid	Used on beans against aphids and termites.	II: Moderately hazardous
Kasir	Yes	Intefa	Chlorpyrifos	Organophosphate	“Kills everything”: insects, fish, frogs, worms, rats, snakes, birds	II: Moderately hazardous
Shefa	Yes	Intefa	Cypermethrin	Pyrethroid	For vegetables	II: Moderately hazardous
Jubas	Yes	Intefa	Lambda-Cyhalothrin	Pyrethroid	Protects against hairy caterpillars, cutworms	II: Moderately hazardous

SOURCE: Compiled from author's fieldnotes, WHO (2010), and Dasgupta (2013).

as it targets specific rice pests without killing fish—Virtako by Syngenta. When I asked why he sells toxic pesticides instead of Virtako, he replied: “Syngenta sells ten products in bulk. I cannot only buy Virtako, I must buy the more lethal ones as well. I cannot afford to be selective. I would be making a loss if I do not sell the harmful ones from Syngenta. Also, some farmers want pesticides that kill everything. They may not want snakes or rats, for example, and don’t care if the fish die.” Mr. Mitra highlights how pragmatism drives his actions. He must buy and sell pesticides that are harmful or else lose money. Similarly, farmers are pragmatic when they apply pesticides to save crops as to not lose capital costs invested in cultivation.

However, most of the pesticides they use are not safe. The pesticides used in Bangladesh consist of high shares of toxic chemicals, such as carbamates and organophosphates in insecticides, and dithiocarbamates and inorganics in fungicides (Development Economics Research Group 2013). Both carbamates and organophosphates have been found to be carcinogenic, mutagenic (causing genetic damage), and damaging to fetuses (Zahm, Ward, and Blair 1997). Table 4.1 lists the most often-mentioned pesticides, their toxicity, and whether they are listed as officially sold in Bangladesh to indicate their legality. Dimacron and Hildon are popular pesticides and are classified by the WHO as “highly hazardous” organophosphates that can cause nerve damage (Pillay 2013) and significant damage to fish (Reddy, Vineela, and Kumar 2016; Joseph and Raj 2011). Endrin is particularly harmful and is regarded as “obsolete” and no longer in use (WHO 1992; 2010). It is an organochlorine, the same category of pesticide as (banned) DDT, both of which are still used informally in Bangladesh (Khan 2003).

Farmers referred to some of the pesticide brands as Indian pesticides, reflecting how pesticide traders easily smuggle banned pesticides across borders. As a Bangladeshi professor in agriculture pointed out: “In 1955, the Government of East Pakistan gave out insecticides free of cost to farmers and then removed these subsidies. It has been difficult to control illegal imports and Bangladesh is flooded with low-cost chemicals from India. These are not tested or regulated, they are essentially poisons. Children have died eating fruit contaminated with these chemicals.”

USAID distributed IRRI’s miracle rice in a package with petrochemicals from leading US manufacturers of farm chemicals. The Ford and Rockefeller foundations enabled US multinationals to penetrate Third World agriculture (Cullather 2010, 170). Nobel Prize laureate Norman Borlaug, the “hero” of the Green Revolution who was allied with the chemical lobby (Montrose Chemical, the world’s largest manufacturers of DDT), argued against a global ban of DDT,

stating that the risks to animals were morally insignificant next to the needs of hungry humans; he aligned high yields with chemical toxins and corporate profits (Cullather 2010, 246).

But where did DDT end up once it was finally banned? Many pesticides banned in the Global North are still sold and used in Bangladesh. In 1993, 6,300 tons of US-manufactured zinc oxysulphate, a highly toxic fertilizer containing lead and cadmium, was sold to Bangladesh through ABD loans via Houston's Stoller Chemical Company; 3,250 tons were distributed and 2,800 tons were stored at Bangladesh Agricultural Development Corporation warehouses in Khulna and Chittagong (Gregow and Gain 2002, 66). A loophole in US law allows agrochemical corporations to continue to export banned and unregulated pesticides to developing countries (Dowdall and Klotz 2013). Thus, Bangladesh has a history of having other countries dump their unwanted chemicals onto her soil (Gregow and Gain 2002, 66) and is subject to toxic-waste colonialism (Liboiron 2018).

Bhejal Food, Bhejal People

While many states can ensure the safe use, dosage, and application of approved pesticides, they may end up exporting those agrochemicals over time. Banned agrochemicals easily end up in Bangladesh, which to date has failed to enforce legislation and regulation of the toxins used in its domestic food production. Bangladeshi agriculture thus suffers from weak institutional capacity for regulating the unauthorized agrochemicals that enter its borders, while quality control is inconsistent. This has resulted in farmers using fertilizers that are not quality assured, many of which are counterfeits with traces of heavy metals (Das 2015).

I asked Mr. Das why the weak enforcement of chemicals in food production is allowed to continue and why the government does not promote brands of pesticides that are less harmful. He replied: "In Bangladesh there is only one form of ethics and that is profit. There is no ethics driving business, only profit." His words capture a wider sentiment expressed by many of my interlocutors, that people are greedy and only think of profit (*manush lobbi, suddho labh dekhe*). People are spraying their fields with poison and farmers are buying illegal chemicals at the micro level, while urea subsidies and the lack of state enforcement at the macro level contribute to nitrogen imbalance in the soil. These agrochemicals are used to increase profit and, as most of my interlocutors like Mr. Das, Salma, Sadhu Kaka, and Fupu expressed in different ways, the state and donors have promoted development interventions that have actively taught the Bangladeshi

farmer to increase yields for profit through development narratives of “food security” and “poverty reduction.”

This focus on yield and profit provided an incentive for food growers and food sellers to, in a multitude of ways, make all kinds of food items for domestic consumption in Bangladesh *bhejal* and unsafe for human health. *Bhejal* foods, they argued, contributed to health problems in major organs and increased the incidence of strokes and cancer in Bangladesh. Among the four hundred households I surveyed, most had at least one case of stroke, cancer, diabetes, or gastric problems in the extended family. The World Health Organization (2011) has identified an emerging epidemic of noncommunicable diseases associated with increasing morbidity and mortality in Bangladesh—including diabetes, heart disease, stroke, cancer, and chronic respiratory disease. Rather than food security and yields being the problem, the largest concern shared by Bangladeshis is whether food is *safe* to eat.

When speaking with Professor Hossain in Khulna city (see chapter 2), I asked whether he agrees with concerns that *bhejal* foods have a negative effect on human health. He replied:

Today, there are so many foreign substances that the body cannot handle: the pesticides, the heavy metals, and arsenic. Not to forget the ripening chemicals and formalin used by food sellers. When these chemicals pass through the body, they place significant strain on intestines and kidneys. This ultimately leads to their failure as the organs must constantly remove dangerous substances. The damage in people’s kidneys has in turn resulted in an increasingly large kidney selling business in Bangladesh, with advanced stage of kidney transplant for rich people who appoint *dallals* [brokers], mostly from North Bengal, to buy kidneys for their operations, stitching them up again. The cost of a kidney ranges from one hundred to two hundred thousand taka. By law, the kidneys need to be from a relative, but these brokers procure them from poor people, mostly children. The operation itself costs two to three million taka, and only rich people can afford it.

Widespread fear of the black-market trade in kidneys is linked to toxins entering the body through food.²² Discussions about the kidney trade in Bangladesh is emblematic of a wider public health and safety failure of systematic proportions (there is no public organ donation list; see chapter 5), which Sadhu Kaka’s song about people being cut and stitched up highlighted.

Studies on “food scares” and the lack of food safety in China (Tracy 2016; Klein 2013; Yan 2012) and India (Nichols 2015) suggest that national concerns about food safety are part of social food anxiety in the face of the change that accompanies the transition to technological development (Jackson 2015). However, the effects of agricultural change are not just social or symbolic; the quality and misuse of agrochemicals contribute directly to toxicity in Bangladeshi soil, food, plants, and bodies. Thus, the problem of *bhejal* food and its effects on kidneys is more than a wider critique of capitalism or the failure of modernity (Comaroff and Comaroff 1999)—it reflects lived public health concerns. Climate change is not just a symbolic fear of the world we are living in, it is a biophysical reality with effects on multiple species of life on earth. Similarly, the toxicity of food coupled by the changes to the soil and the microbial universe of life within it is most likely having effects on our bodies and well-being.

The concern of reduced *shakti* and *bhejal* foods highlight how capitalist land-use practices such as export-oriented tiger-prawn cultivation and high-yielding rice cultivation reduced both the environment and food into commodities in a depersonalized and profit-oriented market. A market that detached food from its socioenvironmental context of *desh*, soil, self, and place. This illustrates Karl Polanyi’s point that the expansion of capitalism and the self-regulated market since the 1850s has turned human beings and the natural environment into pure commodities (Polanyi 1957, 187). Commodification and separation of soil, plants, food, and humans enabled farmers and food sellers to (mis)use chemicals in food production and distribution in Bangladesh. This allowed profit to replace morality, culminating in the dominance of *bhejal* foods sold at the market. Yet, as Fupu once poignantly put it: as we make food *bhejal*, humans increasingly become *bhejal* too. The Bengali proverb “rice and fish make a Bengali” highlights the importance of these food items for Bengali identity. As both rice and fish have become *bhejal* through large-scale, globally oriented production, Bengalis themselves have become *bhejal*: both morally and physically corrupted, with an embodied weakness ridden with ill health.

Conclusion: Increasing Yields, Weakening Health

Climate reductive translations of food security and higher yield as adaptation misreads the landscape while ignoring a longer—colonial and postcolonial—history of how artificial irrigation, synthetic nitrogen, toxic pesticides, and intensive cropping patterns have adversely impacted water, soil, biodiversity, and, ultimately, human health. Like embankments and tiger prawns, such development

assemblages use climate adaptation as a narrative of improvement so that they can continue imposing the same bundle of interventions that they have for decades. This is despite the fact that such interventions may exacerbate climatic risks, and ignores how intensive agriculture may be a way of increasing exports rather than reducing hunger, thus helping us rethink Bangladesh as a modern-day Malthusia.

The loss of *shakti* in the soil due to the use of synthetic fertilizer—a loss that can be experienced through taste—captures the local understanding of how soil, food, and humans are entangled. Rather than a loss of *shakti* being a symbolic critique of the changing social relations caused by changes in agricultural practices, it highlights a material and ecological critique of how intensive high-yielding agricultural technologies erode species diversity in the soil and water. Ultimately, this weakens Bangladesh's food production capacity. Showing the entanglements of humans, the environment, and nonhuman species can throw light on complex interdependent species assemblages, particularly of invisible microorganisms and their role in human well-being (Daly and Shepard 2019; Schuller 2018).

By “modernizing” farmers through the intensification of commercial agriculture, both the environment and food have become commodities. Polanyi suggests that the commodification of the environment and humans will assure the destruction of both. Similarly, in his critique of *bhejal* foods and human technological hubris and greed, Sadhu Kaka suggests that a divine force will drown humans in tidal surges as punishment for their sins. Thus, the separation of humans from the environment expressed through the loss of *shakti* highlights the artificial alienation that arises as food is reduced to a commodity subject to *bhejal* practices. These *bhejal* practices—carried out solely to increase profit—have considerable material effects. The urban and the rural, the rich and the poor, are all worried about the damaging effects of today's *bhejal* and *bishakto* (toxic) food sold at the market. In Nodi, health, more than climatic change, is a major concern and source of vulnerability.

Surviving Inequality

“Climate change adaptation” embankments exacerbate flood risks: they raise riverbeds, resulting in silted water bodies. These embankments are broken to bring in saline tidewater for export-oriented tiger prawns, thereby eroding livelihood capacities of the poor. This permanent concrete infrastructure also obstructs monsoon floods from depositing fertile silt deposits on land, which increases dependency on agrochemicals. Embankments are cast as solutions in certain climate change narratives when historically, and locally, they are known to disrupt ecological processes. Tiger prawns are portrayed as an adaptive measure to salinity caused by rising sea levels, but this solution fails to take into account how shrimp cultivators use physical violence to force brackish tidewater into the polder. Likewise, donors promote intensified agriculture as a means to increase yields in light of climatic risks, while neglecting how current land-use practices and the lack of food-safety enforcement weakens the soil and poses risks to human health. Social anthropologist David Mosse (2010, 1157) describes how the interests of poor people are often excluded from the political agenda, making their concerns invisible and depoliticizing their needs. Similarly, top-down narratives of climate adaptation projects funded by development donors fail to reflect the interests of the poor.

Climate ethnographies describe localized experiences of climate change weakening livelihood capacities (Crate 2011). Arguably, such weakened capacities are not limited to climate justice, since changes in ecology and society are linked to wider structures of social inequalities. Whether through the creation of railways and embankments, export-oriented aquaculture, or (imported) input-intensive capitalist agriculture, ideas of development funded by external, global institutions have heavily influenced changes in Bangladesh. This is particularly the case with donors’ loan conditions, which took the shape of the Structural Adjustment Policies (SAPs) in the 1980s and ’90s. The focus on a reduced role for the state decentralized and weakened existing public sector institutions both in

the Global North and Global South, including a reduced institutional capacity for long-term maintenance of embankments and canals (Dewan, Mukherji, and Buisson 2015).

The socioeconomic changes arising from SAPs are entwined with social inequality. A system of state provisions for citizen entitlements such as healthcare and social welfare failed to materialize in Bangladesh in order to keep the public sector “small.” Out-of-pocket expenditure for healthcare and education often result in debt for rural families in Nodi, resulting in reduced life expectancies that constitutes “structural violence” (Galtung 1969; Gupta 2012). Furthermore, the development industry focuses on short-term project interventions rather than long-term structural change. One notable example is that of focusing on women to lift their families out of poverty through “smart economics” (Chant and Sweetman 2012). Not only do such entrepreneurial projects and microcredit NGOs target women over men, but they do little to address the structural un-(der)employment of educated young men with hopes and aspirations that make them unwilling to take on farm and day laboring work. This has resulted in a political economy of marriage arrangements where men actively use dowry and marriage as a means to secure an income; when women are unable to meet the demands of the groom, this sometimes leads to dowry-related domestic violence and/or separation.

Most households in Nodi, like many other places in Bangladesh, are tied into four to five NGO loans (one pays off another), which are used primarily by male family members (Goetz and Gupta 1996) or are used to pay off the dowry for a female relative (Karim 2011; Paprocki 2016; Banerjee and Jackson 2017). A substantial and empirically robust body of work critiques microcredit for spiraling rural indebtedness both in Bangladesh (Karim 2008; Banerjee and Jackson 2017; Cons and Paprocki 2010) and throughout the Global South (Bateman 2010; Bateman and Maclean 2016). Such entrenching of capitalist relations can be seen as contributing to social dispossession (Paprocki 2016). Microcredit is thus a symptom of a wider issue of structural violence and social inequality where Bangladeshis are denied citizenship entitlements and must therefore accumulate debt to afford out-of-pocket expenditure on healthcare, education, bribes for work, and dowries in a social landscape filled with underemployment and short-term microprojects.

The absence of the state enables widespread social inequality, whereas short-term project narratives tend to ignore the structural constraints faced by the people they seek to help. As much of Bangladesh’s development aid in coming years is allocated to climate change adaptation, it is important to ensure that

translations of climate change address the needs of the general population and improve livelihoods in a context of environmental degradation, for-profit food production, and scarce public healthcare facilities.

Health Inequalities as Structural Violence

Bhejal food makes *bhejal* people: the contamination of food results in increased illnesses such as diabetes, stroke, and cancer, as well as major damage to the stomach, liver, and kidney (chap. 4). Although there is no unified public healthcare system in Bangladesh that collects such data nationally, the issue of healthcare was a recurring theme of precariousness among the four hundred households that I surveyed in Nodi, as well as among the twenty landless women working on temporary road maintenance projects who were my main interlocutors, their neighbors, and families in both the Lonanodi and Dhanmarti unions. Many of them suffered from “gas” (gastritis) and took several pills each day. As both Sadhu Kaka and Fupu pointed out, the young are weaker and more ill—and the costs for examining and treating such ailments falls onto the individual families and their ability to get support from their kinship circles.

I became good friends with Lakshmi, a thirty-year-old woman from Nodi. Although we were roughly the same age, I had no children at the time, while Lakshmi was already the mother of two adolescent daughters—at the end of my fieldwork, she had already become a grandmother. I spent a few days each week in her village in Dhanmarti Union learning the seasonal work from planting to carrying water, and finally ended up tutoring her children in English. We mostly sat in her earthen kitchen after she came home from a day of earthwork (shoveling earth and leveling small roads) while she prepared different food items, with the occasional neighbor or family member stopping by. Lakshmi’s husband Kamal was chronically ill with severe stomach pains and was unable to eat. He weighed only thirty-five kilograms and was unfit for manual labor, and Lakshmi therefore had to act as the breadwinner. She had worked in a donor-funded earthwork project for the past five years to repay a debt (with high interest rates) taken out from microcredit NGOs and local moneylenders. She used the credit of several hundred thousand (lakh) taka to take Kamal to India for treatment and medication, without any noticeable results. One day, while Kamal was out selling vegetables at the local market, Lakshmi exclaimed: “All the money I earn, all the hard work I do, what is it for? I’ve spent it all on him. Look at him, he’s so weak and he cannot help at all. What’s the point of taking him to the doctor?”

Karuli, a landless woman employed in a two-year road-maintenance project is also the main breadwinner in her household. Her husband is unable to work because of chronic problems with his kidney and gastritis; toward the end of my fieldwork, Karuli feared for his life: “We tried to take him to local doctors at first, it was just too expensive to go to the hospital in Khulna! Then he got so ill that my in-laws and I took [out] loans to take him to Khulna city to be examined. It cost five thousand taka, that’s more than I earn in a month! His kidney is damaged, the medicine they gave isn’t working. What if this does not cure him? We have borrowed so much money and now I won’t have a project income.”

Karuli explained that the local healthcare facilities at the Upazila level are rudimentary, while the nearest hospital is located in the district capital of Khulna over two hours away by public transport. Even there, public health facilities lack medical equipment and instruments. Community-based clinics funded through development projects are unsuitable for treating more chronic or severe problems like Karuli’s husband’s illness. They provide vaccines for newborns, painkillers, contraceptives, antidiarrheal medicines, and oral rehydration packs and illustrate how health initiatives tend to be cofinanced by donors or delivered by NGOs, just like Bangladesh’s safety-net schemes (Barkat-e-Khuda 2011).

The extremely poor condition of state-funded health infrastructure in Bangladesh, and in the coastal zone in particular (Murshid and Yasmeen 2004), is the result of decades of insufficient state expenditure. Public healthcare provides only the barest level of service for most of the population, with serious disparity of access to basic services between rich and poor (Lewis 2011, 192). Thus, while Bangladesh’s statutory health system in principle covers all citizens with a range of services free of charge, in practice a substantial number of sick people are left untreated (World Health Organization 2015). Many of the people I spoke to in Nodi believed that public healthcare professionals in Bangladesh are incompetent, and they frequently sought private alternatives.¹ The best private and high-cost hospitals and clinics with major state-of-the-art diagnostic equipment and facilities are in Dhaka and Kolkata, India. Because of its proximity to the border, my Khulna-based interlocutors preferred seeking care in India. As Lakshmi said: “If it costs as much to get excellent healthcare in India, why should I go to Dhaka?”

However, Lakshmi became heavily indebted to microcredit-lending NGOs, local money lenders, and relatives in order to obtain healthcare in India. Similarly, Karuli borrowed money from her relatives to go see a doctor in Khulna, but she has been unable to gather the funds required to take him to see a specialist in India. The temporary donor-funded earthwork schemes targeting landless

women enabled both Lakshmi and Karuli to pay off healthcare debt. Nevertheless, these funds were not enough to help these families sustain their household expenses. Furthermore, when her project came to an end, Karuli had no means of paying for her husband's care. She expressed considerable anxiety over the uncertainty of future income opportunities. The costs of private healthcare are unaffordable to many, including the poorest and the middle classes, as it often exceeds general household consumption. This system has resulted in inequitable accesses to health services between rural and urban areas.

To access healthcare and treatment, many families end up highly indebted and enter a negative spiral of healthcare costs and poverty (Kabeer 2004; Satapathy 2016). Once a family member falls ill, the costs of visiting a doctor, undergoing examinations, and medication severely impact the economic resilience of a family (McIntyre et al. 2011; Matin, Sulaiman, and Rabbani 2008). High debt is linked to the out-of-pocket expenditure (OOP) as a percentage of private expenditure on health as illustrated in table 5.1. It shows that while individual households in Bangladesh contribute 67 percent of total healthcare expenditure through out-of-pocket payments to access health services (World Health Organization 2012), the government only contributes 33 percent of total healthcare expenditure. In India, private expenditure constituted 69.7 percent of total healthcare expenditure in 2009—one of the highest OOP in the world. India's National Health Policy 2015 argues that the “catastrophic expenditure due to healthcare costs is growing and is now being estimated to be one of the major contributors to poverty. The drain on family income due to healthcare costs can neutralize the achievement of the goal of income increases and every Government scheme aimed to reduce poverty” (Ministry of Health and Family Welfare 2015, 3).

A WHO report highlights: “The cost of services in private health facilities is unaffordable to many poor people. Bangladesh, therefore, still needs to travel a long way to reach universal health coverage” (2015, 54). Despite recent years of increase in health spending, Bangladesh's health expenditure remains one of the lowest in Southeast Asia. But why is this the case?

When I visited Chameli from the earthwork group in Lonanodi, her brother Liton—like many others—asked me if my country is rich and if money is readily available so that one can study as much as I have and receive good healthcare treatment without accumulating debt.

Camelia: Hmm, in Sweden we must all pay income tax to the state that then provides us with healthcare and education.

TABLE 5.1. Comparative healthcare expenditure in Bangladesh, India, Sweden, and the United States, in 2000 and 2009

	Out-of-pocket expenditure as % of private expenditure on health		Private prepaid plans as % of private expenditure on health		Per capita total expenditure on health at average exchange rate (US\$)		Per capita government expenditure on health at average exchange rate (US\$)		Per capita government expenditure on health (PPP int. \$)		General government expenditure on health as % of total expenditure on health		Private expenditure on health as % of total expenditure on health			
	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009		
Bangladesh	95.1	96.5	0.1	0.3	10	21	24	53	4	7	9	18	39.0	33.0	61	67
India	91.8	86.4	1.1	4.6	20	44	67	124	5	13	17	38	26.0	30.3	74	69.7
Sweden	91.1	90.1	0	1.2	2,280	4,347	2,286	3,722	1,935	3,543	1,941	3,033	84.9	81.5	15.1	18.5
US	25.5	23.4	60.3	62.7	4,703	7,960	4,703	7,960	2,032	3,795	2,032	3,795	43.2	47.7	56.8	52.3

SOURCE: World Health Organization (2012).

Liton: You must pay money to the state from what you have earned? You trust the state?

Camelia: You pay based on what you earn. For example, if I earn very little, say ten thousand taka per month, I do not have to pay tax. But if I earn thirty thousand taka, I pay one-third in taxes and if I earn one hundred thousand taka, I pay half in taxes. So even the richest who pays half his salary in taxes will still have five times more money than the person that only earns ten thousand taka. With this money, the state takes care of us. Because it is our money, we check on the state.

Liton: *Apa* [sister], that sounds like a good system. If we had that system here, we would not need to struggle so much with debt. It would be good for us poor.

Liton expresses the desirability of a progressive tax system for universal healthcare that would benefit the poor of Bangladesh. Our conversation also reveals two common general beliefs: (1) the lack of trust in a state perceived as corrupt, and (2) rich donor countries (like Sweden) hand out benefits to all their citizens. In 2009, Sweden spent US\$3,033 on per capita government expenditure on health, while Bangladesh spent US\$18. Bangladesh, with a population of over 160 million, is considerably more populous than Sweden, which has around ten million inhabitants. However, to simply attribute this difference to GDP and wealth alone might be too simplistic.

Even in high-income countries like the United States, millions of citizens are financially crippled in a marketized healthcare system (Sanger-Katz 2016) where out-of-pocket payment made up 52.3 percent of total healthcare costs in 2009, compared to social democratic welfare states like Sweden where the equivalent figure was only 18.5 percent (see table 5.1). Thus, the share of government expenditure versus OOP on healthcare is a political decision, where Sweden has a high share of public spending and public sector activity along with a well-developed, progressive taxation system (OECD 2015)—even though inequality is rising as taxation has steadily reduced in recent years (OECD 2011). Bangladesh, in contrast, has a weak revenue generating capacity and its collection of direct taxes remains one of the lowest in the world (Lewis 2011).

Low government allocation to healthcare expenditure in Bangladesh is ultimately tied to a wider restructuring of the state, which began in the late 1970s. Longstanding aid dependency on donors driven by a promarket and antipublic spending agenda of the World Bank hindered the development of a fully functional and national public healthcare system, education system, and responsive

job market (Broad 2006; 2007). The founding father of Bangladesh, President Sheikh Mujibur Rahman, sought to unite and build up the country on the four pillars of secularism, nationalism, socialism, and democracy. Inspired by the Soviet Union and socialism, he nationalized Bengali-owned businesses when he came to power in 1971. Foreign investment was to be permitted, but only in joint venture with the public sector, with a maximum of 49 percent foreign equity (Lewis 2011). However, the international donor community, led by the World Bank, opposed Mujib's new economic policies.²

In 1975, a state coup resulted in the assassination of Sheikh Mujibur Rahman and his family in their home in Dhanmondi, Dhaka. The government of Major General Zia-ur-Rahman followed the "guidance" of the World Bank and "rehabilitated" the private sector by meeting the demands of business elites and donors. The Ershad regime implemented denationalization and the return to private ownership beginning in 1982; there was strong trade-union opposition to the assault on the public sector, yet the regime opened up Bangladesh through trade liberalization policies (Lewis 2011). This formed part of a global phenomenon in the 1980s where the World Bank and International Monetary Fund gave loans to low-income countries in Latin America, Africa, and Asia experiencing debt crises after the global economic downturn of the 1970s. These loans were made conditional upon macroeconomic policy reforms, called Structural Adjustment Policies, based on the neoliberal doctrine of privatization, trade liberalization, and deregulation (Harvey 2005). The conditionalities were also known as the Washington Consensus, a list of "ten commandments" with an implicit promise that if a country implemented these macroeconomic reforms, it would experience economic growth (Rodrik 2006; Williamson 2004, 205). By encouraging economic growth and foreign exchange, the countries would be able to repay their loans (Easterly 2006).

In practice, debtor countries like Bangladesh were to privatize and deregulate state-held enterprises and utilities such as healthcare, water, electricity, transport, and natural resources while denationalizing the public sector. They were required to implement trade liberalization: removing existing (protective) tariffs and export taxes as well as deregulating currency markets (H. White 1996). In Bangladesh, SAPs escalated in the years following 1986, with more extensive actions beginning in 1992 (Tait 2003).³ It was during this time that donors in Bangladesh promoted high-yielding intensive agriculture, export-oriented commercial aquaculture, and the contentious Flood Action Plan.

Structural Adjustment Policies represented a decisive moment in the re-making of global capitalism with a high degree of external intervention on the

national policies of sovereign countries, impacting the citizens of debtor countries (Checchi, Florio, and Carrera 2009). They came to be extremely unpopular in the implementing countries as these reforms involved selling off precious state assets to foreign firms at fire-sale prices, massive deindustrialization, increased unemployment, and a sense of “recolonization”—where “neoliberalism” came to refer to a fundamentally different situation than it did in Western Europe and North America (Ferguson 2010). The denationalization of the public sector, lifting of market restrictions, and integration of the national economy into the world economy was part of a global pattern of taking crucial economic issues out of the hands of national governments.

Based on mounting criticism of the Washington Consensus and how it reduced the role and power of nation states, the World Bank moved toward the Post-Washington Consensus (PWC) in the 1990s to expand on development as economic growth and to incorporate poverty reduction and human development, focusing on literacy, life expectancy, increased income, and so on (World Bank 2006). However, the PWC was referred to as “sugar-coated structural adjustment policies” (Muhammad 2003, 121) as it effectively depoliticized the debate on poverty reduction by removing discussions of political economy, just like SAPs did before it (Dijkstra 2011). Like SAPs, Poverty Reduction Strategy Papers (PRSPs) had a negative view of the state: limiting its role to that of ensuring that markets function. Good governance was cast as the opposite of the state’s bad governance, to help create institutions that enable markets by reducing transaction costs and rents (often referred to as corruption).⁴

In line with this focus on governance in the PWC, donors and IFIs (International Financial Institutions) introduced partnership to the 1990s development discourse, where national governments must *own* their development strategies and civil society must *participate* in their formulation. Such a partnership would ensure transparency and accountability (or “aid effectiveness”) in the implementation of development (Dijkstra 2011). During the 1990s, civil society soon came to be equated with—or rather reduced to—nongovernmental organizations (Elyachar 2003; Sukarieh 2012). Under the PRSPs, donors increasingly directed funds to NGOs and away from governments, causing an explosion of NGOs (Pfeiffer and Chapman 2010).

SAPs undermined Bangladesh’s ability to provide public sector services for the poor. After the 1990s, public healthcare receded and education was outsourced to “service delivery” NGOs by the Bangladesh government and donors (Vaughan, Karim, and Buse 2000). Wood (1997, 81) terms this outsourcing of state responsibility for the delivery of universal services and entitlements (such as

healthcare and education) to nonstate bodies like NGOs as the “franchise state” that ultimately renders “the purpose of democracy toothless and meaningless.” By 2000, there were more than twenty-two thousand NGOs in Bangladesh, with multimillion dollar budgets, high-rise offices, and not-for-profit business concerns (Lewis 2011). Anthropologist Delwar Hussain (2013) further points out that structural adjustment policies and the opening up of Bangladesh in the 1990s reduced state capacity in a context where it had not been in a position to provide services for the majority of its citizenry in the first place. This proved to be the beginning of the abdication of what many of his interlocutors came to expect of the state, such as establishing public infrastructure. This contributed to a system where Bangladeshis were increasingly reduced to “beneficiaries” in donor-funded development projects, rather than citizens who pay taxes to a state that is responsive to their needs.

Arguably, the ideologies of the Washington Consensus and good governance agenda thwarted the development of strong state institutions, including those for public infrastructure such as revenue collection and a universal public health-care system (Tait 2003; Hussain 2013; Hossen and Westhues 2012; R. I. Rahman and Ali 1996). In lieu of public healthcare and education, rural Bangladeshis like Lakshmi and Karuli now indebt themselves in order to pay for private services that could help save family members from early death. Such structural socio-economic inequality does not “fit” into existing climate change–centered assumptions of problems in Bangladesh. The reduction of healthcare for the poor in the wake of structural adjustment policies has become an enduring problem of inequality in South Asia. Akhil Gupta (2012) argues that the life-denying consequences of chronic poverty in India have largely disappeared from public discussion: “Despite the rhetorical importance given to the eradication of poverty in government policy pronouncements, the scandal of the state lies in its failure to acknowledge that condemning an estimated 250 to 450 million people to a premature and untimely death constitutes a crisis of grave proportions. . . . How is violence [like exceptional poverty] taken for granted in the routinized practices of state institutions such that it disappears from view and cannot be thematized as violence at all?” (Gupta 2012, 4–5).

Gupta refers to this as a form of “structural violence” following sociologist Johan Galtung (1969, 168), who defines violence as arising “when there is a difference between the potential and actual somatic and mental achievements of people”—that is, whenever outcomes are unequal, violence is present. Violence is structural, Galtung suggests, when “it is impossible to identify a single actor who commits the violence. Instead the violence is impersonal, built into the structure

of power,” where it is invisible (Galtung 1969, 170–71). Though Lakshmi and Karuli work and indebt themselves through various microcredit loans to pay for private healthcare for their ill and underemployed husbands, they have been unable to ensure that their husbands receive appropriate treatment and recover fully.⁵ Galtung (1969, 168) suggests that “if a person died from tuberculosis in the eighteenth century it would be hard to conceive of this as violence since it might have been quite unavoidable, but if he dies from it today, despite all the medical resources in the world, then violence is present according to our definition.” Similarly, because of the high levels of private out-of-pocket expenditure for healthcare in Bangladesh, many poor families are unable to realize basic life expectancy.

The political, administrative, and judicial action—or inaction—that perpetuates a system of inherent inequality of life expectancy and health arguably constitutes “structural violence.” Excessive out-of-pocket payments and subsequent high indebtedness for healthcare thus reflect structural conditions of inequality by which certain segments of the Bangladeshi population can afford adequate healthcare and others cannot. Yet such factors are often overlooked as individual experiences of poverty (Farmer 2005). Currently, inequitable access to healthcare, and the subsequent livelihood erosion, indebtedness, and early deaths attached to this, is not part of public debates that individualize experiences of poverty and focus on “vulnerability.” To address “weakened livelihood capacities” anthropologists cannot only look at issues related to climate (Crate 2011), but must also engage with the inherently unequal power structures that enable structural violence embedded in bureaucratic structures despite long-standing efforts to “reduce poverty.”

Unequal Education and the Crisis of Masculinity

While Karuli and Lakshmi were concerned over how to afford healthcare with their short-term earthwork projects ending, Lipi expressed anxiety over her inability to continue her daughter Hetal’s education. Though Hetal is the daughter of a single mother who earns little as a day laborer, she dreams of continuing her studies to become a pilot. The mother-daughter pair live with Lipi’s frail widowed mother, and are surrounded by Lipi’s brothers and their families in a crowded patrilineal homestead compound located in Lonanodi village. When I went to visit Lipi, we sat on her cool mud porch while she was cooking. The earthen walls of the homestead were crumbling, and the surrounding land was barren, with no trees or vegetation. Once the earthwork project ended, Lipi

would no longer have a regular income. There were few work opportunities for women in her village: “My daughter is so smart and does well in school, but how am I to pay for her tuition and guidebooks? They are so expensive! I don’t want to take her out of school, but I am I’m barely making ends meet by washing dishes and clothes in other people’s homes; they give us food [rather than cash]. I don’t know how long I’ll be able to keep my daughter in school.”

Although primary school is free for girls until the age of fifteen and the government provides core textbooks, these textbooks are poorly structured and overly complicated. Without “guides” [guidebooks], most children are unable to comprehend the textbook and pass their exams. Private “tuition,” often with the un(der)paid schoolteacher, is necessary to help explain both the guides and textbooks. Parents would, in addition, pay a fee to the schoolteacher to attend class. These costs range from five hundred to one thousand taka per month (sometimes per subject). For these women on temporary earthwork projects, this is a substantial amount of their disposable income of three thousand taka per month. The tension over how, and for how long, they could send their children to school was integral to their hopes and aspirations of “making a life worth living” (Narotzky and Besnier 2014). In one study, half of the surveyed single mothers in Bangladesh were unable to send their children to school because of inadequate income (McIntyre et al. 2011). Noshima (introduced in chapter 3) is a single mother living in Lonanodi village. She was unable to pay the two thousand taka required for her thirteen-year-old daughter Nisha’s class-eight examination, resulting in Nisha dropping out of school. Noshima did not have money for a dowry, which meant that Nisha was unable to enter into a marriage arrangement and thus spent all of her days at home. This illustrates how the high out-of-pocket expenditure required for schooling limits a child’s ability to gain education when s/he is limited by the family’s financial resources. Educating girls in Nodi, whether through conventional schools or single-sex madrasas, was often a means to delay marriage. As a secondary school certificate is now required for work in the Dhaka ready-made garments industry, some families expressed a greater interest that their daughters study to secondary-school level, something Noshima also wanted but was unable to afford as her brother used his contacts to get his wife the earthworking contract instead. Nisha ended up married as a child and quickly divorced, because of her mother’s inability to keep her in school. Depending on the family’s socioeconomic status, some girls are married off as children, while others marry of their own choice as adults. Such a difference in social outcomes arguably constitute structural violence just as much as inequitable access to healthcare.

Unfulfilled Aspirations and Gendered Un(der)employment

Extensive efforts by the government and NGOs alike increased literacy rates in Bangladesh from 24.27 percent in 1974 (BBS 1975) to 57.53 percent in 2010 (BBS 2011). Millions of young girls and boys are becoming more educated than their parents and aspiring toward middle class professions, dreaming of another life than that of their wage-laboring families. Lakshmi's neighbor, the academically bright Parth, is the son of a wage-laboring farmer. He dreams of studying at university and having a *sarkari chakri* (salaried employment from the state). For educated youths aspiring to be more than their wage-laboring parents, the prospect of manual labor is agonizing.

Riparna, like her colleagues Karuli and Lipi, toils in the scorching sun as an earthworking day laborer. Her husband Ajoy is eloquent, well-mannered, and dresses in the shirts, trousers, and shoes of the rural middle-class. He avoids wage labor because of pride, despite not owning land. While she was preparing breakfast one Friday morning, Riparna was frustrated that Ajoy refused to work as a day laborer: "My husband is so lazy. He refuses to do any physical labor. He does not think of the future. We have two children. Both their education costs and the costs of our daughter's dowry are things we must start saving for. But Ajoy doesn't care. He just sits around all day. Everything is my headache [*chinta*]."

Ajoy, however, suggests that his own inability to provide for his family is due to structural problems of male unemployment: "Bangladesh's poverty is due to the millions of unemployed young men looking for jobs. This is why so many men want to go abroad. There is no *chakri* [regular, salaried employment] here [in the local area], only *kaj* [irregular work, day labor]."

Ajoy's comment highlights a wider theme of the fading aspirations of educated but unemployed male youth both in the Global North (Standing 2016) and the Global South (Gideon and Molyneux 2012; Ferguson 2010; Jeffrey, Jeffery, and Jeffery 2007). These young men, the educated unemployed, search for higher-status employment that are not there, as capitalist development had given a vague promise of a brighter future to come (Li 2017, 1250).

The paradox of contemporary globalization is that it has undermined the opportunities for educated young men to obtain stable and well-paid work. "At almost the precise moment that an increasing number of people formerly excluded from mainstream schooling have come to recognize the empowering possibilities of education, many of the opportunities for these groups to benefit from schooling are disappearing" (Jeffrey, Jeffery, and Jeffery 2007, 9). In this sense, education is a contradictory resource: while it provides marginalized youth with

certain freedoms, there is simultaneously a decline in opportunities for salaried employment that has a marked impact upon the self-perception and cultural practices of young men in India (Jeffrey, Jeffery, and Jeffery 2007).⁶

In their ethnography of ex-untouchable mobility in South India, Caroline Osella and Filippo Osella (2000) further show how a young person's social position (caste, class, age, etc.) influence the strategies available to them after leaving school. The unequal access to education is contingent on differential abilities to pay for out-of-pocket expenses for different qualities of educational institutions (state, private, etc.) and frequently reproduces inequality within a society. Thus educated un(der)employed young men occupy an ambivalent position regarding hegemonic masculinities; they conform to certain visions of successful manhood by virtue of their education, while they are simultaneously unable to assume male breadwinner roles (C. Osella and Osella 2006).

Though development projects and donors have promoted universal education in Bangladesh, they have not supported the state to expand employment opportunities for both men and women. As Ajoy remarked: "There are so few *chakris* available that one must pay several hundred thousand taka in bribes to secure an employment: it can sometimes cost more than migrating abroad on a two-year contract! Not all of us are qualified for a *chakri* either. This is why so many young men are going to *bidesh* [foreign land, abroad] and why I am also considering going to *bidesh*."

The search for salaried employment is competitive and is particularly difficult for those rural youths of wage-laboring families who lack personal contacts to secure a job and assist with finding work, transport, and accommodation (Kuhn 2003; Gardner and Ahmed 2009). Like in India, where school leavers use money to obtain work (Jeffrey, Jeffery, and Jeffery 2007), Bangladeshi male school leavers must often rely on bribes (*ghush*) if they lack the necessary contacts. Many households in Nodi mentioned bribes in the range of 400,000 BDT (US\$4,800) to become a state-employed police officer, one hundred times more than the 4,000 BDT Lipi and Riparna earned per month during their two-year project. Similarly, the cost for securing the services of a broker (*dallal*) to migrate abroad was often several hundreds of thousands of taka as well, where the debt was to be paid off with earnings gained in the host country.

The number of educated rural poor youths, particularly men, who lack the social networks and economic capital highlights how un(der)employment tends to reproduce existing inequalities in society. Such lack of employment is a bane to rural livelihoods struggling with increasing out-of-pocket expenses for costs arising because of the lack of social provision. These uneven outcomes, and the

differing ability to ensure that one's child can pursue the education they desire or reach their full potential, highlights the anxieties of a life worth living when aspirations are unfulfilled and manual labor is seen as demeaning.

Underemployed as Surplus Population

Following the 1980s and SAPs, the issue of employment for citizens fell off the development agenda as temporary sacrifices for “growth” were made (Chhachhi 2014). Global economic growth in the past few decades has not only increased the inequality gap, it has failed to translate into new jobs; women and men in the Global South work long and hard, but for very little (International Labor Office 2005). This lack of jobs has created a “surplus” population—a massive number of people who are underemployed. This illustrates how the powerful discourses of “immanent” development, or development “to come,” may fail to deliver on its promises.

The promise that growth will bring prosperity to all is still sold by transnational agencies such as the World Bank and by national governments. It also forms a centerpiece of people's hope for a better life if not for themselves, then for their children. The world over people invest in education, migrate to find work, and despise idleness because they see work and education as the route to making a better future for their families. They buy into a story of progress which suggests that through their own diligence and skill, and sometimes with entrepreneurship, a better future will come. Economic growth linked to progress is a hopeful, sometimes utopic narrative to which a great many people are fervently attached; they elect to make, or are forced to endure, huge sacrifices in its name. (Li 2017, 1252)

Li's concept of surplus population and her critique against the story of progress captures the unfulfilled aspirations in Nodi. The issue of unequal education and unequal prospects for finding work is, in addition, highly gendered. Nodi is an aid-dependent landscape, filled with NGOs, development projects, and microcredits unlike more industrial regions like Chittagong, where I recently started working. Girls unable to complete their studies may end up married as children. Boys may become wage laborers. Yet men (and some women, like Hetal) dream of having salaried employment, of having a regular and stable income that also affords a high social status.

NGOs like BRAC—one of the largest in the world—used to deliver rural credit to men via village organizations for agricultural work. With donor pressure in the 1980s to include women, these credit provisions to men were phased

out (Goetz and Gupta 1996). Today, men access loans for agricultural activities via women through NGO microcredit (Banerjee and Jackson 2017). Despite the stories of growth and a better life for themselves and their families, the combination of neoliberal economic policies and women's empowerment initiatives within the development industry have ultimately resulted in the exclusion of men (Silberschmidt 2011). This is further exacerbated by universal education and jobless growth in the wake of SAPs, which undermine men's abilities to socially perform masculinity and meet the ideals of being a male breadwinner (Jackson 2001). Surplus populations are often surplus males—where the focus on women as the vehicle for “development” has resulted in the “feminization of poverty” (Chant 2011). This development trend has created a moral narrative of “deserving” poor women and their “undeserving” male counterparts; in the context of structural underemployment this has resulted in changing patterns of kinship (Vera-Sanso 2008).

Doting on the Son-in-Law: Stories from Nodi

One day when Lakshmi and I were walking to a nearby football tournament and were far away from her family and neighbors, she expressed frustration over how supporting her family had become her responsibility. In her community, husbands are expected to support their wives and buy them food and clothing, yet Lakshmi's husband did not even symbolically act the role of husband: “Did you know that in the twenty years we've been married, he's never once bought me a sari?”

Although young, beautiful, and strong, Lakshmi, like Karuli, has a dark complexion. Fair skin is the beauty ideal in Bangladesh while dark skin is connected to ideas of impurity and lower status—often associated with manual labor in the sun. Dark-skinned girls (*kalo meye*) must pay higher dowries to their in-laws to “compensate” for their appearance as few families accept a “dark” daughter-in-law. Dowry demands from men with stable incomes and without prior failed marriages are too high for many girls from poorer backgrounds—particularly those with a dark complexion or without fathers like Nisha. These girls therefore tended to end up with men who did not demand a dowry, either because they do not work, are older (and divorced), suffer from substance abuse, or have other problems that reduced their ability or willingness to provide for their families.

Afrina resides with her adult children in Dhanmarti village, together with an aged, bed-ridden, and chronically ill husband. During the hot and dry mango

month of Jyostho, we sat inside their cool room atop the simple wooden bed covered with a bamboo mat under the cool breeze from their solar-driven mini-fan. Her mother was twice a widow with four daughters and one son. Afrina, the youngest of her siblings, was married off at the age of twelve to a married man forty years her senior solely because he did not want a dowry. He was ill and unable to work, and Afrina had to provide for her family from the onset. She has lived a physically demanding life; she is in her mid-forties, but her face is covered with leathery skin and deep wrinkles, her hair completely gray. Despite her own experience, Afrina married off her daughter Parul at the age of twelve to a family in a neighboring village across the river who said that they will “take” the girl without a dowry. As her son was only nine years at the time, Afrina was the sole breadwinner and could not afford a higher dowry, so she agreed to the marriage proposal.

Soon after their marriage, Parul’s husband demanded that she bring money from her mother to buy him a van to drive; she was also responsible for bringing all the household furniture and kitchen utensils. As Riparna warned, those who do not demand an upfront dowry are the worst ones. Parul’s husband beat her frequently when she failed to bring money from her natal home. Afrina recollected this gruesome period:

He beat her with any object available. He hit her, kicked her, and beat her with sticks; he was ruthless. She still has a broken tooth and a broken finger that hasn’t healed properly. When they got married, we didn’t know he smoked marijuana and drank alcohol, the marriage broker [*ghottok*] did not tell us, perhaps my son-in-law’s family paid him off. My son-in-law kept torturing Parul to the point that she was hospitalized, and I had to go and take care of her. I decided it would be better to bring Parul home where she would be safe. We filed for divorce as he was never happy with anything we’d give him. His greed was endless.

A son-in-law (*jamai*) holds a special status in Bengali custom. He is given special treatment, whether it be food, gifts, affection, or terms of respect. For single mothers, or families that struggle with just one income, it can become difficult to sustain such doting on a son-in-law. Thus, the greed of Parul’s husband illustrates how continuous dowry becomes enmeshed with this precedence of showering the son-in-law with gifts as a way of showing affection (*ador*). Unfortunately, Parul’s story was not unusual; every family I met had at least one example of such incidences of violence. The inability of a woman and her natal family to supplement the son-in-law’s income was often a contributing cause of divorce

or abandonment. Either he would leave her for another or she would be subject to such violence that she would decide to leave her husband and return home.

Sayma, whom we met in chapter 4, is a widow with four daughters—two married as adolescents and two in madrasa. Her oldest daughter's marriage took place only a few months before Sayma's husband died. As a widow with two daughters in school, Sayma was unable to provide for both herself and the needs of her oldest *jamai*. Throughout the year, the violence against her oldest daughter Tashu continued to increase as Sayma was unable to satisfy her son-in-law's demands for money. He threatened to leave her and beat her so much that she returned home on several occasions—bruised and battered—to heal. At the end of my fieldwork, Tashu was on her way of returning home to her mother as she could no longer stand the violence. Afrina's and Sayma's stories illustrate how mothers who are single earners (or whose husbands are addicts, disabled, or unable to earn an income) are unable to satisfy the monetary demands of their sons-in-laws and their families even when incurring themselves.

Whether enduring violence or rejection, many young brides return to their natal homes to support themselves. They may remarry and leave their children with their mothers, like Parul ultimately did. Violent and abusive marriages were highly prevalent when the dowry was low or nonexistent; a lack of dowry often turned into continuous demands to support the husband and his family. The increased incidence of dowry-related violence can in some instances become conflated with the custom of the special treatment of *jamaais*. Like Rozina once said while we ate lunch after their work on the canal in Lonanodi: "Some women think it is better to die by their husband's hands than suffering the shame of returning to their natal homes as divorced women. Others feel that it is better to return to their natal home than to die at the hands of their husband."

Marriage as a Business and the Crisis of Masculinity

One woman reflected how her ex-husband had "married" more than seven times: "Marriage is a business [*biyer byabsha*] for him. When he runs out of money, he will marry another poor girl and destroy her life as well." This mentality of profiting from marriage resonates with for-profit tiger prawn cultivation that undermines local livelihoods and motivates actors to overuse agrochemicals and adulterate food despite the harm it causes others. While previous modes of profit were driven by development interventions promoting exports and higher yields, marriage as a business may reflect how dowry becomes a means for the groom [and his natal family] to secure a livelihood or obtain higher social status through material ownership. Dowry can be used for a bribe (*ghush*) for a salaried

employment (*chakri*) or for a motorcycle or van, used to remediate structural male un(der)employment.

Through detailed fieldwork in rural Bangladesh, Shahnaz Huda (2006) argues that greed is used to exploit social customs of doting on *jamaais* and that such patriarchal materialism is the main reason for the escalation of dowry. Other studies have further linked the escalation of dowry practices to the availability of microcredit from NGOs (Karim 2011; Banerjee and Jackson 2017). However, rather than solely being a result of male domination or greed, the increase of dowry among Bangladeshi Muslims may also reflect how socioeconomic changes undermine men's status and identities as the main breadwinner. This can be seen as a form of a "crisis in masculinity," where men are unable to handle the loss of decision-making power within and about households (Chant 2000; 2001) and that may lead to conjugal breakdown (Moore 1994). Margrethe Silberschmidt (2011) writes on Kenya and suggests that that this crisis in the wake of neoliberal policies involved men falling back on patriarchal attitudes and behaviors with a greater vulnerability toward alcoholism, HIV, and violence. In the Bangladeshi context, increased dowry-demands reflects how men are seeking to address underemployment in a context where women are target for development interventions.

Reconfiguring Kinship

The escalation of dowry and the exploitation of the *jamaai* custom is much more complex than this story of patriarchal control and violence may allude to, urging us as scholars to investigate the interrelationship between changing macroeconomics and that of wider structures of marriage and family (C. Osella 2012). For instance, Parul rose beyond her abusive experience and got older. Her mother helped take care of her daughter from her first marriage, her brother grew up and began contributing to the household. He, in turn, married and his wife now helps their mother Afrina with household work. Parul herself remarried out of love, giving birth to a beautiful and intelligent daughter. Attending to life cycles of "female-headed households" (Gardner 2009; Chant 2008) helps counter narratives that reduce women to victims and instead highlights their agency, inner resilience, and strength. Second marriages, albeit many of which were informal, are expressions of women reclaiming sexual agency that they did not have in their first (child) marriage (Dewan, in review).

This attention to life cycles shows how social customs can be altered in different ways. During some of these second marriages, the husband chose to live uxorilocally with his wife and her family—and sometimes existing

children—abandoning his own filial duties. The trend of *ghar jamai* (resident son-in-law) is a practice long frowned upon as sons are expected to reside with and take care of their own parents in old age—“eating together” as a joint household. In her study of middle-class families in Kolkata, Henrike Donner (2002) shows how the prevalence of *ghar jamais* is increasing and that they take the role of a son in an honorary capacity. This was particularly the case among single-child families with only a wage-earning daughter who was completely responsible for her parents’ well-being. Moushumi lives with her parents and daughter in Dhanmarti. She was resentful over the fact that her only brother decided to leave their natal home to live uxorilocally with his new wife and in-laws as a *ghar jamai*. Rather than having a son and a daughter-in-law to take care of them, their divorced daughter—a single mother—took on the traditional male role. It is Moushumi who supports her parents through earthwork and tailoring, relying on her mother and daughter to take over reproductive tasks at home. Moushumi’s case illustrates that there are two sides to each story. On the one hand, you have the son who fails to take up his duties, but on the other hand you have a daughter that can stay and support her own parents.

But what happens when it is the daughter-in-law who is the earner? Lakshmi’s husband Kamal is too ill to work. His mother is no longer guaranteed the support of her son in her old age. Instead, she was staying with her daughter Snigdha, who returned home after leaving an abusive marriage. The mother-daughter pair resided at the back of the homestead, in between the latrines, the poultry, and the pigsty. The Hindu community in Nodi expect that a daughter, once married, becomes part of her husband’s family and that she does not make demands on her natal home. This custom dictates that Snigdha cannot inherit any land, despite it being her right by secular Bangladeshi law. Lakshmi emphasized: “In our community, even when one becomes a widow, one stays with one’s *shoshurbari* [in-laws’ home]. It’s not culturally accepted to return to one’s father’s home after marriage,” she said, explaining why she was so negative toward her *nonod* [husband’s sister].⁷

Development interventions such as earthwork projects may strengthen women and their immediate nuclear families economically, enabling daughters-in-law to be dominant and more independent in their decision-making. At the same time, it also reflects an increased mentality of separation and individualization among affines. The targeted interventions and benefits are given to specific, individual households, rather than to a kinship group.⁸ By doing so, it erodes existing social relations of support as each subunit of a family becomes a competitor in the limited project contracts and benefits allocated to a village. While

Lakshmi is fortunate to get one contract to repay her husband's healthcare debt, it also means that there is less work and income for Snigdha. While Noshima was unable to keep her daughter in school, her brother's wife was able to work on an earthwork project; this allowed them to focus on their own children's expenses and improve their own brick house over helping with their niece's educational costs.

In this sense, development projects—whether earthwork, tiger prawns, capitalist agriculture, or microcredit—erode noncommoditized relations through which people may have previously been able to access food, labor, and land, weather crises, or achieve aspirations such as education. As the nuclearization of the family continues in a society without universal social welfare, the poor and elderly are increasingly vulnerable and often find themselves helped by their daughters.⁹ These daughters may be divorced women, sometimes with children, returning to their natal home, or they may be married women of enough means and independence to support their parents or ask them to come live in their husband's household.

Conclusion: Misreading Coastal Vulnerabilities

Attention to the fabric of everyday life, livelihood anxieties, and hopes among landless women in Nodi frames an alternative reading of coastal—and gendered—“vulnerabilities.” More than half the women in both the Lonanodi and Dhanmarti earthwork groups I interviewed were married to chronically ill men unable to work. All of them struggled with the high costs of social reproduction, healthcare for ill family members, and education for children. Their livelihood anxieties were further exacerbated by the costs for (continuous) dowry demands made by their daughter's husbands and in-laws, bribes, and the extortionate fees of brokers to arrange overseas work. These out-of-pocket expenses are internalized as *private* costs and families often end up in debt spirals, taking out one loan to pay off another and having to take the help of moneylenders and microcredit loans from several NGOs. Development interventions like rural employment schemes bring temporary relief in the constant day-to-day struggle, but they also exacerbate the problem by disguising the insecurity of living without safety nets in a political economy filled with precarious underemployment. This debt arises for social services that are citizen entitlements in the countries funding development projects in Bangladesh.

Development aid is ultimately paid for by the taxes of citizens in high-income countries and is used for a plethora of NGO activities in Bangladesh. These

NGOs, donors, and development bureaucrats are largely exempt from tax, as are the multinational corporations benefiting from Bangladesh's export-oriented industries. Although this is in line with a neoliberal development agenda that treats local people as "beneficiaries" of external charities, the development industry evades the issue of the state's responsibility to provide social provisions for its citizens. This perpetuates a problem that arose from SAPs decades ago. Despite living in an area of waterlogging, tidal surges, and occasional cyclones, my interlocutors were mostly concerned with social reproduction, with how to make a life worth living for themselves and their families in the present and in the future, while having to deal with substantial precarity in an unequal society. Coastal vulnerabilities in this region are thus not limited to uncertainties in the face of climatic change, but to a different level of precarity that all the people living there face. To address their social and economic needs requires an active and long-term involvement of the state at various levels: as a creator of jobs (e.g., rural employment schemes targeting the landless), creating a working public healthcare infrastructure that addresses the health needs of all its citizens, and addressing the continued social issues of domestic (dowry-related) violence and child marriages that perseveres despite decades of focusing on "girls."

Conclusion

Misreading Climate Change

On 11 March 2020, the World Health Organization declared the Covid-19 outbreak a global pandemic. Bangladesh went into a nationwide lockdown until end of May 2020, keeping its schools closed for a full year. It was during this lockdown, on 20 May, that the severe cyclonic storm Amphan approached the coastal districts of West Bengal and Bangladesh. As part of an early warning system, the Bangladesh government proactively evacuated 2.4 million people into more than twelve thousand cyclone shelters and saved countless lives—only twenty-six people died. The shelters were supplied with face masks and hand sanitizer to help combat the spread of Covid-19.¹ While I worried that this would result in a serious outbreak, fortunately, none of my interlocutors contracted the coronavirus. Nodi's open and airy landscapes helped to keep cases of the respiratory disease low.

Yet the pandemic had other effects. As we were catching up on the phone in the spring of 2021, Hassan recounted how many adolescent girls in Nodi were married off prematurely because of the long school closures. At the same time, it is impossible to say if Bangladesh could have managed Covid-19 as well as it had without having closed schools. How many would have become ill, or even died, especially considering the high prevalence of noncommunicable diseases (chap. 5) that increase the risk of Covid-19? Furthermore, considering Bangladesh's limited public health infrastructure, with insufficient Intensive Care Unit spaces and an inadequate ability to treat large numbers of seriously ill people, Bangladesh's government and civil servants showed admirably proactive leadership. They even paused essential manufacturing activities, such as the ready-made garment and ship recycling industries. Nevertheless, due to lockdowns and global travel restrictions, people were unable to travel for healthcare, and even local doctors refrained from physical examinations. It is unclear how many people lost their lives due to delayed examinations and treatments. Unfortunately, I know too many individuals who were adversely affected by these circumstances.

This intersection of pandemic and cyclonic events not only highlights the importance of a proactive government, but also the need to create a public health-care system with universal coverage. Zoonotic epidemics are likely to increase in

frequency as industrial food production and habitat loss worsen in our current economic system. For Bangladesh to survive future challenges, long-term governance and infrastructure is of the essence, for without such a system structural violence and inequality prevails. This attention to social injustice and citizen entitlements tends to be neglected in development discourses of Bangladesh.

By combining an ethnography of rural livelihoods with an environmental history of Bangladesh's southwest coastal zone, *Misreading the Bengal Delta* seeks to more accurately represent the sociopolitical challenges and ecological realities of a country increasingly portrayed as a climate change victim. This environmental ethnography grounded in the anthropology of development shows the different ways in which development interventions are based on mistaken causal explanations, such as misreading floods, sea level rise, food insecurity, and coastal vulnerabilities. Misreading the Bengal delta ultimately undermines Bangladesh's ability to withstand future risks and challenges and highlights the importance of social sciences in complementing the existing quantitative, model-based natural-science literature on climate change.

This critique of the development industry and how it risks failing the environment and society in coastal Bangladesh is urgent. The logic of "intentional development" and technical solutions is based on the idea that interventions will make things better (Li 2007; 2017). Such narratives of improvement center on development as bringing prosperity to all, but social anthropologist Tania Li argues that the hegemony of such narratives cannot be sustained: inequalities between the wealthy few and the rest of the world are growing like never before. This fact was further accentuated by the Covid-19 pandemic. The social and economic burdens of living in a lockdown were distributed unevenly, and access to health-care and vaccines favored wealthy nations. It is therefore an absolute necessity to critique these stories of development, especially as economic activities resume in a postpandemic world. "Critique means prizing open the capitalist world as we find it, and exposing its imminent tendencies—the waste, inequality, and violence, as well as the growth—to critical challenge. Why is it so, and more importantly, why should this be accepted? In the international development arena, it means asking about how problems are defined, and what elements are not being considered, or set aside as too difficult or too political?" (Li 2017, 1248).

This critique becomes even more urgent as these narratives of improvement are now used by certain development assemblages to further their longstanding agendas. Narratives of improvement act as metacodes; the translations of the very same metacode of climate change are now justified under the narratives of economic development, progress, and prosperity. Whereas climate change started

as a movement critiquing capitalism for fundamentally driving global warming, heterogeneous assemblages of capitalist interests now co-opt climate change by translating it in ways that legitimize projects that may advance their own (organizational, financial) interests, but which continue to damage the environment and rural livelihoods. The shift toward capital-intensive technologies and products (flood-protection embankments, tiger prawns, high-yielding rice cultivation) benefitted capitalist actors, while the accumulation of foreign exchange from exporting cash crops like tiger prawns helped lending institutions ensure that debtor countries could repay their loans. The Bangladesh government, with donor support, profited from the expansion of export-oriented aquaculture and Green Revolution technologies. Now, these very same development assemblages are recasting these decades-old interventions as climate adaptation measures.

However, while climate change may be a narrative of improvement, development is not an imposing, hegemonic discourse controlling the actions and thoughts of development actors. The considerable heterogeneity of different climate-related development projects—that are sometimes conflicting—can best be understood from the perspective of performative brokerage. That is, each intervention reflects the interests and capacities of the particular development assemblage of international, national, NGO, and local development actors invested in the project. Through these networks, development brokers actively create and sustain a variety of translations of the climate change metacode as a problem that they are equipped to solve, thereby legitimizing project funding applications.

Identifying the Assemblages behind Narratives of Improvement

Building embankments in the present is not a new strategy designed to address climate change. From modern railways to climate-change adaptation, capitalist interests have long worked with the state to further their economic and political interests through large-scale embankment infrastructure. It is a continuation of state simplification that colludes with capitalist interest through capital-intensive projects justified through high modernist ideology. Colonial railway embankments replaced waterways and yielded profits for railway capitalists in London, while the postindependence Coastal Embankment Project provided capital-intensive technical assistance for Pakistan to modernize. While protests ultimately thwarted the 1990s Flood Action Plan (FAP) to build more permanent flood-protection embankments, the FAP promoters also represented capitalist interests allied with the Ershad regime. Today, state simplification works together with climate reductionism to maintain strategic ignorance of local

contexts, such as the history of the expansion of environmentally disruptive, permanent embankments in a hydrologically active delta.

For example, the World Bank's recent Coastal Embankment Improvement Project is based on the idea that climate change *causes* floods in Bangladesh. It is therefore climate reductive: it attributes all floods to climate change without acknowledging how embankments disrupt monsoon inundations and raise riverbeds, which results in damaging *jalabaddho* floods. In addition, embankments, by preventing annual sediment deposits on floodplains, contribute to silt becoming trapped in numerous water bodies. These rivers and canals are now dying, and the water retention capacity of the delta has been reduced. Having wide, deep, free-flowing rivers could otherwise help stave off precipitation uncertainties in the future. Thus, the simplified misreading of coastal Bangladesh as requiring higher and wider embankments perpetuates and worsens the very situation it claims to be mitigating.

Yet, development schemes not only fail because the state and capitalist interests collude through narratives of improvement (Scott 1998). The state itself is composed of diverse actors with different agendas. The colonial state was well aware of the negative effects of embankments; a range of colonial civil servants with local expertise, like Sir Arthur Cotton, Charles Bentley, William Willcocks, Rai Lahiri, and C. A. White, repeatedly pointed out the negative environmental consequences of permanently embanking an active delta with high sediment loads and meandering rivers that erode river banks in a country dependent on monsoon floods and riverine transport. The existence of dissenting voices highlights that there are often competing actors within the state. Those that vocalize narratives that further economic, geopolitical, or administrative agendas are better at harnessing support than those that dissent against such interventions. Thus, rather than a singular homogeneous "state" using "high modernist ideology" to "collude with capitalist interests" (Scott 1998), the promotion of railways, flood protection, and climate change adaptation are outcomes of particular actors within the state winning internal debates about what is accepted as knowledge at a specific time. The state—whether the East India Company, the British Raj, or Bangladesh's Ministry of Water and the World Bank—recognizes contextual knowledge when it supports its specific interests and marginalizes it when it does not.

The link between embankments and siltation is marginalized in certain climate change projects (like that of the World Bank), and addressed in others (such as creating rural employment via canal excavation). Rather than a hegemonic development discourse where environmentally unsustainable translations

of climate change are inescapable, heterogeneous development brokers with different agendas translate climate change in ways that further the goals of particular institutions and projects, where climate change funds can be used to both benefit and harm local populations. Bangladeshi development professionals actively participate in creating different translations of climate change—even when a particular translation is ineffective in solving a stated problem. However, such translations were often at odds with the environmental knowledge that Bangladeshi development professionals had of local context and complex environmental processes. I found that few Bangladeshi development professionals openly opposed climate reductive translations of embankments as adaptation infrastructure because of the fear of being blacklisted. To resolve the tension of being an international project employee and a knowledgeable Bangladeshi with their own informal and skeptical opinions, they would codeswitch between the official project metacode in English and their personal reflections in Bangla. Although this allowed them to use climate change as a spice in a pragmatic way, translations of embankments as an adaptation strategy to climate change contribute to the continued neglect of the problems of siltation, rising riverbeds, and *jalabaddho* floods.

Breaching Embankments: Shrimp Dispossession or Silt Management?

Certain development assemblages translate export-oriented tiger-prawn cultivation as an adaptive measure to salinity in a future of rising sea levels. When proponents of tiger-prawn cultivation state that salinity in Bangladesh is *caused* by rising sea levels, they deflect attention away from the fact that salinity in the coastal zone of Bangladesh is also seasonal, human-made, and reversible, ignoring the contentious violence and the dispossession that arises from wetlands and canal grabbing. Such a climate reductive translation that attributes salinity solely to rising sea levels is another example of state simplification, where particular sections of the state, the development industry, and the private sector collude to co-opt climate change to further their own aquaculture interests in ways that ignore a history of negative environmental and social impacts on rural livelihoods. The expansion of tiger-prawn farms reduced Sundarbans mangrove cover that protects against tropical storms. Tiger-prawn cultivation involves weakening the embankments by making incisions and installing pipes to bring in more salt tidewater during the dry season. Such high levels of salt reduces soil fertility, biodiversity, and the availability of local foods, thereby eroding the livelihood

capacities of the poor. Furthermore, Cyclone Aila in 2009 and Cyclone Amphan in 2020 breached the damaged embankments in tiger-prawn cultivating areas—inundating whole villages with brackish water: crops were damaged, and many people migrated away because of the devastation of property. Thus, tiger-prawn cultivation not only exacerbates anthropogenic environmental degradation through forced salinity intrusion, it also increases coastal people's vulnerability and risk during the tropical storms characteristic of the Bay of Bengal, which are expected to increase with climatic change.

Saltwater aquaculture results not only in wider loss of land and water commons, but also in suffering from living in a barren, nonfertile landscape. While people in Nodi were positive about the combination of agriculture and export-oriented aquaculture (*golda* prawn, crabs), they suffered in the barren deserts of tiger-prawn *ghers* that break embankments to bring in saltwater during the dry season when river salinity is at its highest. Such interventions, however, are different from Tidal River Management (TRM), where particular sections of the embankments are broken during the monsoon to relieve waterlogging and address how embanked floodplains are sediment starved. TRM does not constitute depolderization or the removal of embankments as part of a wider agenda of agrarian dispossession, but it may help enable longer agrarian futures. The main question is how to compensate those living in the polder communities; when the embankment is breached, they cannot farm. The 1990s top-down Khulna-Jessore Drainage Rehabilitation example shows how engineered solutions without proper local implementation result in poor results and conflicts rather than water governance remediation. As anthropologists have long demonstrated, bottom-up input from local people is invaluable in correcting the misreadings of top-down blueprints, for example in designing more effective Ebola management that builds trust and helps make the community's voices heard (WHO 2015). Going forward, TRM should be designed in consultation with local stakeholders and compensate all polder residents through direct cash transfer via mobile technologies (bKash). Rural employment schemes consisting of pond and canal excavation should also be included in TRM implementation. This could help address the lack of rural work and mobilize local community support for such work.

The Commodification of Food: From *Shakti* to *Bhejal*

A common climate reductive translation of agricultural development projects is that as climatic risks increase, Bangladesh must use high-yielding seed varieties

and agrochemicals to ensure food security for its population. Such a narrative does not engage with the paradox that food is exported *out* of the country, nor does it acknowledge the negative impact of intensive agricultural production on long-term soil health. Donors like the World Bank and USAID instead continue to push a similar package of interventions as in the past—then bundled under the Green Revolution—but is now rephrasing them as climate adaptation solutions. This rebundling does little to address the longstanding and severe problems caused by high-yielding, intensive agriculture dependent on agrochemicals and groundwater irrigation, while the lack of quality assurance of agrochemicals poses risks to human and environmental health. The continued focus on increasing yields deflects attention away from the problematic use of scarce water resources for export production. As my interlocutors repeatedly expressed, they are rarely able to taste the high-value tiger prawns and fish sent abroad. Furthermore, the privatization of common wetlands and the reduction of wild fisheries for the expansion of tiger prawns reduced their overall access to food.

A focus on exports as well as yields also ignores the physical health of the soil itself. The salinization of the soil from brackish aquaculture reduces the agricultural capacity to grow food today and in the future. In addition, decades of development projects and the promotion of high-yielding seed varieties has resulted in the extensive overuse of synthetic nitrogen, resulting in soil acidification, reduced soil fertility, and the inability to maintain current yields without increasing the quantity of fertilizer each year. Not only is reduced soil fertility a liability as climatic risks increase, the production of synthetic fertilizers are fossil-fuel dependent and contribute to greenhouse gas emissions, thereby exacerbating global warming (Kahrl et al. 2010).

The continued promotion of high-yielding rice—known for decades to reduce biodiversity and increase soil acidification (Shiva 1993; Alauddin and Tisdell 1991) is also problematic in the face of changing weather patterns. My interlocutors in Nodi, such as Sadhu Kaka and Fupu, described how there were over a hundred different local (*desi*) heritage rice varieties prior to the introduction of IRRI (International Rice Research Institution) rice. *Desi* rice plants are tall with bitter leaves, and are grown with fertilizer rich in organic matter (cow dung, river silt, plants that decompose during monsoon inundation). In the past, farmers rarely needed pesticides because of the vast numbers of fish, frogs, and birds that ate insects. In contrast, IRRI plants are shorter and rely on agrochemicals for higher yields and for protection against pests, which is perceived to reduce *shakti* (power, strength, life force). Today, only a handful of IRRI rice varieties

are grown in Nodi, having replaced most of the *desi* varieties. In the context of changing precipitation, temperature, humidity, and sea levels, growing a variety of plants with different properties diversifies risk; if there is a longer and intensive period of flooding, plants with higher *nara* (paddy straw) can survive, while local varieties that are more saline-and heat-resistant would be more resistant to irregular precipitation.

Since the introduction of IRRI rice in the southwest coastal zone in the 1980s, the over-and misuse of unregulated agrochemicals has resulted in many species disappearing from the soil. Globally, such agricultural development has included earthworms, nematode worms, soil mites, algae, insects, and fungi vanishing at a rapid pace (Smith 2011). This illustrates how the simplifications of industrial farming multiply beyond the original target species (Swanson et al. 2017, M6). As environmental anthropologists are increasingly pointing out, life forms are entangled with each other in symbiotic relationships. Disrupting such symbiotic entanglement across multispecies relations creates “monsters” of soil acidification, which culminates with species extinction. The ecological simplifications of the modern world—illustrated in ideas that adding nitrogen to HYV rice increases yields—“have turned monstrosity back against us, conjuring new threats to livability” (Swanson et al. 2017, M6).

People in Nodi described how the loss of fertilizing silt in the wake of embankments and the loss of a fallow period, during which livestock could graze freely and provide manure for agriculture, reduced *shakti* in the soil. This was exacerbated by the use of agrochemicals. Even though they did provide higher yields, they did not replenish the soil with *shakti*. This resulted in less *shakti* in the rice and ultimately less *shakti* in humans, making their bodies weaker. In contrast, *desi* rice varieties grown with cow dung and compost are filled with more *shakti* and nutrition. The idea that certain substances are rich in *shakti* and others are not reflects a mode of environmental knowing where humans, plants, food, and the environment are inseparable and possess qualities that for a long time have not been discernible through the quantitative and yield-centered models of [Western] agricultural science. Recent discoveries in microbiology and multispecies ethnography show how individuals are not so individual after all, that there are no bounded organisms separate from others. Life forms are entangled, particularly through symbiotic interdependence linked to bacteria and microbes. Concepts such as sympoiesis and holobiont, along with the latest findings on microorganisms, highlight how the inseparability of beings and the environments they live in is perhaps more than just “anecdotal” indigenous knowledge.

Furthermore, despite awareness of the negative effects of various agrochemicals, farmers continue to use toxic pesticides to save their crops and apply increasing amounts of synthetic nitrogen each year to compensate for declining soil fertility. Shop owners sell pesticides they know are toxic to avoid financial losses, while market intermediaries use formalin and ripening chemicals to avoid losing money on rotting food they cannot sell. The commodification of food is thus also about economic pragmatism in a context where food is reduced to yet another money-making commodity. Yet the shift to food as a commodity has resulted in a depersonalized and profit-oriented market detached from its sociomoral context. This enables farmers and food sellers to misuse chemicals in food production and distribution.

The translation of climate change as necessitating further intensification of agriculture and a dependency on agrochemicals is therefore another misreading of the Bengal delta. It does not address how the interventions it repackages as climate adaptation are part of the same industrial practices that has already made food production vulnerable. Nor does it recognize that Bangladeshis are more concerned with food *safety* (quality) than food *security* (quantity, yields). They are afraid not only of the loss of *shakti*, but also the toxic substances that pollute their food.

From Structural Adjustment to Structural Violence

Why is it that embankment maintenance is dependent on donor-funded projects and the people in Nodi are reliant on NGOs for their livelihoods? Why are development projects so active in promoting particular modes of agriculture? Why and how can banned agrochemicals be used in Bangladesh? Why does “food adulteration” take place, resulting in *bhejal* foods? World Bank and IMF loan conditionalities of the Structural Adjustment Policies (decentralization, trade liberalization, and deregulation) in the 1990s resulted in weakened public sector institutions in Bangladesh. This reduced state capacity for long-term maintenance of embankments and canals (Dewan, Mukherji, and Buisson 2015), while the focus on export-oriented cash commodities like tiger prawns occurred in a context of minimal public institutional structures to enforce food safety regulations.

Structural Adjustment Policies resulted in many Bangladeshis abandoning their expectations regarding the state, including such basic services as public healthcare and education. Donor support for vaccinations and antidiarrheal medicine help with acute problems, but most of the rural poor suffer from non-communicable, chronic illnesses like diabetes, heart disease, stroke, cancer, and

respiratory diseases, all of which are currently on the rise (see World Health Organization 2011). Many households in Nodi become indebted because of the high costs of basic healthcare and education. Such costs are internalized as private expenses rather than as citizen entitlements. Because of the Structural Adjustment Policies, low tax revenue, and four decades of donor dependency, rural Bangladeshis now expect very little from the state. Such costs are further exacerbated by having to pay bribes to get a job, extortionate fees for brokers to arrange work overseas, and increasing—and sometimes continuous—dowry demands. In aid-dependent areas like Nodi, people are lucky to be selected as “project beneficiaries,” competing with their fellow community members for scarce resources. In this context, the introduction of development interventions promoting earthwork, export-oriented tiger-prawn cultivation, capitalist agriculture, or microcredit wind up individualizing income while undermining nonmonetized livelihoods and eroding supportive social relations. Unequal access to healthcare and the means to support one’s family result in reduced life expectancies, which in turn constitutes structural violence, which is embedded in institutionalized inequality.

Currently, there is no national database of health indicators for the overall population to monitor these trends, just as there is no regular and consistent data collection on siltation and other hydrological information for the delta. A long-term national infrastructure needs regular funding, staff, and institutional capacity, and cannot be funded through short-term development projects. By evading the issue of state provision of social services to its citizens, the development industry perpetuates precarity after decades of reducing state capacity, which has had the unintended effect of ignoring the lived vulnerabilities of the population it seeks to help. These dynamics cannot be captured through a climate reductive translation where weakened livelihood capacity is mainly attributed to climate change.

Climate reductive translations in development projects risk obscuring the levels of deprivation caused by a combination of economic policies (brackish aquaculture, capital-intensive and high-risk agriculture) and social policies (the weakening of state capacity through structural adjustment policies). The reframing of coastal vulnerabilities as tied to climate justice diverts attention from the precarity and structural violence that arises in a context where the state no longer provides social services for its citizens. This reframing instead fuels a system of structural underemployment and high levels of debt to pay for dowries, healthcare, education, and labor brokering fees—all enabled by the high prevalence of microcredit NGOs in Bangladesh.

The Path Ahead

Climate change has come to dominate the current development paradigm in Bangladesh in diverse ways, while the Covid-19 pandemic brought out multiple dimensions of vulnerability. As increased amounts of funding are allocated to climate change, various assemblages of development brokers translate it in such a way that helps legitimize their project interventions. However, since there is a fixed sum of money available for aid (Hossain, Islam, and Saha 1987), an emphasis on climate change means giving less priority to other types of development activities, including addressing long-term political issues of structural violence. In addition, certain climate reductive translations misread the coastal landscape in ways that may exacerbate vulnerabilities to cyclonic storms by rearranging causality to legitimize short-term projects. For example, proposing embankment construction as climate adaptation neglects how they choke up waterways and increase *jalabaddho* flood risks. Similarly tiger-prawn cultivation as an adaptation to rising sea levels ignores how shrimp cultivators damage existing embankments to draw in saltwater, making them more vulnerable to breaches while salinizing the land and negatively affecting food sovereignty and life quality. Lastly, unsustainable intensive agriculture reduces both soil fertility and biodiversity required for strong local food production. By reproducing climate reductive translations, Bangladeshi development professionals risk diverting attention away from the creation of long-term solutions for Bangladesh as the causal mechanisms contributing to floods, salinity, and food insecurity continue to go unaddressed as a result of donor agendas. This is particularly problematic in the face of anthropogenic environmental degradation, climatic risk, and future health crises.

Engaged anthropologists have an important role to play in communicating everyday livelihood concerns to local, national, and global stakeholders. Our strength in analyzing processes of knowledge production while taking into account everyday livelihoods can help shed light on areas usually deemed as belonging to the sphere of natural scientists; through such work we can formulate real-world policy suggestions. For example, long-term solutions would include the public and formal acknowledgment by donors such as the World Bank and the Netherlands that embankments in the heavily silted Bengal delta worsen flood risks by trapping silt in the rivers, further reducing water availability in the dry season. Institutionalized and regular data collection of the extent of siltation is needed to establish how it can be resolved, along with including canal and pond excavation into rural employment schemes. Wider, deeper canals can

retain rainwater from the monsoon until the dry season and several households in Nodi suggested that regular canal excavation using local labor would help them both with generating rural employment and resolving irrigation needs.

Tidal River Management is increasingly seen as a potential strategy for addressing the severe waterlogging caused by embankments. TRM, if implemented, should engage in rural employment schemes to excavate canals with local labor from the landless classes, and also pay a basic universal income to all residents in an embanked area where the embankment is breached to address siltation. Efforts must be made to stop dry-season saline tides from reaching the floodplains during these times if such breaches are made. However, breaching embankments to address the siltation problems of the delta must not be conflated with the desires of tiger-prawn actors to zone certain areas as incompatible with agriculture. Brackish aquaculture can be reversed as long as the embankment is closed and does not let in saltwater during the dry season. All donors should acknowledge that brackish aquaculture undermines Bangladesh's food security aims.

Donor concerns about food security must also acknowledge the problem of food safety and the need for the state to enforce regulations to prevent food adulteration, as well as how a focus on yields must look into alternative ways of agricultural practice that help address soil acidification. During my fieldwork, local Bangladeshi researchers were experimenting with different manures and improving the yields of existing indigenous rice varieties; some donors were supporting such small-scale efforts too. This is a step in the right direction. In addition, Bangladesh already has several social security schemes. Greater state expenditure on healthcare and education would be a step toward reducing social inequality, as life expectancy varies according to an individual's ability to meet these out-of-pocket expenses. Social protection should be a right, not a gift, and critical politics is essential in addressing the current challenges of waste, violence, and inequality (Li 2017), where grassroots movements (*andolan*) may hold potential in a transparent and free future.

Various coalitions of development brokers can translate climate change in ways that continue to promote existing capitalist activities, rather than questioning how they in fact exacerbate future climatic risks. Climate change adaptation solutions, such as embankments, brackish aquaculture, and intensive modern agriculture, are the latest repackaging of narratives of improvement dating back to colonial times. In the present, such translations risk becoming climate reductive, as floods, salinity, food insecurity, and coastal vulnerability are cast as *caused by* climate change. Such narratives oversimplify the complexity behind

these phenomena and obscure the fact that capitalist practices and technologies weaken environmental and livelihood capacities. This is further exacerbated by widespread social inequalities arising from decades of Structural Adjustment Policies in an aid-dependent state. Engaging with context helps us move beyond narratives of improvement positing Bangladesh as a climate change victim and ensures that funds directed to climate change actually help strengthen coastal livelihoods and protect ecosystems.

Thus, the findings of this book add complexity to, and a deeper understanding of, the environmental and social problems facing coastal regions in the age of climate change. This serves as a cautionary alert concerning the ways in which well-intended climate reductionism can actually worsen vulnerability to climatic risks. Future research and development interventions must pay more attention to socioeconomic equality and scrutinize the actions of government decisions like introducing a coal plant in the Sundarbans (Rampal), industrializing the port of Mongla, and expanding industry in the former agrarian coastal region of Chittagong. To what extent may the promise of future growth worsen Bangladesh's current problems of environmental degradation, pollution (air, water, soil, noise), and structural health inequalities both today and in a climate uncertain future?

GLOSSARY OF BANGLA TERMS

aushtomashi bandhs temporary (eight-month) earthen dykes

bagda chingri saltwater tiger prawn (*Penaeus monodon*)

bbejal impure, adulterated, corrupted

bidesh foreign land, abroad

bish poison

bonna irregular destructive floods in the wake of cyclones, tidal surges, and storms

borsha monsoon floods

chakri regular, salaried employment

desi local, of the land, indigenous

ghar jamai resident son-in-law

gher enclosed dike for aquaculture

ghush bribe

golda chingri giant freshwater prawn (*Macrobrachium rosenbergii*)

jalabaddho drainage congestion, waterlogging

jomi land

kaj irregular work

kechu earthworms

khal canal

khas government owned

shakti power, strength, life force

shangkar hybrid

shoshurbari in-law's home

NOTES

Foreword

1. See Paprocki (2018) for the formulation “adaptation regime”; also Cons (2018) and Vaughn (2017) for further examples of the power and occlusions generated by climate change-oriented analysis of prospects for rural development.

Introduction

1. See <https://data.worldbank.org/indicator/DT.ODA.ALLD.CD?end=2018&locations=BD&start=2011&view=chart>. In 2016, the Local Government Initiative on Climate Change (Logic) was launched with an initial budget of US\$20 million (UNCDF 2016). These are only two examples of the many climate change funds going to Bangladesh, where the rural annual wage is generally no more than US\$610 (estimated on twelve consecutive months of four thousand taka per month, excluding periods of no work and no pay, or gender discriminate wages for women) and the total government revenue for 2015 was BDT 2.77 million, approximately US\$35.2 million (BBS 2015, 239).

2. Bangladesh also engages in internal colonialism against indigenous peoples (*adivasis*) who are also subject to colonizing narratives of Bangladeshi nationalism, but this is beyond the focus of the current book. For more information, see Lamia Karim, “Pushed to the Margins: Adivasi Peoples in Bangladesh and the Case of Kalpana Chakma,” *Contemporary South Asia* 7 (3): 301–16.

3. Colonial anthropologists also played a part in promoting and establishing words such as *progressive* and *primitive*, explaining “native” phenomenon benchmarked against European conceptions of normativity (Asad 1991). Anthropologists, from Malinowski to Bourdieu, benefitted from the patronage of European colonial powers; colonial discourse and practice “was always part of the reality anthropologists sought to understand, and of the way they sought to understand it” (Asad 1991, 315).

4. Foucault uses government in its broadest sense, meaning anyone in a position of power, from political head to magistrate, educator, or patriarch (Butler 2002).

5. Several anthropologists have made use of the Foucauldian conceptualization of power, knowledge, and discourse to deconstruct modernity and how colonial categories shaped colonial institutions, practices, and ultimately colonial subjects; see, for example,

the works of Cohn (1996; 1990), Dirks (2001; 1987), Asad (1991), Comaroff and Comaroff (1991), and Rosaldo (1989; 1980).

6. For detailed environmental histories of the southeastern Comilla, Noakhali, and Barisal districts of Bangladesh, see Iqbal (2010). For West Bengal, see Bhattacharyya (2018) on Calcutta and the Hooghly River, Jalais (2010b) and Mukhopadhyay (2017) on the southern Sundarbans islands, Lahiri-Dutt and Samanta (2013) on Damodar embankments and *chars*, and D'Souza (2006) on colonial capitalism and irrigation in the Orissa delta.

7. This builds and extends on Mosse's (2005) ethnography of development policy where he shows how sustaining a particular theory as justified and legitimate involves rearranging expectations of causality. "Participation" is reduced to something achieved through more community-based groups; "empowerment" is reduced to extending rural credit to women.

8. This work draws on Latour's concept of translation "as a relation that does not transport causality but induces two mediators into coexisting [with each other]. . . . Translations [exist] between mediators that may generate traceable associations" (Latour 2005, 108) and is now increasingly also used in environmental anthropology (see, e.g., Di Giminiani and Haines 2020).

9. The names of all people, organizations, and places (e.g., Nodi, Lonanodi, Dhanmarti, and Shobuj town) have been changed to protect the privacy of the communities discussed in the following pages.

Chapter One

1. See S. Huq (2016) for a general overview of climate finance in Bangladesh.

2. Rennell sent Richards, Martin, and Ritchie to survey the Sundarbans rivers for these maps.

3. Rennell's journal entries for 26 June and 29 June, 1764, in La Touche, 1910. Also, see maps IOR/X/1259; /1260; /1261 on maps surveyed in 1813–15 of Sagar Island, Diamond Harbor, and the Sundarbans around the Hooghly River that show many "salt works" in forested areas. Rennell's later works include surveys of the "salt districts" of Bengal located in the Sundarbans to regulate revenues and jurisdiction (Rennell 1803).

4. The Sundarbans was first attached to the Hooghly District in 1757 and the 24 Parganas in 1793. By 1881, Khulna was a part of the Presidency division including Calcutta and Jessore, now in West Bengal India.

5. For a detailed discussion on colonial "wastelands" see Eaton (1990), Jalais (2010b), and Mukhopadhyay (2017).

6. The first British effort to clear the Sundarbans for agriculture was in 1770 by Claude Russel, the collector general of 24 Parganas, through rent-free lessees for the period of forest clearance and cultivation called "Patitabad Taluks" (Lahiri 1936, 66).

7. Similarly, approximately three million people died during the 1943 Bengal famine as Prime Minister Winston Churchill took decisions to export grain to feed WWII troops at the expense of local food security (Mukerjee 2010). See also chap. 4.

8. Through this revenue-based acquirement of land, *zamindars* became instruments of government for the British (Mosse 2003). Indigenous custom continued in parallel with new titling processes required by the colonial administration, which led to the ambiguity of responsibilities that was further exacerbated by complex processes of access to land and water that continue today (Baker 1984; Dirks 1986; Ranajit Guha 1963; Mosse 2003; Price 1996; Scott 1998).

9. See also Iqbal (2010), Bhattacharyya (2018), D'Souza (2006), Lahiri-Dutt and Samanta (2013), Mukhopadhyay (2017), Jalais (2010b), and Pargiter (2020) for more detailed historical analysis of the Permanent Settlement Act in the Bengal delta.

10. The maps highlight the importance of using cadastral surveys as a means of controlling taxation (Scott 1998, 44–46). In 1822 and 1823, all forest lands between rivers were divided into blocks and numbered as Sundarbans lots to be awarded as leases (Lahiri 1936, 67). The Sundarbans lots (222) that describe Nodi from this period are also described in detail in Pargiter (2020, 142–43). Revenue collectors sought to obtain taxes from these plots between 1828–1836 by updating the revenue roll (153). These lots are also visible in Tassin's (1841) *New Bengal Atlas*.

11. See Letters dated 16th June 1831 from the Bengal Government to Court of directors in the Bengal Revenue Board collection (1836), as well as Paragraph 147 (page 17C) in the same volume. For more information about the 24 Parganas and deforestation in the West Bengal Sundarbans, also see Mukhopadhyay (2017) who discusses in detail the Dampier-Hodges line and the importance of the new Sundarbans commissioner in the 1830s to demarcate the boundary of Sundarbans for revenue purposes.

12. Bengal Revenue Department (1817, 2–3) contains several such letters of how the land beyond the Pottaks, seen as separate from the Permanent settlement, were expanded without settling revenue. See No 13. Letter dated 29 November 1814, paras. 51–55; letter dated 11 June 1814. From the Board of Revenue to Governor General Francis, letter dated from Fort William on 5 March 1814, Bengal Board of Revenue to the Governor General of Bengal. IOR/F/4/501/11980 British Library.

13. Similar accounts of rapid forest conversion are found in the Khulna District Gazetteer of 1908 and the 1911 Census of India (O'Malley 1908, 93; Census of India 1913, 191).

14. This appears different from the West Bengal, 24 Parganas Sundarbans where the Sundarbans as a wasteland was a means of ensuring it remains as state property (Mukhopadhyay 2017).

15. Henckell, the Jessore Magistrate in 1780, was unable to afford these repairs and applied for funds from the Board of Revenue to provide £1500 for *takavi* advances to the cultivators and £600 to repair the embankments in his newly “reclaimed” Sundarbans (Hunter 1875b, 277). For further details about what is known about embankments in this period for all of Bengal, see *The Bengal Embankment Manual of 1873* (Harrison 1875).

16. In the *talukdar* (landowner) Prawnkishen Dutt's appeal against the Revenue Board, he claims that the board confiscated land that he and his family spent significant personal expenses to convert from mangrove into arable paddy land for the Pottak (grant) they had bought from the administration in 1782. Among these costs was that of raising embankments, dividing the lands into separate settlements (*mouza*) and

procuring tenants (Bengal Revenue Board 1836). Although Dutta lost the case, it contains one of the few references of the landowner paying the cost of embankments as a private cost. See the letter dated 30 April 1836, paras. 142–47, Bengal Revenue Board (1836).

17. Using the case of the Orissa delta, D'Souza (2006, 52) suggests that colonial capitalism under the Company recast the previously flood-dependent agrarian regime into a flood-vulnerable landscape. That is, the *zamindari* system required land to be realized in a manner that compelled the Company administration to treat deltaic inundation as a calamitous event rather than a geomorphologic process. In my own research I found that the East India Company acknowledged the importance of “flood dependence”—evident in the earlier statements and in the mapping of lands under “inundation.” D'Souza also points out that embankments are damaging to Orissa's deltaic ecology (102). In Bengal, there are differences between earthen *bandhs* that stopped seasonal saline incursion during Company rule, and that of watertight embankments during the British Raj that prevented beneficial monsoon inundation and instead cast them as “natural calamity.” These different types of embankments further highlight the importance of different forms of water—salt and fresh, dry and monsoon flows.

18. The Bengal Embankment Manual of 1873 provided guidance on the extent and delegation of responsibilities of the embankments of lower Bengal regarding the “State,” while the Embankment Act II of 1882 later placed the construction and maintenance of embankments under the authority of the lieutenant governor. Both legal documents show how the management of Bengal's embankments was shifting toward a more centralized responsibility by the colonial state (Ingles 1911).

19. This is in stark contrast to the lived colonial realities of export policies and British-induced famines in the subcontinent where these same “subjects” are dehumanized, devalued, and expendable as part of greater colonial agendas (Davis 2007; Mukerjee 2010).

20. The landlord suspended rent collection from his tenants, sending them a cash advance for seed instead. Upon hearing this, the rent collector immediately asked for a government revenue installment and threatened to arrest the landlord if he did not pay. “Private Memo, a European asking an Indian landlord about the Famine Commission. Benares,” dated 12 December 1878 (Caird 1878).

21. The 1793 Permanent Settlement Act did not include the reclaimed lands of the Sundarbans and its embankments were therefore not included in the 1882 Embankment Act II (Ingles 1911, 46–47). Embankments were seen as inappropriate for Jessore; see appendix A (Harrison 1875). It was not until the amendment in the Bengal Embankment (Sundarbans) Bill of 1914 that the Sundarbans embankments were also given the same rights as other Bengal embankments in 1882 (Government of Bengal 1914).

22. Brammer states that it is a common myth that *borsha* floods deposit fertile silt on Bangladesh's floodplain, including that of the Ganges tidal floodplain where the southwest coastal zone is situated. He refers to soil surveys from 1965 that highlight how when soils are flooded by rainwater, chemical reactions take place that destroy clay and liberate the nutrients they hold, making topsoil acidic. “Blue-green algae living in clear water (through which sunshine penetrates) fix nitrogen that plants can use. Silty

water would prevent or severely limit both these fertility benefits” (Brammer 2020). My Bangladeshi interlocutors, like Sadhu Kaka and other Bangladeshis that have been part of Tidal River Management (chaps. 2 and 3) maintain that *borsha* floods fertilize the land while also gradually elevating the floodplains and enriching natural vegetation.

23. The Partition made East Bengal a part of the dominion of Pakistan and it was renamed East Pakistan in 1955 and then Bangladesh in 1971. For more information on Partition, see Chatterji (2002), Sirajul Islam (1997), Hill (2008), and Van Schendel (2009; 2001).

24. In Bengali-speaking East Pakistan civil-service posts were mainly staffed with trained West Pakistanis, usually Punjabis and Bihari (Lewis 2011).

25. Some scholars suggest that the Coastal Embankment Project (CEP) was constructed to facilitate the Green Revolution, or to “transform” the region from a food secure to a food-exporting region (Paprocki and Cons 2014, 6). Although the CEP was built to stop salinity intrusion and promote aman rice—there is little to suggest that it was built with the aim of facilitating the Green Revolution. For example, Choudhury, Paul, and Paul (2004) write that the Green Revolution would not have been able to take place without embankments, but this does not mean that embankments were made in the 1960s solely to intensify agricultural production and promote exports. Indeed, aman rice HYV varieties were not developed until the mid-1980s in Bangladesh (chap. 4).

26. It was personally organized by UN representative and American citizen Huntington Gilchrist who supported Ayub Khan. The mission was headed by Julius Krug, former US secretary of the interior (Hanlon, Roy, and Hulme 2016).

27. Pakistan was the main bulwark of land separating socialist India from the neighboring communist states of the Soviet Union and China (Cohen 2004, 34, 302).

28. During my visit to the National Archives of Bangladesh, there was a notable lack of continuity of records, and very little in the Jessore District records on the period from partition to 1971. The archivist explained that since the capital of Pakistan was first Karachi and then Islamabad, most of the records from Calcutta had been transferred and stored there.

29. For an excellent description of Bangladesh’s modern history, please see Lewis (2011, 76) for details.

30. India’s unilateral construction of the Farakka Barrage with the reduced inflow of freshwater into Bangladesh combined with billion tons of sediment unable to flood the plains suggests that both transboundary waterflows and the construction of embankments contribute to the silting up of the delta.

31. In the Jessore District, permanent *jalabaddho* is the largest problem. Experimentations using indigenous solutions to break the embankment in certain places have been used to remove inundation, currently referred to in development projects as Tidal River Management.

32. There is extensive literature on this. See Adnan (1994); Boyce (1990); Clayton (1994); Elahi and Rogge (1991); Hofer and Messerli (2006); H. Hossain, Dodge, and Abed (1992); M. Hossain, Islam, and Saha (1987); Hughes, Adnan, and Clayton (1994); A. Rahman (1992); Sklar and Dulu (1994); Zaman (1993); Shaw (1992).

33. Scott suggests that interventions fail when there is a weak civil society. It is unclear what role civil society played during the colonial period when voices like that of Sir Arthur Cotton were silenced. During the CEP, when East Pakistan was ruled by West Pakistan, protests included the 1952 Bengali Language Movement and the 1971 Independence War. The failure of the Flood Action Plan shows the importance of civil society.

Chapter Two

1. Union Parishad is the lowest level of local government. The next tier is the subdistrict, Upazila.

2. The chairman is the elected democratic representative of the Union Parishad.

3. This work draws on Latour's concept of translation "as a relation that does not transport causality but induces two mediators into coexisting [with each other]... Translations [exist] between mediators that may generate traceable associations" (Latour 2005, 108).

4. "Adaptation" generally tends to anticipate the adverse effects of climate change and to take actions that may prevent or minimize the damage they can cause or encourage people to take advantage of opportunities that may arise. Examples of this tend to be infrastructure solutions or changes in land-use practice. Climate resilience was often used to define the capacity for a socioecological system to maintain functioning in the face of external stresses imposed by climatic change, focusing on shock absorbing and self-renewal, and is often used in Bangladesh to focus on increasing the "resilience" of individuals and communities to deal with stresses in their everyday lives.

5. He explained: "When constructed, the embankments stopped the sediment from reaching the floodplains. Now the silt deposits in the river system. On top of this, Farakka Barrage has led to reduced water flows to flush out silt in the dry season, so there is more silt in the rivers further contributing to problems of water logging [drainage congestion]." While conducting interviews, I often heard various segments of the population, researchers, and government officials make this argument. With the reduced inflow of water due to the Farakka barrage, the tributary rivers no longer have the force to carry the silt all the way down to the bay, which has directly contributed to greater sedimentation rates in the delta (Hill 2008, 179; Swain 1996).

6. Many foreigners who have worked and lived in Bangladesh for long periods (some more than four decades) speak Bangla and know of the longstanding problems of siltation and embankments and the performance of development events and are increasingly writing about these issues internationally.

7. Baviskar (2019) points out how there was a lack of opposition to dam projects in India in the 2000s compared to the 1990s, similar to how there were strong social movements against FAP, yet not against CEIP. She suggests that this has had to do with NGOs working against such projects with legal and technical means, while local communities are compensated and thus are not as vocally critical.

8. The Asian Development Bank tried to carry out a project based on the grassroots breaching of embankments in Jessore District, called Tidal River Management. The

project was highly contentious as it was based on embankments being breached strategically in several places, but failed to implement the necessary relocation and compensation program due to the difficulties of understanding which of the many actors (landowners, sharecroppers, tenants, those living on it) should be compensated for their loss and how (Shahidul Islam and Kibria 2006).

Chapter Three

1. I introduced myself as a PhD student from the UK and made it clear I was not part of any donor initiative.

2. The subregion of the Ganges tidal floodplain, which Nodi is part of, is thus different from the forested islands in West Bengal that Mukhopadhyay (2017, 127) and Jalais (2010b, 7) describe, where tidal rivers appear to be saline throughout the year.

3. With the 1947 partition, Bangladesh's four-thousand-kilometer border with India crossed fifty-four shared rivers, from which China, Nepal, and India can all divert water before it reaches Bangladesh (Hill 2008).

4. In the 1960s the average annual daily minimum flow was 1,920 m³/s. The construction of Farakka Barrage reduced the flow to 920 m³/s; in the 1990s it dropped again to 425 m³/s (Z. Khan et al. 2015b, 35).

5. These narratives to justify aquaculture to "feed the population" continue to this day. At the international conference described in chap. 2, a *bideshi* presenter suggested, "Aquaculture must more than double by 2050 to satisfy the projected demand for fish and South Asia is the hotspot for this." The statement was directly contested by the Bangladeshi in the audience and a few hours later, the secretary at the Ministry of Fisheries and Livestock asked: "Who is responsible for the coastal zone? Bangladesh is earning foreign exchange by exporting shrimp. We produce *bagda* [tiger prawn], but do we ever taste it?" Aquaculture may produce higher yields in the short term, but most Bangladeshis are unable to afford and eat *bagda*. The global trend to increase fish production through aquaculture may in fact reduce both the availability of, and access to, the wild capture fisheries so essential for the poor. In addition, it uses scarce land resources to produce cash crops for exports, land that could have been used for agricultural and cereal production, thus undermining local food availability. I will return to this subject in chap. 4.

6. Lewis (2011, 152) further points out that the Bangladesh government's Poverty Reduction Strategy Papers favored *bagda* for exports over *golda*.

7. For a comprehensive review and discussion about supply chain governance, agrarian transformation, and the role of certifications of commercial aquaculture globally, see Saidul Islam (2014).

8. Saidul Islam (2014) suggests that it is a myth that shrimp farming causes greater salinity than paddy farming. While this may be the case for freshwater *golda*, it is not the case for brackish *bagda*.

9. As Bakul points out: "Instead of looking at what made the embankment break, they [donors] are now blaming climate change for the salinity in these areas."

10. *Khal dakal* remains a serious problem in Bangladesh irrespective of aquaculture. As the canals also silt, landowners may fill up canals to extend their own landholding (Daily Star 2020).

11. Cultivation requires significantly less on-farm labor (Swapan and Gavin 2011). While Islam suggests this is a “myth,” the survey I conducted in Nodi made it clear that local people were not hired to work in the *ghers* because of risk of theft, and that the work is less labor intensive than paddy cultivation.

12. See Pokrant (2014) for a longer history of the importance of fisheries for rural Bangladeshis. Many of the rural poor had access to various common pool resources (community ponds, tanks, seasonal beels, ditches and canals; 109).

13. Marx’s primitive accumulation describes how private owners take publicly owned land and enclose it, expelling existing claimants and later releasing these once public resources as private capital (Fairhead, Leach, and Scoones 2012). Marx refers to how the English state enclosed common natural resources (“the commons”) and forcibly deprived English peasants of directly accessing a means of production. He argues that this was a point of departure for a capitalist mode of production, hence the term “primitive” (original, or *ursprünglich*) accumulation (Marx 1976, 873–95, cited in Hall 2012).

14. Harvey’s ABD extends Marx’s primitive accumulation by incorporating global capitalist financial processes after 1973 and sees it as an economic process of overaccumulated capital finding new outlets, where appropriated land and nature is converted into financial investments and speculation (Hall 2013, 1593–95).

15. Harvey’s concept of ABD presumes that the expropriated resources are initially owned or held by the dispossessed groups (Adnan 2013; Lerche 2011). However, empirical studies in Southeast Asia (Hall 2012; Schober 2016) and South Asia (Adnan 2016; Ahasan and Gardner 2016; Gardner and Gerharz 2016) highlight the complexity of rural property relations, where the transfer of land from one group of users to another is often incremental, politicized and shifting over time. For example, Nielsen (2010) highlights the near consensus of a wide variety of actors and interests in West Bengal supporting land acquisition for a Tata car manufacturing factory in the name of “social development” and local jobs.

16. See Pokrant 2014; M. S. Hossain, Uddin, and Fakhruddin 2013; A. Ali 2006; Shahid and Islam 2003; Deb 1998; Hill 2008, 179; A. Rahman 1994, 23) for details on the agroecological and biodiversity consequences of brackish aquaculture.

17. Paprocki and Cons (2014b, 16–17) suggest that Polder 22’s relative independence from industrial agriculture has facilitated the survival of peasant agriculture. However, they also note how most landless people are unable to recover costs from sharecropping in rice cultivation because of the expenses of buying seeds and “other inputs” (15–16). Indeed, high-yield rice seeds and agrochemicals are capital intensive products that are integral to the global industrial food regime (chap. 4). Freedom from *bagda* does increase local food supplies, but may not necessarily result in freedom from neoliberal food regimes.

18. According to Noshima, single women often collect *kurte* instead of buying rice to save money, but in Lonanodi the *gher* owners forbid them from entering the fields, instead selling the *kurte* to businesses.

19. See also Pokrant (2014) and Veuthey and Gerber (2012, 614).

20. In contrast to Jalais's (2010a) suggestion that prawn-fry collection empowers women in the Indian Sundarbans both economically and socially, enabling them to challenge existing patriarchal norms, women from landless households (like Noshima) struggle the most because of the tiger prawn's negative impact on food availability and employment opportunities (Guhathakurta 2003). This illustrates the different scenarios in the more saline islands of the West Bengal Sundarbans when compared with Nodi, where agriculture is possible.

21. Noshima catches shrimp fry with *current jal*: a synthetic blue fishing net prohibited by law. She sells these wild fry (less prone to disease and whitespot virus) to hatcheries and gher owners. When I asked about bycatch, she replied that they cannot sort out all the different fry next to the river and take the bucket home where they save the *bagda* and *golda* fry, then throw away the rest. "We cannot spend an hour to go back and forth to the river to return the other fry."

22. Wild fisheries are also under threat from overfishing by commercial trawlers. The number of fish and fish species have been further reduced by embankments, the siltation of canals, dams, flood control, and pollution (Van Schendel 2009).

23. I discuss how *bhejal* is tied to the commoditization of food for profit in chap. 4.

24. "The abundance of fish afford a supply almost attainable to every class, and in the Ganges and its innumerable branches are of many different kinds. Their plenty at some seasons is so great that they become the ordinary food of the poorest natives, who are said to contract disease from too liberally indulging themselves" (Hamilton 1815, 122).

25. From 2006 through 2008, an interim caretaker government was responsible for managing Bangladesh's state affairs until parliamentary elections were held. See Lewis (2011) for further details.

26. Local Bangladeshi NGOs actively supported grassroots movements that opposed tiger-prawn cultivation and its associated human rights abuses. In January 2012, the High Court of Bangladesh ruled that salinity intrusion and the expansion of saline tiger-prawn cultivation water infrastructure were illegal.

Chapter Four

1. Cullather's historiography traces the role of the "calorie" and the various historical developments forming the spread of the modernizing Green Revolution across the Global South to counter a red communist revolution.

2. The colonial reform agenda focused on intensifying cultivation rather than changing technologies. Hunter (1875) highlights the use of local agricultural tools and the importance of cow dung as a supplement to the fertile silt deposited during the monsoon season.

3. Yields were around twenty *maunds* per acre, 6.67 *maunds* per *bigha*, with no cost for seeds or livestock manure (Lahiri 1936, 37). Compare this with the yield of around fifteen to twenty *maunds* per *bigha* of HYV BR-23 with agrochemicals in Nodi today.

4. Despite droughts and famine, Viceroy Bulwer-Lytton insisted that nothing should prevent the export of rice and wheat to England. Even as millions died, he concentrated on preparing for Queen Victoria's investiture as empress of India. The highlight of the celebrations was a week-long feast for 68,000 dignitaries (Davis 2007, 26–28).

5. Cullather's book provides a deeper understanding of the global geopolitics of the Green Revolution, especially the key actors and institutions. IRRI and its sister organizations became part of the CGIAR system (Consortium of International Agricultural Research Centers). The latter was founded in 1971, and included OECD members, the Asian Development Bank, World Bank, Inter-American Development Bank, International Development Research Centre, Ford Foundation, Kellogg Foundation, Rockefeller Foundation, the FAO, and UNDP (CGIAR 2016).

6. In Nodi, there was minimal *boro* rice cultivation, thus few farmers who grew water-intensive crops during the dry season. For more details on the negative environmental effects of groundwater irrigation, see Sultana and Thompson (1997); Rasul and Chowdhury (2010); Hill (2008); Whitcombe (1995); Khan (2003); Swain (1996); and FAO (2011, 151–62).

7. Millions of tube wells have never been tested for arsenic contamination (A. H. Smith, Lingas, and Rahman 2000), which is present both in drinking water and tube well irrigated crops (Chandrasekharam 2004; Swain 1996). Some 85 million people in Bangladesh are at high risk of developing deadly arsenicosis symptoms (M. S. Islam 2016), while consumption of water with high levels of arsenic can result in lung, bladder, and skin cancers (A. H. Smith, Lingas, and Rahman 2000).

8. For more information see Alauddin and Tisdell (1991, 263); Zaman (2000); Miah (2000); Naseem (2000); Mulvaney, Khan, and Ellsworth (2009).

9. Fupu once owned several hectares of land that she inherited from her father. I was surprised as her family now has no property other than their homesteads, located next to Hassan's home. Fupu, along with many others, lost land with little compensation in the 1970s, around the time of the war of independence. Old and without income or property, Fupu was no longer seen as useful and received little support from her sons. Fupu passed away in December 2019, and I am deeply indebted for the time, wisdom, and care she shared with me throughout my fieldwork.

10. BR-23 is a high-yielding variety that arose out of two early deep-water rice varieties in the mid-1980s: BR4 (Sheshu, Malabanan, and Mallik 1988) and DA29 (Bangura and Goita 1988). It is one of the few varieties that is tall enough to withstand the salinity and relative high floods in the embanked and low-lying southwest coastal zone (BRRI 2020).

11. Growing more than thirty varieties entails greater diversification of risk amid today's varying and unpredictable weather changes. Thus, promoting several different types of *desi* varieties could actually help Bangladesh prepare for future climatic risks.

12. Recent research published in *New Scientist* reveals how modern agriculture is increasingly cultivating less-bitter varieties to accommodate the palates of consumers, while, in fact, this very bitterness indicates a richness in the chemical phytonutrients that help the body function properly and help prevent disease by including antioxidant, anti-inflammatory, and liver-health properties (Zaraska 2015).

13. Mainly based on informants from the DAE, BRRI, IRRI, BARC, and FAO.

14. He further explained: “A plant requires seventeen different nutrients. Fourteen of these are micronutrients: calcium, sulfur, magnesium, zinc, manganese, copper, iron, boron, molybdenum, chlorine, nickel, sodium, cobalt, and aluminum. Three of these are macronutrients: nitrogen—what we call urea—phosphorus (TSP), and potassium (potash, MOP).”

15. In Hinduism, *shakti* is the primordial cosmic energy that gives birth to the universe, and is also worshipped as the mother goddess (Lowitz and Datta 2004, 111).

16. The ethnology of India allowed a space for local knowledge systems to be evaluated in their own terms versus prevailing ethnocentric and orientalist approaches to India (Marriott 1991; Dirks 1989), but it is criticized for being ahistorical, apolitical, and essentialist as it studied rural society as a microcosm of the Hindu universe (Vasavi 1999). See also Moffat (1990).

17. He added: “But to be honest with you, it is not good that we cultivate a second crop with irrigation. It is better that the land lies fallow so the soil can recover, and we can rear cows again. These development projects should stop the cultivation of a second crop and promote *desi* rice varieties and help people to rear cows. But it is a problem now, we are too many people.”

18. Toxic residuals occur when pesticide is applied and sold without regard for the maturation time prescribed. The extensive problem of pesticide residues and how frequently they are above maximum residue limit has been the focus of several studies analyzing vegetables including (M. W. Islam et al. 2014; Barański et al. 2014; M. A. Islam, Islam, and Hossain 2015; A. Z. Chowdhury et al. 2014; M. A. Z. Chowdhury et al. 2014; Taylor et al. 2003). Furthermore, reports of similar problem appear prevalent in India (Times of India 2015)

19. Even those with relative wealth living in urban areas had a hard time avoiding *bhejal* foods unless they had access to rural lands where they could hire someone to grow food without chemicals, thus evading market intermediaries.

20. Already in the early 1990s, scholars and activists warned that the use of agrochemicals can reduce species diversity, upset the ecological balance, and stimulate the development of pest populations by killing nontarget populations beneficial to human beings. They also warned that fisheries are affected and that residual pesticides may cause human health problems (Alauddin and Tisdell 1991, 275; Shiva 1991).

21. The main means for landless people to acquire rice is either to grow the rice on leased land (*bandhok*), by sharecropping (*bhag*), to work as a wage laborer to obtain rice as a payment in kind, or to buy it.

22. For ethnographic details on the illegal kidney and liver lobe trade, see Moniruz-zaman (2012; 2019).

Chapter Five

1. Because of the low wages of public healthcare professionals, many doctors have a “chamber” at the public institution where they are employed where patients come for private consultations after working hours.

2. Sheikh Mujibur Rahman's administration was accused of corruption and poor decision making. He did not heed the advice of the prime minister, Tajuddin Ahmed, and created a one-party system as well as a paramilitary unit called the Rakkhi Bahini, which the public perceived to be brutal and which engaged in torture and rape (Karim 2011; Lewis 2011).

3. This entailed import liberalization, quota restrictions lowered from 42 percent of imports to only 2 percent of imports by 1996; the creation of export-processing zones and duty-free subsidies; a ten-year tax exemption and exemption from income tax on interest for foreigners; duty-free import of machinery, raw materials, and construction materials; and duty-free export of foods produced in the zones (Tait 2003).

4. While "good governance" originated among African scholars in relation to making state-society relations developmental, democratic, and socially inclusive, the term was taken up by international institutions, including the World Bank, as a new label for aid conditionality. Good governance became a way to suggest that bad governance, or corruption, was why SAPs failed (Mkandawire 2007, 679). This view of the state assumes that markets would be able to succeed where states failed because of corruption, and that anticorruption reform of market-enabling institutions would reduce transaction costs and increase market efficiency. However, critics argue that this anticorruption focus in practice meant reducing the state's capacity to intervene in general (M. Khan 2004) and contributed to pervasive state failure, paradoxically creating a vacuum and producing an environment within which widespread corruption could flourish (Onis and Senses 2005).

5. The precarious situation faced by Lakshmi and Karuli gives credence to Chant and Sweetman's (2012) argument that women, individually and collectively, acted as buffers to the fall out of SAPs: rising male under-or unemployment, falling purchasing power, and scaled-down public-sector service provisions. Under SAPs, women were expected to substitute for the failure of state institutions to provide health, education, and other services for their citizens (Elson 1995) and to make ends meet in an era of high and increasing unemployment (Chant and Sweetman 2012).

6. Similar dynamics are also happening outside of South Asia, as illustrated by Mains's (2007) ethnography of young men in Ethiopia and Honwana's (2012) case study on the lived experience of failed neoliberal economic policies among young men in Mozambique, Senegal, South Africa, and Tunisia.

7. Hindu interlocutors suggest that their marriages rarely resulted in divorce, unlike their Muslim neighbors.

8. This social shift has been taking place for several decades. Alauddin and Tisdell's (1991, 161) analyze the greater penetration of capitalist market forces in rural Bangladesh and state "the traditional 'sharing ethics' at the local and community levels may have been or are gradually being replaced by egocentric considerations characteristic of more individualistic societies."

9. A tally of my survey suggests that half of the sons are taking care of at least one elderly parent.

Conclusion

1 Cyclone Amphan hit the Satkhira District the hardest. Weak embankments in many tiger-prawn producing areas broke completely at the height of the saline dry season—for agricultural areas the saline incursion was particularly devastating. Khulna and Nodi were thankfully spared as the Sundarbans mangrove forest greatly reduced the impact. While migration in the wake of this natural disaster could be portrayed as “climate-induced,” it also points to the importance of embankments in protecting land from dry season saline incursion and cyclonic events. Yet 150 kilometers of embankments were broken at eighty-four points in thirteen districts (IFRC 2020), illustrating how embankments, whether because of storms or regular river erosion, require constant, institutionalized maintenance and repair. Migration in this area is complex and multifaceted (Dewan, in review) and was further affected by Covid-19 lockdown policies nationally and abroad.

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