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The Mangrove Walks: An Econometric Analysis of Climate Migration Drivers from Coastal Bangladesh and their Geopolitical Impacts

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Geography

by

Kendall Scott Byers
University of Arkansas
Bachelor of Arts in
Middle Eastern Studies and International Relations, 2009

August 2022
University of Arkansas

This thesis is approved for recommendation to the Graduate Council.

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With invaluable guidance from Professors Aaron Shew and Ted Holland. Thank you for pointing me in the right direction and encouraging me forward. Thanks to Professor Lawton Lanier Nalley, who ruined a week in June in beautiful Mauritius on my behalf.

To Intervarsity Christian Fellowship, Christian Graduates Fellowship, the Junior Explorers Club, M. (my dearest distraction), and the frENDYs, for keeping me rooted in the real world, which was my greatest joy in all my studies.

I never would have delved into this issue without the friendship of numerous Bangladeshi migrants I met within Nizamuddin West—the *chaiwallah*, the *dergah* servant among them—nor would I have glimpsed inside this world without my Delhi host family and Urdu teachers, the (Alvi) Khan brothers of 2015. *Aapke karj main hoon. Hamesha.*

Foreword

From 2012 to 2015, I worked for an Urdu language and culture homestay program in an Indian metropolis. As my ears began to make sense of the voices of the bustling and heady multitudes, so did society's anthropology unwind into many strands of belief, praxis, ethnicity, and clan; like gathering with like. A world apart from them all were the Bangladeshis.

Distinguished by their fervent hospitality and keen conversation, Bangladeshi migrants in my neighborhood became my closest friends as they quietly shared glimpses of their life stories to me over chai and fried veg *pakora*, hinting here and there at their perhaps less than legal immigration status keeping them from going back, even once, to the land of their birth. Sometimes they would tell me stories of heartbreak they never shared with their own kindred. The greatest need of the nameless, it seemed, was to be named, heard, and known.

I suppose I am still trying to make their stories known today. Dr. Aaron Shew granted me use of data from a survey of Bangladesh's polders and guided me to let the data tell the story of why so many from Bangladesh leave, never to return. The rising seas just south of Bangladesh menace the land, and the crumbling earth no longer supports the feet atop it. The data tell the story of how society's divisions reinforce the dangers of the changing world environment. The environmental drivers for migration seem to strike in every country along society's fault lines. This led me to wrestle with the headlines of nativist hostility worldwide. Climate migration from Central America coincided with America First politics. India, my second home, rumbles more and more with ill portents for its Muslim minority, initialized by the unauthorized cross-border movement of Muslim laborers. Among those in the crosshairs are the many Bengalis, some properly documented, some less so, who I counted on in confidence as my closest friends in Nizamuddin Basti, Delhi.

It is my hope that uncovering the link between climate and migration will spur us to consider our own policies towards those driven off their land by the desperation of climate-change induced poverty, insecurity, and war.

As famed Indian author and opposition activist Arundhati Roy writes,

"Another world is not only possible; she is on her way. Maybe many of us won't be here to greet her, but on a quiet day, if I listen very carefully, I can hear her breathing."

Dedication

To the Byers family and *Khuda*: I am in your debt of grace.

Table of Contents

Chapter 1: Signposts

The aim of this thesis is to dive deeply into a climate-vulnerable human population to determine the strength of environmental drivers of migration and discern whether planned or catastrophic migration is now predominantly occurring.

Chapter two comprises the background and quantitative analysis. The chapter begins with the scale of the climate migration issue, the importance of the study area in Southwest Bangladesh, the theorization of environmental migration, source data provenance, data description and conceptual-empirical model for econometric analysis. What follows is a discussion and analysis of the most significant migration drivers.

Chapter three unpacks an unexpected result of the study: the chief salience of religious affiliation for migration decision. I theorize why religious affiliation appears to be a strong selector for emigration in the study area within Bangladesh. This chapter connects the local issue of religious differences in household capacity within our study area with the structural geopolitics surrounding the immigration issue regionally. Religion is highly politicized in South Asia.

Chapter four explores the political impacts of the global climate migration issue by focusing on migration from Bangladesh to two Indian border states. I apply the framework of host-migrant proximity to the two largest receiving areas for Bangladeshi migrants across the Indian border, Assam and West Bengal states. These proximities help explain the history of the presence/absence of nativist political violence against Bangladeshi immigrants and the recent instrumentalization of religious identity for citizenship in India. I discuss the purpose and impact of India's border militarization and how, more broadly, it represents an increasingly popular authoritarian response to global climate migration. I connect climate, conflict, and

authoritarianism, concluding with a brief discussion of state versus civil society roles in the crisis.

Chapter 2: Econometric Analysis of Bangladesh Polders

1. Introduction

Over 105 million people live in the Ganges Delta, more than 8 million of whom live on polders constructed by Bangladesh through a national campaign for flood defense in the 1960s (Edmonds et al., 2020; Mainuddin et al., 2021). These artificial islands (polders)—all less than 10 meters above sea level, many beneath it—house a population that may be the world's most vulnerable to climate change. Cyclonic deluge, sea level rise, increasingly erratic monsoons, drought, and salinification are the backdrop to a stark rise in emigration, even as Bangladesh seeks to bridge a yawning gap in rice imports by prodding—and funding—farmers to stay on the polders.

Through an econometric analysis of a 2016 USAID cross-sectional survey of a thousand households living on the polders, I ascertain the environmental pressures influencing emigration and identify the magnitude of their effects. I gauge the power of these forces against those of key socio-economic push and pull factors to determine whether the resident populations are in the midst of planned or catastrophic environmental migration.

1.1 The Scale of Climate Migration

Climate-driven migration is the current and worsening reality of the 21st Century. In the last decade, 21 million people each year were forcibly displaced by climatic hazard worldwide (The White House, 2021), and ten times that amount are projected to move by 2050 (Rigaud et al., 2018). South and East Asians comprised 85 percent of those affected by climate displacement in 2015 alone (The White House, 2021).

Migration is no geophysical process but rather a social phenomenon of risk perception and community response (Adger et al., 2021; Z. Ahmed et al., 2022). Environmental impacts tend to increase already existing migration flows while exacerbating social inequalities inherent in societies sending and receiving migrants. The dynamic interplay between economic, political, demographic, social, and environmental drivers, and the complex social trends emerging therefrom, generate migrant outflows from an affected area (Black et al., 2011). Climate scientists have recently identified the 339 million people living on river deltas worldwide as those most exposed to the climate impacts, 97% living in least-developed economies, 89% in the latitude of most tropical cyclones, over 105 million of whom live on the Ganges-Brahmaputra delta shared by India and Bangladesh (Edmonds et al., 2020). 86 million or more have moved into the high-risk zone between 2000-2017: the number of at-risk people is likely only to increase within the next decades, even as the intensity of climate impacts increases ever more (ibid., 4).

Emerging climate research shows, increasingly, that climate change amplifies global conflict through the economic *price signal* of food: the decreased productivity of land, the sudden ejection of rural populations to the cities, and the public's intensified reliance on ever-pricier government subsidies to manage the precipitous rise in food prices, triggering unrest against the state and even against perceived immigrants whenever the price of staple foods climb out of reach for the working poor (Buhaug & von Uexkull, 2021; Koubi, 2019; Petrova, 2021; Wischnath & Buhaug, 2014). By 2100, for example, India is projected to become the most populous nation at the same time as its key staple crop yields in rice will decrease by a sixth, wheat by a fifth, and lentil by a quarter due to hotter climates (Birthal et al., 2014). Within present-day India, we already see mass protests against lifting agricultural subsidies and episodes

of increasing mob violence channeled along religious and communal lines (Ayyub, 2021; Iffat, 2021; Oza, 2007; Wischnath & Buhaug, 2014; Ziegler, 2013). Climate change intensifies the price signal of farm failure, food price increase, migration, and conflict. It will be vital to grasp the systemic linkage of agricultural stress and emigration stemming from climate change in the oncoming decades. Global climate migration models predict South Asia alone will host 40 million internal refugees—predominantly failed agriculturalists—with Bangladesh the foremost nation affected worldwide (Rigaud et al., 2018).

1.2 Why Bangladesh Matters

Half of Bangladesh's people live in a Low Elevation Coastal Zone (LECZ), no higher than 10 meters above sea level, at high risk of displacement by the rising seas and more intense storms predicted in future CO_2 emission scenarios (J. Chen & Mueller, 2018, 2019). The increasingly unseasonable Southwest Asian Monsoon will bring simultaneously greater flooding to Bangladesh and greater propensity for drought, resulting in increased salinization of land as seawater from the Bay of Bengal intrudes upriver in the dry season, catastrophically eliminating crop productivity (Cornwall, 2018; Islam et al., 2019; Khan et al., 2021; Mainuddin et al., 2022; Mondol et al., 2021; Schwartz, 2021).

Bangladesh's population is enormously concentrated in areas of risk. Comprising 165 million, just over half the population of the USA, in a country the size of Iowa, about two-thirds of Bangladeshis reside in rural areas, a density of 1,200 people on average per km^2 (Shew et al., 2019, World Bank 2020). Despite its hundred-million-strong workforce farming in the world's fourth-largest rice producing country, despite half of its population engaged in rice cultivation, Bangladesh has never been self-sufficient in this vital crop and is experiencing a widening import gap, along with record high prices (FAO, 2017; Shew & Ghosh, 2019). A recent study by

Khan et. al (2021) estimated that 4.1 million Bangladeshis were displaced by climate disasters in 2019, 13.3 million could be displaced by 2050, and 18% of its coastland will disappear underwater by 2080 (Khan et al., 2021). It is for these reasons that both the Intergovernmental Panel on Climate Change (IPCC) and the World Bank have identified Bangladesh as the most vulnerable, exposed, and least climate-resilient country within Asia (Rigaud et al., 2018).

1.3 Khulna's Polders and Our Study

Along the southern coast of Bangladesh lie 139 polders, 3 million acres of artificially embanked islands raised above the sea by Bangladesh's Coastal Embankment Project (CEP) in the 1960s and 70s to guard the Ganges-Brahmaputra river delta from salinity, storm, and seawater (Assefa et al., 2021; Mondal et al., 2006; Yadav et al., 2020). The estimated 8 million farmers who work the soil of these polders are on the ramparts of climate change, a major focus for agricultural intervention in order to tighten the rice yield gap within Bangladesh (Cornwall, 2018; Shew et al., 2019).

The polder region is the least intensified and least productive of Bangladesh's rice-growing regions: the prime agricultural intervention area by the central government to stabilize the systems of internal canals, sluice gates, and local cooperative water management groups to increase agricultural productivity (Assefa et al., 2021; Yadav et al., 2020). In the past decade, Bangladesh has partnered with the Dutch Government to sponsor intervention within the vulnerable southwest polders through "Blue Gold," a local cooperative water management organization, in the process commissioning a 2016 cross-sectional survey in three polders ("Number 28/1," "Number 28/2," and "Number 30") before undertaking the revitalization of physical and social hydraulic management infrastructures (Thomas, 2020). This three-polder survey is our source data for analysis.

This 2016 cross-sectional survey, funded by the United States Agency for International Development (USAID) and conducted by teams from the International Rice Research Institute (IRRI-Philippines) and the International Water Management Institute (IWMI-Sri Lanka), focuses primarily on economic health and rural infrastructure performance but includes numerous questions on climate change impact perceptions and migration. A 600-question snapshot of 1,025 households in three polders of Southwest Bangladesh, the survey represents an in-depth view into the nature of ongoing climate migration decisions among the world's arguably most climate-vulnerable people.

Policy stakeholders are increasingly facing the problem of vulnerability directly: the Government of Bangladesh allocated $1 billion of its 2018-19 fiscal year budget to directly address the climate change threat (Ravi, 2021). There is a significant role for scientists to advise policymakers by providing an in-depth characterization of migration drivers within highly vulnerable agrarian districts that will be the most likely to experience mass emigration in the coming decades (J. Chen & Mueller, 2019). Understanding climatic drivers of migration, and how they align with socioeconomic capacities, helps decisionmakers enable migration of choice and ameliorate catastrophic unplanned migration. The findings of this paper's analysis should shape future IRRI / IWMI interventions and Government of Bangladesh funding priorities within the vulnerable coastal region to minimize catastrophic and maximize planned migration.

We now turn to the distinction in the two and describe the theorization undergirding our hypotheses and methods.

2. Theorization

2.1 Migration Theory: New Economics of Labor Migration & Capability Theory

We base our analysis on the migration theory of the World Bank's 2018 Groundswell Report team, which relies foremost on both Stark and Bloom's New Economics of Labor and Amartya Sen's Capability theories of migration (Bonfanti, 2014; Hamilton, 2019; Massey et al., 1993; Rigaud et al., 2018; Sen, 2000; Stark & Bloom, 1985). We also utilize Jon Barnett's concept of climate maladaptation to situate desirable versus undesirable channels of migration (Barnett & O'Neill, 2010).

Our theorization informs our analysis by concluding that a) *households are the basis* for decision-making, b) *income risk reduction strategies are the primary motive for migration* from our study area, c) there are *empirically measurable economic indicators distinguishing between migration of choice and forced migration,* d) our study area population has *distinct climate vulnerabilities* based on its social and environmental capacities, e) acute, *fast-onset disasters* (storms and floods) will tend *to reduce emigration* while *slow-onset disasters* (soil salinization, crop pest infestation, drought) will *generate emigration*, through the prime mechanism of systemic agricultural degradation, and f) *planned migration is preferable to catastrophic migration* as it reduces maladaptation through *preserving household wealth* rather than destroying it.

This theorization guides the aims of our analysis to measure the current magnitude of slow-onset climate migration effects within the coastal Bangladesh study area. As we will see in the next section on data description, our analysis contributes to the wider research by intensively analyzing a high-emigration population in a medium-salinity agriculture area. Its impact is to

identify the distinct climate vulnerabilities of the polder zone in Bangladesh, providing a sharper focus for policymakers to address the drivers of, and ameliorate, climatically forced migration.

2.1.1. The Contribution of the New Economics of Labor Migration Theory: Migration is a Household Risk Reduction Strategy

Stark and Bloom's New Economics of Labor Migration (NELM) theory argues that migration is not a self-determined but rather a community decision due its attendant high costs and risks (Massey et al., 1993). To reflect the power of community decision, our analysis considers the household head the primary decision-making unit. NELM assumes that the household collectively chooses to maximize combined household income in order to reduce the risk of an income loss (Assaduzzaman et al., 2020), calibrating the risk calculus to the economic barriers of various forms of migration. Permanent migration abroad has the greatest risk, so we must assume that mass migration is not the chief modality of environmental migration: more often, families facing economic pressures from environmental causes will opt for seasonal, short-distance, or domestic urban migration (J. Chen & Mueller, 2019; Cundill et al., 2021; Kaczan & Orgill-Meyer, 2020).

NELM theory fits the quantitative findings of researchers Chen and Mueller that migration from coastal Bangladesh is rarely across national borders, frequently seasonal rather than permanent, and often not geographically distant from the (materially poor) communities of the coast, primarily due to the prohibitively high up-front financial and educational costs and the income uncertainty regarding cross-border, permanent moves (Gray and Mueller 2012; Chen et al. 2017; Chen and Mueller 2018, 2018, 2019). Households prefer to minimize the risk of income loss in funding migration; high-stakes international migration frequently costs much and has a longer lead time until migrant earnings return to the sending family (Bonfanti, 2014;

Chakraborty, 2018). Domestic migration, primarily to urban centers, is as comparatively low in cost and risk as a train ticket or a bus ride. Lower costs influence higher numbers, and internal migration is estimated to be at least three times higher than international migration (de Sherbinin 2020), attracting greater weight in the Groundswell Report's climate migration modelling (Rigaud, et al. 2018).

Why does NELM theory matter for our study? NELM implies that the basic decision-maker is *not the one who migrates*, but is rather the household holistically, and moreover, the influence of the household head in decision-making—and chiefly the father, as South Asian societies like Bangladesh are constituted patriarchally—weighs heavy upon a decision to migrate (Rabbani et al., 2015). It follows that the capacity of the household head to make informed decisions matters a great deal for earnings at destination. The questionnaire used to obtain source data for our study, accordingly, characterizes households as the basic unit of family data (not the individual) and targets the chief stakeholder, the household head. Our analysis focuses on the household head's attainment status as a key marker for greater opportunities available to a migrating family member. Towards environmental risk, the questionnaire also asks about *household* perception of environmental hazards, assuming that migration is a response to an increased household perception of hazard, a household income risk reduction decision (Assaduzzaman et al., 2020).

2.1.2. Capability Theory: Migration is No Evil, Rather, the Constraint of Choice Is

The ability to adapt to environmental risk through migration is the concern of the Capability Approach (Sen, 2000). Economist Amartya Sen asserts that migration is objectively neither good nor bad on its face. Migration can enhance a migrant's economic outcome or it can liquidate costly assets and reduce a migrant's status (Bonfanti, 2014). For Amartya Sen, the

choice to move or not, and the *capability* to *convert* the *opportunity* to do so into a realized decision, is the bright line between freedom and bondage (Sen, 2000). Sen says, in short, the freedom to choose whether to stay or to go is sacrosanct. He successfully advocated that individual agency should be the foremost aim of developmental policy frameworks: today, the Capability Approach is the basis for international frameworks such as the Human Development Index championed by the UN and the World Bank (Fukuda-Parr & Hulme, 2011). The utility of the Capability Approach lies in permitting the probabilistic, rather than deterministic, response of humankind to a migration opportunity—human agency is paramount in the science of risk—exhorting policymakers to enable the breadth of migration response rather than enforcing either immobility or relocation (Bonfanti, 2014). Due to the unavoidable randomness of human agency regarding migration decisions from our study area, we use a probabilistic "probit" regression measuring what factors enhance the likelihood, not inevitability, of migration. As we see in the next section, not actual but *perceived* risk of income loss is the primary driver of climate migration. Environmental risk is a socially amplified phenomenon. Migration is a social, not a geophysical, phenomenon (Black et al., 2011).

To Alex de Sherbinin, a co-author of the Groundswell Report and proponent of the Capability Theory, there is a "mobility continuum" with forced displacement (e.g. the Syrian Civil War) at one end and opportunity migration (e.g. the Dakota Shale Boom) on the other, both quantifiably different at either end (de Sherbinin 2020). Refugee-like circumstances are marked by decidedly low "volitionary capacity" due to the lack of what Capability Theory calls *conversion factors*, meaning social and material capital that can be converted into mobility decisions. Overlaid upon them all are both systemic barriers and facilitators to movement. These inhibitory/catalytic frameworks can be *macro*-systemic (e.g. the decadal drought of the Dust

Bowl 1930s), removing volitional capacity from nearly all people of a region; frameworks can persist on a *meso*-scale (the clan networks of the Ulster Scots when moving to the New World of the 1700s, Stalin's 1933 *Holodomor* trapping Ukrainians into mass famine), affecting one particular class, race, religion or ethnicity; and lastly frameworks can be *micro*-scale, situations which one particular household finds itself inheriting (such as a landowning grandfather, or heirloom jewelry), enabling a *conversion* into, say, train tickets or a potential well-paid job elsewhere for a migrating family member (Assaduzzaman et al., 2020; Black, Adger, et al., 2011b; Snyder, 2010; Woodard, 2012).

Assaduzzaman and Black among many others assert that the forced migration channel predominates among poorer societal strata due to lack of conversion factors. Migration of choice is only available for those who surpass the crucial threshold of wealth that enables pre-planned migration. Often the bright line separating society's middle from its poor is the ability to surmount the hurdle of generational poverty, in many cases, the *de facto* serfdom of tenant farming which chains the poor to the land by their debts (Assaduzzaman et al., 2020; Black et al., 2011). Tenancy factors into our analysis of migration.

Forced migration and migration of choice will be evident in our analysis by their attendant markers of freedom (cf. shortage of food, degree of perceived climate-induced land degradation, income level of family, number of male adult earners, salary/pension as proxy for income stability). In close parallel are the concomitant markers of migration earnings potential (cf. education of migrant, urban or rural destination, and whether they are earning an agricultural or non-agricultural wage) which indicate better opportunities.

What determines the difference between forced and opportunity migration is frequently the climate vulnerability of a community, roughly defined by its exposure to environmental

hazard minus its physical and social capacities to withstand it. Understanding the *climate vulnerability*—the degree of exposure and the socio-economic capacities of resilience—of our study area enables us to estimate a possible climatic "tipping point" beyond which catastrophic migration becomes inevitable, and migration of choice is no longer possible.

2.2 Climate Vulnerability, River Deltas, and Slow Versus Fast-Onset Disasters

The IPCC pioneered the framework of "climate vulnerability" to prioritize communities such as Bangladesh that stand most squarely in the face of predicted, recurrent environmental disasters. Climate vulnerability is a function of a community's exposure to potential environmental disasters minus the social and material capacities to rebuild within the community in question (Barnett, 2020). For Degroot, a community's *resilience* need not only be material, but also social, "absorbing" environmental impacts "without losing the fundamental features and shape of the system as a whole" (Degroot et al., 2021). As such, the environmental exposure of a community needn't be the supreme concern unless the society is also sensitive to impact. The Mississippi Delta has a $14 billion post-Katrina levy system defending its population; the oil-blackened Niger Delta does not (AP, 2021; Ratcliffe, 2019). Communities are climate sensitive when they lack social and material safety nets in the form of insurance, assets, infrastructure, and the like; in short, the most climate-sensitive are the world's poor—a high percentage of the 300 million people who live on river deltas like Bangladesh—remain sensitive and therefore vulnerable to the increasing tempo and magnitude of climate-linked environmental disasters (Edmonds et al., 2020).

Exposure in our study area is reflected in four climate-change-linked environmental risk perceptions: frequency of flooding, frequency of drought, frequency of insect/disease outbreak, and perceived crop loss due to soil salinization. *Sensitivity* appears in relation to infrastructural

robustness and income stability. And *resilience* is reflected in our inclusion of key socioeconomic factors related to risk-sharing networks. These three factors compose a community's adaptive capacity. A community's adaptive capacity to climate change is modulated, in addition, by slow- and fast-onset environmental disasters which often have opposite effects on emigration.

Slow-onset disasters (e.g. droughts, soil salinification, sea level rise, increasing temperature extremes) are fingerprinted by the literature as the most powerful environmental drivers of migration (Black et al. 2011; Chen et al. 2017; Rigaud et al. 2018; Kaczan and Orgill-Meyer 2020; Khan et al. 2021; de Sherbinin 2021). Counterintuitively, rapid-onset disasters (cyclones, floods, and wildfires inter alia) tend to *decrease* migration as household resources which would otherwise fund potential migration is exhausted and extra labor is needed to rebuild, an observation ground-truthed by Chen and Mueller in Bangladesh repeatedly through remote sensing cross-verified with national census data (J. J. Chen et al., 2017; J. Chen & Mueller, 2018a, 2018b). We expect our research to bear out that *not all environmental effects will increase migration*. Acute, *fast-onset disasters* (storms and floods) will tend *to reduce emigration* while *slow-onset disasters* (soil salinization, crop pest infestation, drought) will *contribute to emigration*, through the prime mechanism of systemic agricultural degradation (Rigaud et al., 2018).

We anticipate that the incidence of flooding, notably prevalent in our low-lying riverine study area, will be the most profound environmental pressure *against* migration. Similarly, any related failure in the functioning of the area's hydraulic management systems should decrease migration as well.

2.3 Maladaptation and Immobility Prioritize Successful Agriculture on the Polders

Lastly, planned migration is preferable to catastrophic migration by preserving household wealth rather than destroying it. Jon Barnett's concept of maladaptation is a useful frame for this idea. Barnett contributes the idea that not all climate adaptation is good adaptation. Maladaptation is an "action taken to reduce vulnerability to climate change that…[nevertheless] increases the vulnerability of systems, sectors, or social groups" (Barnett & O'Neill, 2010). Among other criteria, maladaptation: a) disproportionately burdens the most vulnerable; b) opts for costlier impacts relative to alternatives; and c) limits future adaptation options through high path dependency. In our context, mass unplanned migration from the study area would chiefly flow into big cities such as Dhaka, which are no less sensitive to climate environmental threats (Rigaud et al., 2018; Ullah, 2004). Disproportionately, rural migrants occupy poorly constructed urban slum housing vulnerable to environmental impacts, unrest, and criminal landlords (Adger et al., 2021). Opting for total mass emigration from current agricultural land decreases staple crop productivity, increases food prices, and burdens the state's welfare apparatus to provide greater, more unsustainable food subsidies (Rigaud et al., 2018; Wischnath & Buhaug, 2014). Lastly, the study area of the polders, once abandoned by smallholders, is not likely to admit return. Nordqvist and Krampe note that within the region, seasonal emigration engenders land-capture by rapacious elites who use the law to fabricate land claims and private armies to forcibly establish tenure (Nordqvist & Krampe, 2018). Thomas examines the recent development of absentee land speculators buying farmland in coastal Bangladesh, influencing the adverse operation of sluice gates to maximize salinity for their own export-oriented brine shrimping industry (Thomas, 2020). Market forces may exacerbate perverse incentives for the powerful to introduce negative externalities into our study area.

Ultimately, successful adaptive interventions in our study area will reduce forced migration by targeting the structural factors that limit choice in migration decisions; we agree with Shew, Ahmed and others that the best adaptive intervention to our study area maximizes household income through increased agricultural productivity and enables planned, not unplanned, migration (Z. Ahmed et al., 2021, 2022; Shew et al., 2019). Yet, we must agree with Assaduzzaman and coauthors that "it is not only forced migration that is problematic. A forced option to stay is, perhaps, even worse." (Assaduzzaman et al., 2020).

3. Methodology

3.1. Data Description

This paper seeks to answer the question: "*Is climate change a major driver of migration from our study area in coastal Bangladesh?*" We analyze a 2016 survey of a coastal population of Bangladesh performed by a team from IRRI and IWMI, supported by USAID. The survey, focusing primarily on economic health and rural infrastructure performance, is a 600-question point-in-time snapshot of 1,025 farmers in three polders of Southwest Bangladesh (fig. 1).

We test probable drivers for migration via a probit regression series, allowing us to see how climate pressures are impacting a densely populated low-lying river delta on the edge of a rising sea. As the Brahmaputra-Ganges-Meghna delta comprises one third of the 300 million at-risk deltaic flood-zone dwellers worldwide (Edmonds 2020), results will open a window to perceptions of climate risk and migration response within this vulnerable population.

Our study relies on a probit analysis of migration. In our study, 165 (16%) of our households reported sending one or more migrants away—87% of whom migrated individually. The migrant's mean age was 34 years old. Migration was primarily permanent (57%), with the mean time of migration 3.9 years ago (range: 0.08-8.25 years). Migration has no kilometer-

distance threshold in the survey: having one or more members separated from the responding household within the polder community is sufficient to define "migration." The destination of choice for migrants was not primarily abroad (only 18 members, or 11%), but rather to urban areas within Bangladesh (97, or 59%), with a minority (35, or 21%) moving to other rural areas. Our study, then, characterizes environmental impacts on *primarily domestic, rural to urban migration*. We test each household's economic, demographic, and environmental responses to identify the main factors increasing the odds of migration. The study's toplines are below in Table 1.

Table 1 –Survey Toplines

Variable	**Stats / Values**	**Frequency of Response**	
Polder Number	Polder 28/1	173	16.90%
	Polder 28/2	322	31.40%
	Polder 30	530	51.70%
Religion	**Hinduism**	844	**82.70%**
	Islam	176	17.30%
Household Head's Gender	Female	36	3.50%
	Male	989	**96.50%**
Household Head's **Age**	Mean: ***52*** *years* Std Dev: *14.3*	Min ≤ Median ≤ Max : 16 ≤ 51 ≤ 99 y	
	Inter-Quartile Range: 21.8		
Household Head's **Literacy**	Illiterate	126	12.30%
	Literate	899	**87.70%**
Owns Farm	**Has Plot Papers**	872	**85.10%**
	No Papers	153	14.90%
Migration (one or more family member has migrated)	None	860	83.90%
	At Least One Migrant	165	**16.10%**
	(Of which, sent >1 Migrant)	22	
Type of Migration	**Permanent**	94	**58.7%**
	Seasonal	71	43.0%
Destination of Migrant	**Urban** (Domestic)	97	**58.8%**
	Rural (Domestic)	35	21.2%
	Abroad	18	**10.9%**
	More than One Location	12	7.0%
Duration of Migration (in months)		Min ≤ Median ≤ Max : 1 ≤ 36 ≤ 99	

Local enumerators sampled 25-26 households from 41 villages among Polders 28/1, 28/2, and 30 on the west bank of the Kazibacha (more broadly, the *Rupsha*) River in the Batiaghata *upazila* of Khulna district, southwest Bangladesh, for a total of 1,025 households surveyed (figure 1, next page). Mean household size was 5.04 people. Almost one of every six households surveyed had sent at least one migrant out of the district (16.1%), nearly triple the national rate (6.1%) surveyed by Gray & Mueller in countrywide data (2018). Heavy outmigration underlines our study area as a useful case study for investigating the ongoing mechanisms of climate migration.

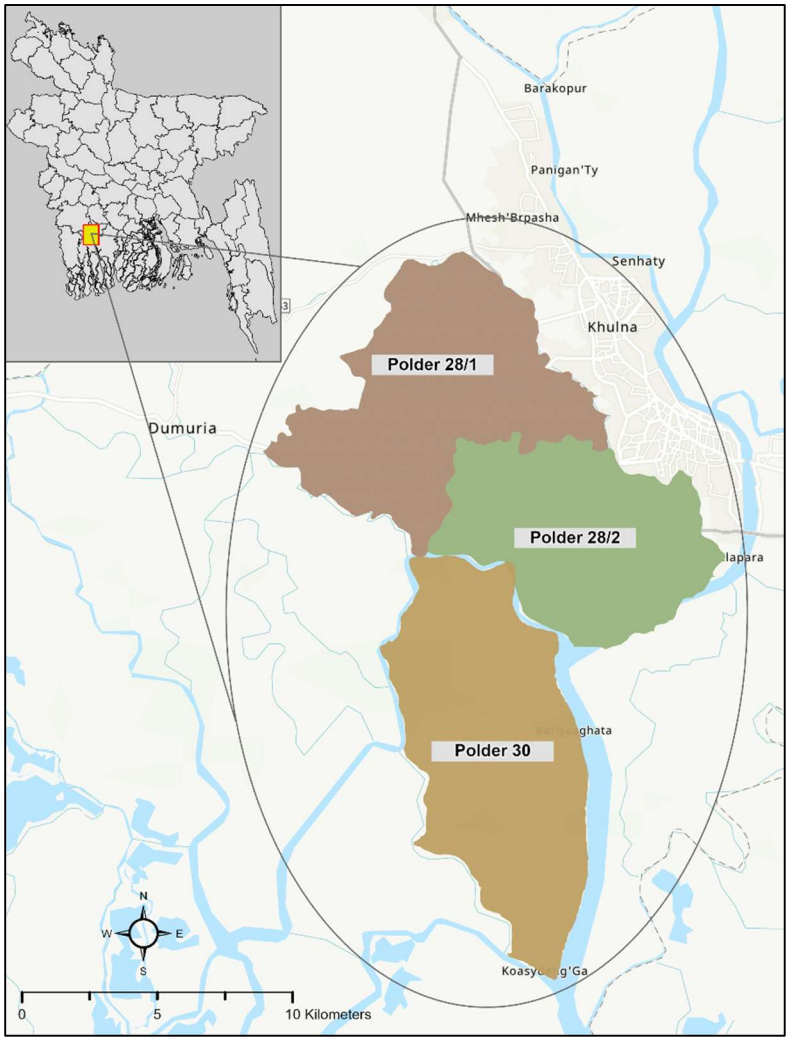


Figure 1. Polder study area. Western bank of the Kazibacha River, three polders southwest of Khulna town. (courtesy: Zobaer Ahmed)

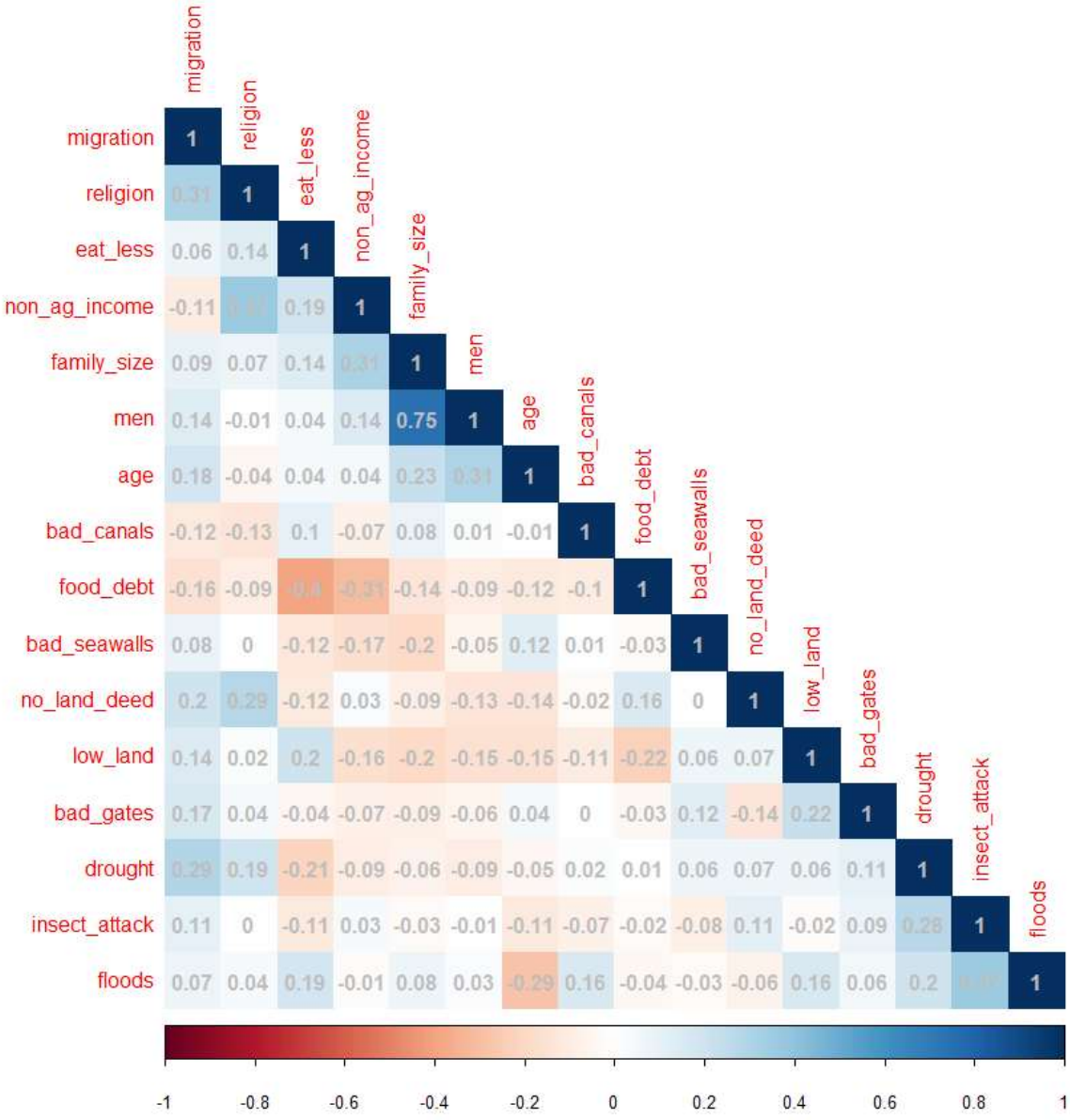
In our study, 97% of the families still had male household heads, and this number, combined with the low percentage of migrants who were female (4.8%), indicates that the basic household structure in our study population is still undivided by migration. We infer that households are still the basic unit of migration decision in this location, as accords with both New Economics of Labor and the Capabilities theories of migration (followed by the Groundswell report's climate migration models) (Massey et al. 1993, Rigaud et al. 2018, Assaduzzaman et al. 2020).

As per these theories, the most important indicators of sending capacity and wealth should be the age of the household head (mean: 52), the household head's literacy rate (88%), and landownership (85%). (Farm size was highly clustered around 0.4 ha, insufficiently varied to include it as an asset predictor.) With higher age presumably comes greater asset wealth and a presumably higher contribution from working-age children. Literacy enables higher earning and greater investment in children's education (yielding better employment opportunities), suggesting higher migration rates. In contrast to higher income, tenancy (not possessing official deeds of title of worked land) would seem to predict migration. We expect land ownership, age, and literacy to increase propensity to migrate.

Identifying key factors (from a bank of 600 questions) of migration in a climate-vulnerable, low-income, agrarian coastal population—which is already migrating at a high rate—allows us to create better predictions elsewhere, wherever there are agrarian populations threatened by similar pressures.

Initial reconnaissance of the data yields the following correlation plot (figure 2). Here we take a glance at what tends to affect migration. Does what we see match what other authors have observed about the socio-ecological drivers of migration?

Figure 2 – What is Driving Migration? Correlation among expected drivers



Determining which climate change drivers are the most important determinants of migration from low-lying agricultural areas such as ours, and, secondarily, determining which

factors most impact the poorest, is vital for predicting the worldwide forced migration of people over the next century. If climate migration is already occurring, it is our task to determine why.

3.2 Conceptual model

Migration is the oldest pathway of climate adaptation (Black & Bennett 2011). The utility of migration from an agriculturally degrading area confers obvious economic and even nutritional benefits. Our data show that nearly 6 out of 10 migrants relocate to urban centers within Bangladesh. Just as the native mangrove tree derives stability within the sediment from roots that emerge elsewhere aboveground, families sending migrants derive remittance sources, economic inputs for greater capital investments locally, and even another stable living space for permanent relocation through sending migrants. In our study, a family must have a migrant elsewhere (even temporarily) while still residing within our study area. This gives us a window into the conditions that prevail alongside migration. Our model uses a probit model to test the binary outcome of a family unit sending a migrant ("1") or not ("0") versus literature-informed, selected factors. Coincident factors such as climatic stress possibly make migration likelier. Drawing a picture of migration drivers present in 2016 allows us to predict what processes are occurring presently.

Research Questions

1. Do the *socio-economic* variables *identified in the literature* (more men in the family, greater wealth, higher elevation land) drive migration? Does *food shortage* (experiencing a season of going without food) affect migration in our study area?

Prior literature identifies larger families, older household heads, greater wealth and higher literacy as the predominant drivers of migration (Adger et al., 2021; Farhana & Mannan, 2018; Ullah, 2004). We expect to see these characteristics increase migration. In Northwest

Bangladesh, seasonal hunger migration (*monga*) was identified as a major driver as well (Sultana, 2010). If food insecurity is driving current migration out of our study area, then we may already be witnessing a precursor of an unplanned, catastrophic migration response to climate change.

2. What climate-change linked *environmental drivers* dominate the outflow of migrants in the study area?

Previous literature contends that only long-term climatic shocks such as salinification or drought (not short-term disasters like flooding unless they mount repeatedly in short order) push migrants out (J. J. Chen et al., 2017). Short-term drivers like floods pin migrants down, as households require work and use savings to rebuild, absorbing emigration potential (Kaczan & Orgill-Meyer, 2020). We suppose salinification to be the primary driver, drought following, and flooding to be anticorrelated with emigration (i.e., greater flooding reduces migration) in accords with previous findings from Bangladesh (J. Chen & Mueller, 2018).

3. Do the *physical and social infrastructures* controlling the hydraulic landscape (hydraulic management cooperatives, the physical condition of canals and sluice gates) influence migration through poor functioning and increased perception of risk?

We presume that poorly operating social and physical infrastructure in the study area (e.g., canals, drainage gates, and cooperative hydraulic governance groups) influences local perception of climatic resilience (Yadav et al., 2020). Local perception of poor infrastructure systems should increase migration through the pathway of increased perception of environmental risk.

4. Does increased *income,* or does worse *poverty*, drive migration?

Wealth predicts migration, but forced migration linked to destitution has also occurred in the recent past, namely stemming from environmental cataclysm (Ravi, 2021). We expect to see evidence of planned migration from those with migration capacity (wealthier households) and unplanned migration from those without capacity (those with debt or without assets).

In our pursuit to answer these four questions with functional models, we also test non-hypothesized variables previously denoted in the literature to affect migration, for controls.

3.3 Estimation procedures/econometrics

To test the hypotheses outlined in the conceptual models above, we estimate a probit model as outlined in equation (1).

$$P(migration) = \frac{1}{1 + e^{-migratio}} \tag{1}$$

Here, we investigate the impacts of environmental and socio-economic drivers on migration outcomes as specified in equation (2):

$$\begin{gathered} Y_i^* = \beta_0 + \beta_1 Household\ Size + \beta_2 Men\ in\ Household + \\ \beta_3 Age\ of\ Household\ Head + \beta_4 Household\ Religion + \beta_5 Lowland + \\ \beta_6 Food\ Shortage + \beta_7 Flooding + \beta_8 Drought + \\ \beta_9 Insect\ Outbreak + \beta_{10} Salinization + \\ \beta_{11} Water\ Management\ Membership + \beta_{12} Canal\ Condition + \\ \beta_{13} Floodgate\ Condition + \beta_{14} Sharecropping + \\ \beta_{15} Household\ Men\ in\ Agriculture + \beta_{16} Pension\ or\ Salary + \\ \beta_{17} Business\ or\ Trade\ Income + \varepsilon, \end{gathered} \tag{2}$$

where Y_i^* = 1 represents a household with a migrant and 0 represents no migration, B_0 is the intercept, and B_1 through B_{17}, are the estimated coefficients, respectively, for: 1) number of people in household, 2) number of men in household, 3) the age of household head, 4) religion (Hindu or Muslim) of the household, 5) household identifies as living at low elevation above sea level, 6) household reports a season of food shortage in prior year, 7) flooding, 8) drought, 9) insect outbreak, 10) crop destruction from soil salinization, 11) has membership in a hydraulic

management collective, 12) condition of internal canals is 5 or less on a 10 point scale, 13) condition of floodgates is 5 or less on a 10 point scale, 14) sharecrops rather than owns papers for farmed land, 15) number of household men working in agriculture, 16) draws a pension or a salary, and 17) draws income from commerce. ε represents model noise.

Focusing on environmental variables, flooding, drought, and insect outbreak are frequency counts within the past 5 years from farmers' self-reported answers on the 2016 source questionnaire. Saline crop loss is a binary score reporting recognized loss from the stress of salinization. Soil salinization is not a frequency count variable like the other environmental variables as it is experienced as progressive crop loss according to this model. Because most migrations occurred within the past five years (72%), environmental risk perceptions in the past 5 years will play a major role in assessing the constellation of migration drivers. The 600-question survey was not primarily designed to capture migration decisions in response to climate change impacts, but we have enough data to make conclusions about correlation.

4. Results

Our research questions were as follows: 1) Do the *socio-economic* variables *identified in the literature* (more men, greater wealth, higher land) drive migration? Does *food insecurity* determine migration in the study area? 2) What climate-change linked *environmental drivers* dominate the outflow of migrants in the study area? 3) Do the *physical and social hydraulic infrastructures* (water cooperatives, canals and gates) influence migration through poor functioning and increased risk perception? 4) Do increased *income*, or does worse *poverty*, drive migration?

The figure below (Table 2) reports our primary findings. Table 3 indicates marginal effects of the factors we tested.

Table 2: Factors Influencing Migration – Probit Regression Series

	Base	**Climate**	**Infrastructure**	**Income**	**Pooled**
Intercept	-1.219 ***	-1.469 ***	-1.247 ***	-1.403 ***	-1.702 ***
	(0.076)	(0.138)	(0.104)	(0.103)	(0.214)
Household Size	0.032†	-0.005	0.032	0.006	0.013
	(0.083)	(0.125)	(0.084)	(0.087)	(0.130)
Number of Men	0.088	0.177	0.095	0.065	0.139
	(0.086)	(0.128)	(0.088)	(0.090)	(0.134)
House Head's Age	**0.119 ***	0.157	**0.116 ***	**0.117 `**	0.109
	(0.058)	(0.085)	(0.059)	(0.062)	(0.093)
Household Religion	**0.326 ***	0.316	**0.389 ****	**0.440 ****	**0.606 ****
(*Muslim)*	(0.139)	(0.204)	(0.142)	(0.151)	(0.235)
Lowland	**0.212 `**	**0.512 ****	0.185	0.151	**0.350`**
(yes, self-identified)	(0.119)	(0.173)	(0.121)	(0.125)	(0.183)
Food Shortage	**0.306 ***	0.156	**0.306 ***	**0.332 ***	0.125
(yes in past year)	(0.131)	(0.195)	(0.133)	(0.141)	(0.218)
Frequent Flooding		**-0.262 ****			**-0.241 ***
(count in past 5 yrs)		(0.097)			(0.103)
Frequent Drought		0.086			0.086
(count in past 5 yrs)		(0.086)			(0.089)
Frequent Insect Outbreak		0.031			-0.051
(count in past 5 yrs)		(0.095)			(0.104)
Saline Crop Destruction		**0.339 `**			**0.373 `**
(yes in past 5 yrs)		(0.183)			(0.198)
Member of Water Mgmt Group			**0.417 *****		**0.334 `**
(*yes*)			(0.126)		(0.196)
Poor Canal Condition			**-0.292 ***		-0.152
(*<5 on 10 pt scale)*			(0.115)		(0.179)
Poor Floodgate Condition			0.159		**0.411 ***
(*<5 on 10 pt scale)*			(0.124)		(0.180)
Sharecropping				0.135	-0.100
(yes)				(0.128)	(0.192)
Number of Men in Agri				**0.178 ****	**0.163 `**
				(0.057)	(0.087)
Salary or Pension				**0.739 *****	**0.499 ***
(yes)				(0.147)	(0.215)
Business or Trade Income				**-0.360 ***	-0.134
(yes)				(0.182)	(0.232)
n	798	409	791	768	391
AIC	681.868	346.547	668.466	624.938	329.512
BIC	714.643	390.698	715.199	676.019	400.949
Pseudo R^2	0.060	0.159	0.095	0.142	0.223

**** p < .001; ** p < .01; * p < .05 ; ` p < .1*

† *Beta Coefficient of Effect. (Standard errors in parentheses).*

Table 3: Marginal Effects of Significant Factors Influencing Migration

	Base	**Climate**	**Infrastructure**	**Income**	**Pooled**
Household Size	0.00†	-0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Number of Men	0.02	0.03	0.02	0.01	0.03
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
House Head's Age	**0.00** *	**0.00`**	**0.00** *	**0.00`**	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Household Religion	**0.08** *	0.08	**0.10** *	**0.11** **	**0.15** *
(*Muslim)*	(0.04)	(0.06)	(0.04)	(0.04)	(0.07)
Lowland	**0.05`**	**0.13** **	0.04	0.03	**0.08`**
(yes, self-identified)	(0.03)	(0.05)	(0.03)	(0.03)	(0.04)
Food Shortage	**0.08** *	0.04	**0.08** *	**0.08** *	0.03
(yes, in past year)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)
Frequent Flooding		**-0.04** **			**-0.04** *
(count in past 5 yrs)		(0.01)			(0.01)
Frequent Drought		0.02			0.01
(count in past 5 yrs)		(0.01)			(0.01)
Frequent Insect Outbreak		0.00			-0.01
(count, in past 5 yrs)		(0.01)			(0.01)
Saline Crop Destruction		**0.08`**			**0.08`**
(yes in past 5 yrs)		(0.04)			(0.04)
Member of Water Mgmt Group			**0.11** **		0.08
			(0.03)		(0.05)
Poor Canal Condition			**-0.07** *		-0.03
(*<5 on 10 pt scale)*			(0.03)		(0.04)
Poor Floodgate Condition			0.04		**0.09** *
(*<5 on 10 pt scale)*			(0.03)		(0.04)
Sharecropping				0.03	-0.02
(yes)				(0.03)	(0.04)
Number of Men in Agri				**0.06** **	**0.06`**
				(0.02)	(0.03)
Salary or Pension				**0.20** ***	**0.12** *
(yes)				(0.05)	(0.06)
Business or Trade Income				**-0.07** *	-0.03
(yes)				(0.03)	(0.04)
n	798	409	791	768	391
Log Likelihood	-333.93	-162.27	-324.23	-301.47	-146.76
Deviance	667.87	324.55	648.47	602.94	293.51
AIC	681.87	346.55	668.47	624.94	329.51
BIC	714.64	390.70	715.20	676.02	400.95

**** p < .001; ** p < .01; * p < .05.; ` p < .1*

†*Numbers indicate marginal effects. (Standard errors in parentheses).*

All continuous predictors are mean-centered and scaled by 1 standard deviation.

4.1 Investigating Base Model: Results and Discussion

Our base regression employs socio-economic factors identified from the literature (Table 2: "Base" column). We expected that with a larger household, more men, higher education, owned plots, and a larger farm, migration ought to increase. We anticipated that a higher elevation of farmland also would increase migration through greater economic capacity (fewer floods, more savings over time, and greater wealth to send migrants). We also tested whether having a food shortage in the prior year would increase migration (*monga* or hunger migration).

We find that family size does *not* significantly predict migration in our study area; neither does the number of men, the literacy of the household head ($P > 0.7$), nor the ownership status or size of the farm (a proxy for income; $P > 0.7$). (Due to persistent high P values indicating a null hypothesis, we excluded literacy and farm ownership status from the results table and regression series.)

However, the age of household head is significant ($p < 0.05$) in our base probit model—albeit with a very slight marginal effect. As we will see in *Section 4.4*, the strength of house head age may be better explained by the number of males working in agriculture—all else equal, older parents will have had more grown children—which strongly suggests that greater spare earning capacity enables migration. Men are almost solely the migrant pool in our survey data (> 95% of primary migrants). Does this suggest that the working men are migrating away to do farm jobs, or does it suggest that more men working the family farm means better food security and better capacity to send others out? Our base finding suggests two paths of inquiry:

1) to investigate the significance of off-farm agricultural income for migrant-associated households (Section 4.4) and

2) to investigate food security as a requisite factor of migration (later in this section).

Religion is a significant factor of migration in our dataset, primarily a social signifier of minority Muslim affiliation within a study area which is 83% Hindu. Religious minority affiliation as a seeming selector of migration is a sensitive political issue within Bangladesh. Chapter two expands on the implications of religious identity as a selector for migration, offering two theories to explain its heavy significance in our results table.

Land elevation matters significantly for migration. In the study, farmers told surveyors whether they considered their main or secondary plot was of "high, medium, or low" elevation. Only 242 of 1025 farmers reported having a plot of "low" elevation, and only 14% of total primary and secondary plots had this designation. Having at least one agricultural plot of "low" elevation *increases the likelihood of migration by 5%* (Table 3). Does this suggest perceived environmental insecurity is a factor for outmigration? Do more vulnerable farmers tend to migrate? Which, if any, climate-related environmental pressures are correlated to migration? The vulnerability of lowlanders validates our upcoming examination of environmental risk perceptions as migration drivers (Section 4.2).

Our last of the base factors, food insecurity (forgoing food or limiting the size of meals within the past year) shows a significant positive coefficient (0.3, $p < 0.05$) increasing likelihood of migration by 8% (Tables 2 and 3). Indeed, then, whether a family experienced seasonal hunger in the prior year correlates persistently with migration across all models. This coincides with findings from an upriver, drought-prone district (Rajshahi) that *monga* is a perennial migration driver in the marginal lands of Bangladesh (Farhana & Mannan, 2018). Mondal & Yadav lay blame on the agricultural system within the polderlands: adverse inundation in our study area during the typically fecund monsoon burdens farmers with a once-yearly cropping system occurring only during the lower yielding dry season (Yadav et al., 2020).

The persistent effect of food shortage throughout our regression model series indicates the salience of poverty-driven migration from our study area. Food shortage suggests persistent gaps in staple crop productivity and inadequate environmental management of the complex polderland hydrology. We turn therefore to investigate environmental disaster frequency and the perception of crop loss from such challenges.

4.2. Investigating Environmental Drivers

In line with what the literature identifies, we predicted that soil salinity, drought, and insect infestation (long-term climate shocks) would induce migration, while flooding (a short-term shock) would inhibit it.

In our data, for every year of the past five that a farm experienced flooding, migration *decreases by 4%* ($p < 0.05$). Counterintuitively, this is in line with the literature's conclusion that floods, a short-term shock, tie down populations in rebuilding and re-cultivating the land (J. J. Chen et al., 2017).

Neither the frequencies of drought nor insect attack were significant migration drivers. Farmers may "factor in" these adverse events to life working in agriculture on the polders (Gray & Mueller, 2012).

However, those who perceived salinity's effects on their crops were *8% more likely to migrate* ($p < 0.1$). This relationship suggests that *even if the spatial impact of salinity is limited* (only 9% of respondents said they had lost crops due to salinity), the perceptible magnitude of salinity's destructive effects on crop yield *is a determinative factor of migration*.

When added to the base model, we notice that environmental drivers (lowland, flood frequency and loss to salinity) largely supplant the significance of socio-economic factors. Lowland cultivation assumes a highly significant marginal effect of 13% to migration ($p < 0.001$,

Table 3, column 2), again highlighting the risk-dependent channel of migration from our area. *This endorses our vulnerability-dependent emigration hypotheses, that climate effects are undercutting choice-driven channels.*

Exposure is one side of climate vulnerability. The other component is resilience. We turn now to social and physical infrastructure; the chief component of resilience.

4.3. Investigating Infrastructure Vulnerabilities

Perception of infrastructure vulnerabilities may be a migration driver. The perception of threat—and the perception of the community's own lack of resilience—is a possible emigration driver for those with enough economic capacity to leave. Our source survey comprehensively evaluated perceptions of infrastructure health and inclusive decision-making within the study area, offering us an opportunity to judge the effectiveness of rural development collectives in influencing outmigration.

Water Management Groups (WMG) within the polder lands such as the Dutch-funded Blue Gold initiative are local hydraulic infrastructure management groups within Bangladesh designed to collectively govern and maintain the polder ecosystem's crucial system of irrigation and embankments. Having a household member belonging to a WMG is highly significant for migration ($p > 0.01$) with a marginal effect of 11% (Table 2 and 3). Perhaps WMGs function poorly and push members to emigrate, seeking some effective economic agency for themselves. Perhaps WMGs function so well, in strengthening the agricultural value chain, that they increase household incomes enough to fund outmigration. However, data analysis shows that mean annual incomes between WMG member families matched non-WMG families ($840 USD), undercutting any vast wealth differences between members and non-members.

We test infrastructure and WMG group effectiveness perceptions broadly against migration and find no evidence of poor group functioning. Only poor canal conditions influence migration (*decreasing migration by 7%;* $p < 0.01$, Table 3, column 3*)*. In our study area, this answers a criticism Thomas has of Blue Gold and associated development projects in coastal Bangladesh that they enrich absentee aquaculture practitioners while forcing local farmers off the land through salinification (Thomas, 2020). In the study area, neither sluice gate operation nor other governance metrics have any significant impact on migration. This suggests that WMG governance functions inclusively.

Poor canals do *point to the salience of flooding infrastructure* within our study area (presumably tying down populations due to post-flood rebuilding). Canals, or *khals,* are natural watercourses through the polders. When they are infrequently excavated and left dry (poorly maintained, in other words), they shunt the seasonally fertile upstream sediment into rivers outside the polder, raising the river's bottom through deposition while the in-polder land sinks lower (termed *waterlogging*). Eventually, the river outside the polder overtops the land inside due to tidal or storm forces. Thus, poorly maintained canals raise the risk of catastrophic flooding (Mahmood & Saleh, 2020; Mainuddin et al., 2021; Yadav et al., 2020).

Since flooding reduces economic capacity to send migrants, we need to explore economic effects on migration. We turn therefore to our results on income amounts and sources to further discern if wealth predicts migration (characterizing a planned, pull-dominant migration flow) or, conversely, if migrants are themselves impoverished (an unplanned, push-dominant flow).

4.4. Investigating Income Amounts and Sources

We intended to uncover the character of emigration from the study area, either *planned* or *unplanned*. To do so, we hypothesized that greater income enabled greater emigration. We

presumed that having urban-oriented, non-agriculture income sources predisposed migration ("brain drain"). In turn, we expected to find that wealthier households send more migrants.

We instead find that higher annual income (and whether it derives from non-agricultural sources) has *no impact on migration*. Instead, we see that having more men working in agriculture *increases migration by 6%* ($p < 0.01$), a characteristic of poverty/overpopulation as a driver. Agricultural migrants do not fetch high incomes in our study area. More mouths to feed increase the subsistence burden. The only significant non-agricultural wealth sources we test have an ambivalent effect on migration, with pension/salary driving outmigration by 12% ($p < 0.001$ in column 4 of table 3), and trade income hindering migration by 7% ($p < 0.01$ in column 4).

We measured whether a household member receives a salary/pension in our study. This source of income may provide the income stability to fund urban-oriented migration with younger members of the extended family. 16% of our study households drew on salary/pension income (169/1025), of whom only 28% sent a migrant. This suggests the opportunity channel for migration is out of reach of most polderland households.

Similarly, trade or business income was limited to 167 households (16%), inaccessible to most. Few households derive wealth from salary/pension or business/merchant activity and thus they are insignificant for a majority of migrant-sending households. Our survey was limited in explaining the exact nature of business as a matter of course, but we can assume trade income's anticorrelation with migration indicates that profits do not fund emigration. Likely, the amounts are reinvested in business: perhaps the livelihood is generally not stable enough to invest in outside opportunities.

Definitively, emigration from our study area is strongly governed by hydrological threat, lack of savings, food insecurity, and a struggling flood control infrastructure.

5. Limitations and Weaknesses

Our pooled model has an R-squared of 22% and loses some observations in the final pooled model due to non-response bias (from 1025 to 391). One of the larger drops in observations is between Base and Climate Perception series presumably because a non-response is a culturally acceptable way to indicate a negative response. It would be possible to impute values on five-year environmental impact frequencies but doing so may fail to capture the intense variation of flooding/salinity within the complex riverine study area. Salinity studies of individual polders prove the intense geophysical variations within them, necessitating the use of ground truthing over household survey response data to capture it precisely (Akter et al., 2020; Assefa et al., 2021). To impute missing data is to disregard the risk perception and agency of the human actors in migration themselves. What may be best would be to re-survey the study polders as Emran et al. did with coast-facing polders in 2005 and 2015 in order to assess the trajectory of poverty and environmental risk perception statistics (Emran et al., 2021).

6. Conclusions

In our analysis, migration from the polderland conforms heavily to the catastrophic climatic response channel of outmigration. Not only are higher wealth markers indeterminate for migration, but cyclical food shortage, low-lying land, and long-term, irreversible climatic shocks (chiefly saline intrusion) have a heavy influence in outmigration. The persistent anticorrelation of flooding frequency and its proxies imply that what little resources respondents have is used in rebuilding a frequently inundated coastal zone, suggesting that the most vulnerable of the polderland farmers subsist within a trapped population that cannot afford to migrate, although

migration and off-farm income has often been found to be the principal way for polder farmers in Bangladesh to afford agricultural adaptation investments (Emran et al., 2021). In other polders closer to the sea such as Morrelganj, salinity is already contaminating the population's drinking water. Locals demand raising the embankments (Charles, 2021), but doing so may encourage the land inside to sink and degrade due to lack of sediment (Cornwall, 2018). NGO involvement in the study area will be key to mediating demands of locals with broader findings and tailoring informed requests for government intervention with the two key goals of 1) lowering barriers to off-farm employment for household members to stabilize incomes and 2) using those incomes to increase agriculture intensity on the polder lands for food security (Assefa et al., 2021; Shew et al., 2019, 2021).

After conducting the 2016 survey on which our analysis is based, IRRI and IWMI undertook extensive experimentation, within Polder-30, to strengthen hydraulic management practices to enable short-grain High Yield Variety (HYV) rice to be grown with a new year-round cropping system (Yadav et al., 2020). Shew et al. model how the rice import gap (which costs Bangladesh billions annually) can be effectively bridged by strengthening this dual regime of better rice and more efficient drainage (Shew et al., 2019). Our analysis concurs, noting that eliminating food shortage, strengthening freshwater retention, and raising agricultural productivity will enable more efficient allocation of labor to the land, allowing this vulnerable part of Bangladesh to close the gap in food security and stem the catastrophic loss of a way of life for millions.

Chapter 3: Religion as Migration Selector

In the above regression series, *household religion* emerged as the most persistent, most significant factor for outmigration. A deeper look into the inequal migration rates between Hindu and Muslim households is therefore not only warranted but compelled by the prominence of the issue.

Khulna district is a demographic anomaly within Bangladesh. The only Hindu-majority district in East Pakistan at the time of Partition (Chatterji, 1999), Khulna continues to host a large Hindu minority within present-day Bangladesh. Eighty-three percent of the households in our three-polder study area within Khulna are Hindu. Yet, belonging to the 17% Muslim population is one of the strongest predictors of migration in our regression series. Why?

In a study area more than 80% Hindu, being Muslim made it far more likely that a household would migrate, with a marginal effect of 15% ($p < 0.01$). Being Hindu had no significant influence on migration. Such a high associated likelihood of migration for a Muslim household raises important questions about differences in risk perception, environmental response, equity, and opportunity between the two communities.

To what extent can we interpret the difference of migration decision as *religiously inspired* or *motivated*? Let us assume within our study area that two neighbors with two different religions do not radically differ in their perception of the risks of climate change, nor do they adopt wildly different, religiously systemized behaviors to risk. Let us, instead, assume that the main function of religious identification in our study area is *as a mere social marker of societal affiliation*. This broader affiliation of religion with the body politic in South Asia has geo-historical logic due to the Partition of British India along lines of overt religious adherence (Chatterji, 1999). If we assume similar migration risk calculi, nevertheless, it is possible the two

communities have very different balances of constraints and resources. Treating the two communities as separate entities for migration analysis suggests two contradictory possibilities: 1) Muslims (the minority in the polders) are ghettoized into areas of increased environmental risk, or 2) both populations are equally exposed, but Hindus (the minority within Bangladesh) lack the social networks of their Muslim neighbors.

This section builds on the UK's 2011 Foresight report articulating a definition of *trapped populations* as those in a downward earning spiral due to increasing environmental pressure, increasingly unable to emigrate in a secure, planned way due to depleted household capital (Black, Adger, et al., 2011a).

Premise 1: Muslim Spatial Segregation

The first premise to test is that *the Muslim community is suffering a disproportionate environmental impact within our study area due to spatial segregation* from the Hindu majority. An underlying explanation would be, perhaps, that Muslims were late settlers to a largely Hindu area and stayed on the cheapest, most marginal, most exposed land (*Chatterji, J., 2007*). If this explanation were plausible, we should see among Muslims: a) lower markers of land ownership and a higher sharecropping percentage, b) a higher ownership of lowland plots, and c) elevated environmental risk perception scores. All of these elements paint the picture of populations aware that they are living on worse, more exposed, land.

Premise 2: Lack of Social Capital for Hindus

Our second premise is a variation on the first. In this explanation, the real difference in land quality and environmental risk between the two communities is minimal and both communities farm equally poor land. Instead, this premise states, Muslims have an "escape hatch" that Hindus do not: more relatives and social communities ready to assist them in making

a move elsewhere (Ravi, 2021). Politically, this premise fits the Indian Government logic—in granting citizenship in 2019 to Bangladeshi *Hindu* migrants only—that Hindus are an oppressed minority within Bangladesh and deserve preferential treatment. The author is skeptical, but willing to test the premise (R. Ahmed, 2018).

If this explanation is true, we should see a difference in the nature of migration: Muslims should be relocating disproportionately on a permanent basis, while Hindus should be "trapped" locally, opting to work seasonally (Black et al., 2011; Mursheda & Abdul, 2018). In addition, I suggest that we should see lower educational barriers to migration among Muslims, e.g. Muslims requiring *less* education to migrate (and therefore Muslim migrants with less average education) as a function of possessing more social capital in other urban centers within Bangladesh (less job discrimination, ease of access to informal networks such as mosques and extended family businesses) which effectively compensates for any lack of educational certificate.

Descriptive Data

Below is a table showing the significant socio-economic differences in the population of Hindus and Muslims in our three-polder study area. From Chapter One, we select the following factors key migration drivers: a) household is Muslim, b) family lives on a lowland plot, c) more frequent flooding (anti-correlated with migration), and d) percentage of crop was lost to soil salinization within past five years.

Along with the migration drivers previously studied, we added additional environmental risk factors (ones suggesting poor land quality), indicators for asset ownership, migrant education and destination, and family size (suggesting greater social network potential). The bolded religious community indicates the higher proportion of response in that category, with the difference in percent between Hindus and Muslims for each category noted on the far right, for

simplicity's sake.

Table 1 – Religious Community Differentials

Variable	Religion	Frequency of Response		% Difference
Religion	**Hinduism**	844	**82.7 %**	**65.4**
	Islam	176	17.3 %	
Migration (one or more family member has migrated)	Hindu	118	14.0 %	
	Muslim	47	**26.7 %**	**12.7**
Environmental Risk Factors				
Sharecropping	Hindu	225	26.7 %	
	Muslim	108	**61.4** %	**34.7**
Lack ownership papers	Hindu	96	11.4 %	
	Muslim	57	**34.1 %**	**22.7**
Farms a Lowland plot	Hindu	189	22.0 %	
	Muslim	53	**30.0** %	**8.0**
Frequent Flooding (>median of 2x in 5 yrs)	Hindu	296	35.0 %	
	Muslim	62	**35.2 %**	**0.2**
Recorded Salinity Crop Loss in past 5 years (>0%)	Hindu	233	27.6 %	
	Muslim	77	**43.8** %	**16.2**
Frequent Insect Outbreaks	Hindu	272	32.2 %	
	Muslim	69	**39.2 %**	**7.0**
Frequent Drought	Hindu	218	25.8 %	
	Muslim	58	**33.0 %**	**7.2**
Social Capital Factors				
Below Mean Per Capita Income	**Hindu**	**262**	**31.0 %**	**2.6**
	Muslim	50	28.4 %	
Larger Families (>5, the mean)	Hindu	340	40.3 %	
	Muslim	**78**	**44.3 %**	**4.0**
Above average farm size	Hindu	386	45.7 %	
(>1 acre)	**Muslim**	94	**53.4 %**	**7.7**
Migrant Education				
High School	**Hindu**	21	**17.8 %**	**15.7**
	Muslim	1	2.1 %	
University	**Hindu**	24	**20.3 %**	**13.9**
	Muslim	3	6.4 %	
Type of Migration	Permanent migration			
	Hindu	**76**	**64.4 %**	**26.1**
	Muslim	18	38.3 %	
	Seasonal migration			

	Hindu	42	35.6 %	
	Muslim	**29**	**61.7 %**	**26.1**
Migration Abroad	**Hindu**	13	**11.0 %**	**0.4**
	Muslim	5	10.6 %	

Discussion

Our first premise states that Muslims are far likelier to migrate due to the poor, environmentally at-risk land they inhabit. Is this plausible? Circumstantially, yes: Muslims are substantially poorer materially than their Hindu neighbors: 35% likelier to sharecrop, 23% likelier to lack ownership papers, and 8% likelier to farm low elevation land (Table 1). In return for inhabiting more marginal land, Muslims were 16% likelier to perceive a degree of saline crop destruction—the chief environmental migration driver from Bangladesh previously noted not just in our prior chapter but by numerous studies (J. J. Chen et al., 2017; J. Chen & Mueller, 2018; Gray & Mueller, 2012), 7% likelier to experience frequent insect or plant disease outbreak, 7% likelier to have frequent drought incidence. There is evidence the worse land reduces ability to educate children too: only 6% of high school or tertiary-educated household heads were Muslim, and only 7% of high school and university-educated migrants were, significantly less than their proportion of the population (17%). *Muslim respondents in our study area are not accessing education, a key input for greater income*. It seems plausible that, as elsewhere in Bangladesh, debts incurred by tenancy and recurrent environmental disasters may require the family to employ child labor on the fields instead of sending them to school (Mursheda & Abdul, 2018).

Our competing premise states that Muslims are nevertheless advantaged due to greater social networks and concomitantly experience lower barriers to migration. Does this bear out? Instead of Hindus relocating seasonally—according to prediction—Hindu migrants prefer to settle *permanently* in a new location. However, they are moving with greater educational status.

This could tell us several things: 1) Hindu migrants *require* better base education to obtain jobs elsewhere, 2) Hindu families have greater *opportunities* to educate their children, apart from forcing them to work through childhood. I cannot prove the first claim without conducting focus groups; I *can* prove the second by looking at educational outcomes and concomitant opportunities obtained from them.

As discussed, Hindu migrants are far likelier to possess secondary and tertiary education diplomas compared to Muslims. This indicates that the choice and opportunity channel of migration—not the catastrophic migration channel—is preferred by Hindus in our study area (Kaczan & Orgill-Meyer, 2020). The data show that Hindus are able to obtain higher education disproportionate to their numbers, despite similar incomes to their Muslim neighbors. The destination for these migrants is likely to be Dhaka or a nearby in-country urban center: only 18 migrants out of 165 headed abroad, and the rate of migration abroad was not significantly different by religion. Note that Muslims had a 12.7% higher propensity to migrate than Hindus. However, note that Muslims prefer seasonal migration over permanent migration by 26%. These migrants are predominantly not high school educated, and we can assume their seasonal work does not earn high enough, stable income to enable permanent resettlement.

Research Limitations

I am limited by the sample size's ability to represent the whole in polders 28/1, 28/2, and 30. Farmers who chose to speak to IRRI/IWMI representatives were those whose responses were recorded. Without speaking to those who conducted the survey, we cannot disclaim a response bias of the better-educated. At the time of publication, the author could not match a national census on the question of religion at the granular level of our study area to determine the

religious representativeness of our sample. The 2016 data stands as the most comprehensive demographic glimpse to date within the study area.

Conclusion and Research Implications

The disparities in our study area are not primarily income and asset based. Instead, the disparities appear to center on educational inputs and migration outcomes.

We see, clearly, that Muslims are far likelier to migrate, but far likelier to do so seasonally instead of permanently. Muslims' educational levels and land ownership status appear to pin them down to land which appears to be riskier in the face of hostile climate pressures. Muslims in our study area appear to be the "trapped population," not Hindus, who tend to plan and choose migration in such a way that household income stability is the likely outcome.

Further research could test the interactivity of religion with environment and agriculture-based job migration within the region in a regression series. Doing so could cast more light on the rural, unskilled nature of minority-Muslim migration from the polder area.

Gaining a true glimpse into the inequities of opportunity within climatically at-risk migrant hotspots enables us to see, as I argue in further chapters, that environmental risk introduces potential cleavages along the very fault lines of society's organization. When inequalities of ethnoreligious nature are baked into the system, climate migration and conflict exacerbate these societal cleavages.

As Yuval Noah Harari writes in 2015's *Homo Deus,* "There are no longer natural famines in the world; there are only political famines." The increasing constitution of nationality by religion within South Asia, and the increasing territorialization of religious identity not only exacerbates the political consequences of environmental mass migration which the Groundswell Report predicts to occur ever more frequently, but also sets the stage for migrant demonization,

demagoguery, and potential ethnic cleansing on an unfathomable scale proportional to the incredibly dense populations of South Asia (R. Ahmed, 2014; Oza, 2007; Slater & Masih, 2019).

Waldo Tobler once stated a fundamental law of geography: “everything is related to everything else, but near things are more related to distant things” (Tobler, 2004, 305). Emigration from Bangladesh most prominently affects its neighbor in India, with which it shares a common past. The next chapter will treat the border regions of India and their acceptance or pushback of migrants as a knock-on effect of climate migration. Assam and West Bengal states are respectively illustrative of the two socio-political choices facing societies in climate migration destination areas (whether to fight or to receive migrants). Tobler’s second law, after all, is “the phenomenon external to an area of interest affects what goes on inside” (ibid., 308). Climate is the external driver increasingly affecting migration and conflict on a macro scale. Let us turn now to see it at work in India.

Chapter 4: India, Bangladesh, and Host-Migrant Proximities

Chapter Summary

As we have seen, climate migration from our study area in coastal Bangladesh is *seldom associated with moves abroad*. Nevertheless, religious affiliation remains a significant factor in migration. It is the religious hue of migration which entangles it by international geopolitics in South Asia, and the fear of mass migration by Muslim Bangladeshis is an instrument that the Hindu supremacist ruling party of India utilizes for mobilizing nativist, religious voters, re-conceptualizing Indian citizenship as belonging foremost to Hindus (R. Ahmed, 2014; Oza, 2007; Saikia, 2020).

The study of climate mobility increasingly highlights the unexamined role of receiving, not just sending, areas (Cundill et al., 2021). India's border regions alongside Bangladesh exhibit vastly different responses in the political sphere to mass migration. Assam has witnessed intense spasms of nativist violence against migrants; by contrast, the state of West Bengal has rarely seen communal violence at all.

I use the findings of Lujala's 2020 Bengal region Focus Group Discussion (FGD) studies of local attitudes toward Bangladeshi migrants to articulate three major psycho-social factors that seem to govern the quality of local political receptions toward environmental migrants: 1) ethnoreligious proximity, 2) socioeconomic proximity, and 3) common perception of spatial proximity to shared risk. The rubric of *proximities* is a constructive tool to explain ongoing refugee flows from countries as varied as Ukraine and Syria, laying groundwork for predicting the political impact of future climate migration flows.

Introduction: A Tale of Two Migrations

On February 24th, 2022, the Russian Federation invaded Ukraine. Almost immediately, Europe stepped in. Romanians, Moldovans, and Poles opened their homes to millions of refugees. Legal barriers to indefinite stay were relaxed, visas were eliminated, businesses advertised open positions for Ukrainians only, the world's wealthy countries organized relief shipments, and neighboring governments' militaries took immediate, prominent roles accommodating transport to ease increased migration flows (Alderman & Cohen, 2022; Stanley-Becker et al., 2022).

In July 2011, Syria descended into civil war. Refugees from the country took to the Mediterranean to reach Europe, and Europe arrested waves of migrants upon the waters. Legal barriers to indefinite stay were erected, and many countries along the migrant path built higher walls and strengthened border forces (Jones & Johnson, 2016). Mediterranean EU countries criminalized migrant-rescue NGOs, embarking on progressively stringent legislation designed to send the message: *you will never have a future here* (Palmer, 2022).

Why these two different responses?

In 1970, the deadliest cyclone in recorded history struck the country of Bangladesh, followed by mass anti-government protests, a genocide, and a civil war. West Bengal hosted three million Bangladeshis, built social networks, granted government assistance, facilitated citizen volunteer help, and over the years, granted many arrivals citizenship. Politicians evinced widespread sympathy towards their eastern "cousins" of the Bengali culture (Ravi, 2021).

The same storm pushed migrants north into Assam. Resentment took hold at the uncounted millions of "foreigners" settling permanently on the land. In the 1980s, student militants violently pressed the government to identify and expel the "plague" of "infiltrators,"

securing Indian Government laws promising to bar citizenship for civil war arrivals (Borah, 2019). In the 2010s, the Hindu nationalist government used the nativist demands as a launchpad to conduct a pilot citizen registry (NCR), identifying "doubtful" citizens on the voting roles and requiring them to produce sufficient documentation of legal residence; many individuals, lacking sufficient documents despite long histories in the region, took their own lives (R. Ahmed, 2018; Vaidyanathan, 2019). The objective of the government was to deport undocumented, non-Hindu, Muslim Bengali speakers. Mass deportation camps continue to be built along the border at the time of writing, and "foreigner's tribunals" increasingly issue summary deportations (R. Ahmed, 2014).

Why these two different responses?

War is a very powerful trigger for unplanned mass migration. Rarely are nations prepared to receive such numbers when it occurs. Yet, host societies and their governments act upon a choice, mobilizing resources to either receive migrants or repel them. Increasingly, climate migration science examines host societies, not simply sending areas, in order to forecast and mitigate future conflicts (Cundill et al., 2021). Although it is a general wisdom that successful migrant outcomes depend upon a positive host community reception, scant research has been conducted until recently into the factors that influence migrant reception.

Through analysis of 2020 focus group discussion (FGD) research within Southwest Bangladesh, Lujala and his co-authors identify three salient categories of shared "proximities" which seem to govern migrant reception within a new community: a) ethnoreligious proximity, b) socioeconomic proximity, and c) social perception of similarly shared risk (Lujala et al., 2020). By applying this rubric to the differential reception of Bangladeshi migration into West Bengal and Assam, and by articulating the different politico-social role granted Bengali Muslims

within both Indian states by the historic logics of Indian geopolitics at the time of Partition, we validate the three-factor rubric and seek to apply it to emerging migration waves in the present day.

Lujala's Proximity Framework: Ethnoreligious, Socioeconomic, Environmental Risk

Lujala et al. sought to fill the gap in research among host communities receiving climate migrants by conducting regressional analysis of focus group responses from 630 residents of Satkhira district, Southwest Bangladesh, along the eastern border if India's West Bengal state (Lujala et al., 2020). The authors tested factors of spatial, attitudinal, experiential, and social proximity among host community participants, calculating the predictive regression for pro- or anti-immigrant sentiments.

Spatial proximity to shared risk mattered: the greater the perception that both the host community and migrant community were at risk from similar forces of climate change, the likelier they were to advocate receiving migrants. Lujala posits that not only greater empathy, but also more realistic appraisal of risks, arises from greater spatial proximity to environmental emigration drivers (ibid.).

Attitudinal and experiential proximity of host-migrant communities also mattered: "those who see people more as makers of their own fate or hold people highly accountable for their actions tend to be more skeptical toward climate migrants while those with higher levels of social trust [of migrants] are more welcoming" (9). The authors write that having experienced traumatic climate migration made respondents additionally more likely to welcome others; experience molds worldview even as the background religious belief in "fate" works to "blame" other forces than the forced migrant for their situation.

Finally, social proximity has a major impact on host-community reception. The closer that migrants were in economic or caste status to respondents, the likelier host communities were to receive them, with "attitudes becoming more negative as socio-economic or class differences increase" (10). The authors also saw scant evidence of the conventional explanation, the labor market competition theory, in play among the working or less-educated poor. Those with more stable, higher-earning incomes often live on higher land and are exposed to less hazard, seeming to decrease their empathetic capacities as they lack shared intensity of risk perception (8-9). Importantly, goodwill among the poor has limits, however: "having extended family members living in highly exposed areas was related to more negative views," as "people in the studied region tend to rely on their extended family when migrating," supporting the evidence that those already burdened were "wary of being stuck with the responsibility of helping their extended family members while also at the same time being asked to accommodate non-family migrants in their community" (10). Even in empathetic, highly proximal locations within Bangladesh, hosts were inclined to perceive capacity boundaries if they were already hosting family.

Lujala et al.'s study demonstrates that environmental risk perceptions permeate all dimensions of psycho-social migrant-host proximities in climate impacted communities such as southwest Bangladesh. We can group these findings into three categories. *Ethnoreligious* proximity explains common worldviews and languages. *Socioeconomic* proximity characterizes common caste, kinship ties, or economic status. And shared risk perception characterizes the *spatial* proximity element of common negative environmental emigration pressures.

A separate study confirmed the external validity of these conclusions with a similar study among West Bengal focus groups. Shared ethnoreligious, socioeconomic, and environmental risk

proximities explain the sociopolitical welcome Bangladeshi migrants have received in West Bengal.

West Bengal: A United History

Host-migrant ethnoreligious proximity was a hallmark of 2017 focus group interviews conducted in West Bengal (Shamshad, 2017). Often, this emerged from the historical unity of Bengal, both West (in India, Calcutta-side) and East (what became the country of Bangladesh). The sources interviewed persistently referenced a shared pre-Partition history, a touchpoint seemingly formative of a common Bengali identity.

The British partition of 1905 United Bengal into Muslim and Hindu sides, done ostensibly to quash the ferment of Indian self-rule coming from the universities of Calcutta—whose massive protests contributed to the British desperation to shift all state functions out of Bengal in 1911 to a baroque, planned city they termed New Delhi—failed upon the reunification of the region (Chatterji, 2007). This initial failure to split Bengal seemed to presage a popular unity that downgraded religious differences for a unified front against the central government (Chatterji, 1999; Shamshad, 2017). This ethnic unity, despite divergent dialects and differing religious majorities, established a common homeland in the popular poems and songs of the early 1900s Bengali renaissance's "Golden Bengal" (Jones, 2012). Interviewees frequently referenced the geography of the Ganges Delta providing a fixed and historical ethnic definition transcending state boundaries or religious divisions (Jones, 2009). The memory of historical unity partly transcended religious divisions during the Partition of India. During Partition talks between the Congress, the Muslim League, and the British commission, India maneuvered to keep the northwestern, majority-Muslim districts of Malda and Murshidabad in order to maintain control of the Ganges headwaters (Chatterji, 1999). In so doing, they began a political

partnership with local Muslim elites in these areas which has persisted through seven decades of secular, not religious, coalition rule (Chatterji, 2007). Secular, broad-based, Muslim-inclusive ruling coalitions have been the norm within Indian Bengal, presenting a base of regional resistance against the central government's imposition of a Hindu criterium for Indian citizenship (Saikia, 2020). This again echoes the historical-political unity of Bengal.

Ethnoreligious identity is the most atavistic and seemingly immutable component of modern national identity. The unity of ethnic belonging among Bengalis seems to override religious identification despite the years of mass migration from Bangladesh. Shamshad claims, despite the unreckoned numbers of undocumented Bangladeshis in West Bengal, "By 1973 [after the 1971 genocide and Liberation war within Bangladesh], almost 15% of West Bengal's entire population, and one in four [urban dwellers] were of East Bengali [Bangladeshi] origin…Today, one in every three people in West Bengal is of East Bengali origin" (Shamshad, 2017).

Socioeconomic proximity in West Bengal is also close between migrants and hosts. Shamshad's interviewees note intermarriage and kinship ties between the two, and with mutual social ties, there are also economic connections. Demand for immigrant labor is strong (Shamshad, 2017). The distinction locals in West Bengal make is merely between Bengal "on this side" (*e-par)* and Bengal "on that side" (*o-par*), a matter of preferring fish to prawns and one sports team to another (439-40). Common social ties and a common economic status provide social networks for new migrants and reduce barriers to migration (Bonfanti, 2014; Mursheda & Abdul, 2018; Lujala et al., 2020).

Perceptions of shared risk also join host-migrant communities in West Bengal. Spatial proximity ensures that environmental disasters such as May 2020's Super Cyclone "Amphan"—the strongest recorded storm ever to form in the Bay of Bengal—impact not only Bangladesh,

but also the entire state of West Bengal (Rajaram et al., 2020), influencing a shared framework of risk perceptions. Environmental risk perceptions among West Bengalis are high, and climate change attribution for degrading farmland is highly prevalent (Adger et al., 2021), undergirding widespread sympathy for forced environmental migrants. In addition to environmental risk, political analysts have noted a shared perception of risk of Hindi hegemony with the ruling power attempting to enforce linguistic and religious unity through a program of Hindutva (*Hindu identity as political criteria for citizenship*) (Oza, 2007; Saikia, 2020). Sympathy towards those targeted by the ruling regime is a factor in receiving Bangladeshi migrants. In practice, both Bangladesh and West Bengal tend to aver, officially as a matter of course, that apprehended undocumented migrants, slated to be deported, are simply native West Bengalis, and it is not uncommon for new arrivals to simply change their Muslim names to neutral or Hindu ones in order to evade suspicion (Das & Ansary, 2018; Jones, 2012; Shamshad, 2017; Tripathi, 2016). The ability of the undocumented to obtain Indian *Aadhar* cards (biometrically-linked government assistance cards) would not be possible without widespread institutional sympathy and civil society assistance (Chakraborty, 2018; Das & Ansary, 2018).

Assam: A Divergent Host-Migrant History

Assam, a region on Bangladesh's north, demonstrates the opposite attitude to Bangladeshi migrants. The ethnoreligious proximity is not close, and in fact, has been diverging since its common history under British colonization—due to the divisions introduced by the British in its colonial enterprise (R. Ahmed, 2014).

Gupta traces the turn of local public opinion against Bengali migrants in Assam. Assamese natives, themselves, are a multi-ethnic people descending from the Ahom, a Tai-speaking people related to the Shan of northwest Burma, intermarrying with indigenous Tibetans

in the Brahmaputra River Valley and incorporating many migrant Indian populations (Borah, 2019). Prior to British control, wars between the Tibetans and the ruling Assamese had devastated the rural population along the lowlands (Gupta, 2018). In the 1890s, the British embarked on a nascent tea industry in Assam, but the enterprise lacked a workforce. The Assam were land-rich but labor-poor, well into the 1930s (Gupta, 2001). With centuries of facility in riverine agriculture, demanding relatively low wages, Muslim Bengalis coming from the overcrowded delta were welcomed by local elites as a laboring class essential to develop a cash economy based on tea export (ibid). Over time, migration from not just Bengal but also central India formed a Hindi pidgin language, a mixed regional identity, both termed *Asami* (Borah, 2019). Assamese language developed into its own dialect and political entity in late British rule.

When India gained independence, Bengali laborers became a great source of political power for the Assamese: during the first census just after independence, Bengali workers followed the Muslim League's insistence and identified as "*Asamiya*" (Gupta, 2018). In this way, Gupta writes,

> "One, for the first time, the *Asamiya* speakers became an absolute majority within Assam. This majority status was further consolidated in subsequent decades... through the enactment of the Official Languages Act, 1960, making *Asamiya* the sole official language of the state...Two**,** the electoral support of the Muslim settlers provided *Asamiya* leaders with a safe route to political power, which was essential for the retention and expansion of *Asamiya* hegemony over Assam's diverse peoples. Three, this marriage of convenience with the migrant Muslims served as a counterweight against the powerful Hindu Bengalis of Assam, who, after Partition, became a minority in the reconstituted state" (Gupta, 2018).

The rivalry with Hindu Bengalis, Gupta elsewhere notes, was due to job competition in the middle class and government service sectors (Gupta, 2001). It was preferable for the Assamese to partner with economically and politically weaker Muslim Bengalis, at least, as we will see in the next section, until those individuals began to gain status and political voice themselves.

The overcount of *Asami* citizens in the bedrock 1951 census lent the illusory conviction that later mass migrations of Bangladeshis had overwhelmed native Assamese speakers (Gupta, 2018). During British rule, land-rich Assamese native elites held an unequal partnership with the land-poor Muslim Bengali migrants against competing Hindu elites. This erstwhile partnership was so strong that, after Partition, Assamese encouraged long-time Bengali farmers to be termed "New Assamese" (Gupta, 2001) and assimilate into the new ethnicity. Host-migrant ethnoreligious proximity had a possibility of developing into a permeable state, much like in West Bengal.

But this unequal partnership was unstable, intolerant of job competition in the middle-class realm. The partnership fell out in communal riots responding to the 1960 Official Languages Act. The imposition of Assamese as a state language—despite the lack of facility in it for the poorly educated Bengali laboring class, and despite only a minority of residents in Assam speaking the language—and riots opposing the Assamese language mandate, began to encourage the rise of a separate Bengali consciousness and voting power (Saikia, 2020). The boundaries between Assamese and Bengali were defined by this attempted assertion of Assamese power in the form of language. Host-migrant ethnoreligious proximity in Assam would diverge henceforth, local politicians using gradually more derogatory names such as *outsiders, Mians (*Muslim men), *infiltrators, invaders,* and finally, *termites* in response to Bengali Muslim

population growth and voting power in the region (R. Ahmed, 2014, 2018; Das & Ansary, 2018; Rajagopalan, 2018). This culminated in periodic and ongoing episodes of extreme communal violence against Muslim Bengali migrants (Borah, 2019; Borkakoti, 2013; Special to The New York Times, 1980).

Thus, ethnoreligious "bright lines" between local Assamese and immigrant Bangladeshis are distinct, and as previously noted, socioeconomic distinctions are fueled by this distinction. The primary dispute between host-migrant communities in Assam is an economic one: the gradual encroachment on previously communally-held Assamese tribal land by immigrant Bangladeshis (Borah, 2019; Borkakoti, 2013; Gupta, 2018). Intermarriage by Assamese jeopardizes communal land rights, so it seldom occurs (TOI, 2020). When the host community perceives immigrants as lower in economic status/potential and erects impermeable boundaries to entry, it is far less likely to receive migrants facing climate distress, as is the case with Assam and Bangladesh (Lujala et al., 2020). Cost barriers to migration can be prohibitive when social networks in the receiving community are poorly integrated or impoverished (Adger et al., 2021).

Spatially distinct, Assamese and immigrant Bangladeshis experience environmental risk differently. As previously noted, native Assamese were historically land-rich and labor-poor. Having communally-held ancestral land entitles Assamese to more environmentally secure land on higher elevations, while the Bengali population lives on highly exposed seasonal islands (*"char")* and bottomlands along the Brahmaputra river, land which Assamese ancestrally considered uninhabitable (Gupta, 2001, 2018). The risk to upland tea gardens, where much of the Assamese socioeconomic activity is located, is therefore different environmentally than the risk to the lowland rice fields along the Brahmaputra, where the Bengali population is located (Black, Adger, et al., 2011a; Gupta, 2001). Drought and flood risk may occur on concurrent years, but it

is more likely that, facing different threats in different years, Assam is less likely to perceive a "greater enemy" in climate change than on the mass influx of Bangladeshis. As a review of climate conflict literature notes, "widespread disasters generate solidarity and cooperation," but disasters affecting groups unevenly, particularly those affecting "river-sharing dyads" such as the Assamese and the Bengalis within the state, tend to "increase inter-group conflict" through scarcity, demand, and relative deprivation (Koubi, 2019). Barnett and Adger (2007) agree that "it is relative rather more than absolute poverty that seems to matter" in civil conflict generated by unequal climate impact.

World Climate Migration and the Authoritarian Response

Climate change means the ominous shift toward a new normal: new average climates, new climate extremes. But we are not yet arrived at the new normal; we are in motion, and all of the planetary systems of agriculture and economics of the 20th century are dragged along by the new tilt of the gravitational sphere as it adjusts.

Strong consensus exists that climate and migration are increasingly tied together, acting upon the "agricultural pathway," the price signal of decreased agricultural productivity and food shortage mentioned in chapter two (de Sherbinin, 2020). The World Bank's Groundswell Report describes climate models that drive natural-resource dependent populations away from drought-prone, coastal areas towards already-populated upland areas of intensive agriculture—and into cities as well, competing for state assistance with locals in order to cope with their livelihoods' mass dislocations (Rigaud et al., 2018). The UK government's Foresight report agrees that "climate change will not cause, but rather amplify existing demographic trends of migration to urban areas" (Black, Bennett, et al., 2011, S10). Although Gray and Mueller disapprove of this so-called "Neo-Malthusian narrative" of famine and want, they admit that there is broad proof, in

absence of state intervention, that the environmentally triggered collapse of local risk-sharing networks and the undermining of local opportunities for off-farm employment increase the motivation to relocate farther away (even decreasing the opportunity cost for mass migration across borders) (Gray & Mueller, 2012). Mass migration seems to take "increasingly perilous journeys" being driven by a "concern about local safety and security along with a prevailing hopelessness," social dislocations caused by the climate's new normal (de Sherbinin, 2020, 7).

For Bangladeshis crossing the border, like 15-year-old Felani Khatun, journeys across India's new border walls end in death. Crossing the fence with her father to visit the house of her betrothed in West Bengal, Felani was killed by India's Border Security Force, which escaped penalty due to authorization of lethal force (Jones, 2016). Khatun's life was only one of the more than 1,000 taken in the last decade along the new border fence built by India to contain "Bangladeshi infiltrators" (ibid.). Ultimately, whether the destination is hostile Assam or hospitable West Bengal does not matter if migrants do not survive the journey.

Border militarization is arguably a re-articulation of state sovereignty *contra mundi*, a purposeful blurring of distinctions between police and military force, and ultimately a political act to make war against unauthorized migrants (Jones & Johnson, 2016). The authorization of migrants depends upon their characterization by powerful state and civil society actors, views governed by host-migrant proximities of ethnic, economic, and spatial risk. Conflict is not the only possible outcome, but it is a logical outworking of mass migration. If mass migration is to increase, conflict may as well.

The links between climate and conflict are tentative, but emerging. A 2019 review of the literature describes the two pathways as direct competition over scarce resources ("greed versus grievance") or indirect via the price signal of staple foods as described in chapter two (Koubi,

2019). The Syrian Civil War, arguably, was sparked by the government's poor management of water resources in the face of a multidecadal drought so severe as to transgress the boundaries of natural variability (Gleick, 2014; Kelley et al., 2015), underscoring the importance of responsive government in anticipating impacts of climate on food price stability. Freshwater scarcity elevates the risk of violence within states, even if limited evidence shows that it drives war (Nordås & Gleditsch, 2007). What already seems to be occurring due to climate change is the exacerbation of political violence inside states along ethnoreligious lines and—most prominent of all—against immigrants (Buhaug & von Uexkull, 2021; Wischnath & Buhaug, 2014). As climate change increases the numbers of transregional and transborder migrants, we may already be witnessing democratic backsliding in response. Here I suggest there is a connection between mass migration and the rise of nativist authoritarianism.

It is increasingly clear that climate change is triggering the political pressure points of mass immigration in the present day, reenacting a form of political theater very familiar to the foremost expert of 20th Century nativist authoritarianism, Hannah Arendt. Herself an émigré from 1930s Germany, she writes in 1951's *The Origins of Totalitarianism* how the popular dream of upward economic mobility collapses in economic downturn, generating mass mistrust towards ruling elites and the liberal concept of the state (Arendt, 1951). The prospering of outside groups engenders native fears of domination by non-natives, spurring alienated citizens toward nativist autocrats who can articulate "negative solidarity," an animus against an internal minority enemy, the embrace of new national mythologies which propose to organize the state to exclude scapegoats—minorities, perhaps immigrants, newly dispossessed of national membership—in order to confiscate their prosperity for transfer to "true" citizens (ibid.).

Arendt may be describing a historical experience, but the echoes today are haunting. After the Cold War, not only the barriers to capital investment fell but also the barriers to labor migration; global migration occurred first among the very wealthy, then the highly skilled; throughout the world, increasingly, however, unskilled migrants took advantage of new, cheaper, transportation and international frameworks for labor migration. In tandem, the global reorganization of industry "offshore" destroyed skilled jobs in much of the developed world in many of the urban centers continuing to receive migrants. Banks collapsed due to unregulated speculation, economic downturn and rising unemployment ensued, and for debtor countries which could not conduct quantitative easing, national austerity yoked high unemployment to a dissolving welfare system in order to repay debts from failed banks to elite foreign creditors who gave little else in return. Suddenly, the rootless wealthy were the origin of the problem, and perhaps they had intended to "replace" native jobs with cheaper ones overseas and pocket the difference. Perhaps migrants had streamed in too readily to drive down the pay of "honest" jobs.

Native perception of demographic dilution and economic subordination to non-natives was not foreseen, but it proceeded from these events. The perception of native demographic threat plays an instrumental role in the emerging so-called global democratic recession. For an example close to home, the University of Chicago conducted regression analysis on the participants of the January 6th insurrection and found large decadal increases of non-majority population in a home county to be highly predictive of riot participation (Pape, 2021). Notably, the researchers found that most of those arrested professed belief in the "Great Replacement" conspiracy theory: the elite's intentional substitution of white labor for imported immigrants ("The Face of American Insurrection: Understanding the Rioters Who Stormed the US Capitol on January 6, 2021," 2022).

It is beyond my scope to examine the transformation of media messaging around immigration and the heightened utilization of mass migration fears for the purposes of political violence. But the United States is not an isolated case. Strongmen in locations as varied as Hungary, Poland, Austria, Italy, India, and Turkey have cultured a fear of immigrants in order to spur a rally around the flag effect, enacting prohibitive restrictions on migrants and in some cases revoking their previously granted rights (R. Ahmed, 2014; Cagaptay, 2018; Iakhnis et al., 2018; Mulder, 2021; Raj, 2020). The destination at the end of the train track is by no means foregone, but the train is going somewhere. Hannah Arendt warns,

> "Politically speaking, tribal nationalism always insists that its own people is surrounded by "a world of enemies," "one against all," that a fundamental difference exists between this people and all others. It claims its people to be unique, individual, incompatible with all others, and denies theoretically the very possibility of a common mankind long before it is used to destroy the humanity of man." (Arendt, 1951, 227)

But the power of the state can be checked by a strong civil society (Acemoglu & Robinson, 2020). Either one can turn the country from an ultimate end in violence.

Conclusion

Ethnic, economic, and environmental risk proximities all anchor migrant reception in India's Assam and West Bengal. The same proximities will influence the welcome of climate migrants worldwide. Whether state structural or vigilante violence confronts the increasing number of cross-border climate migrants depends entirely upon the host perception of ethnic, economic, and risk proximities. Several of these proximities are mutable.

In 2015, German Chancellor Angela Merkel famously marshalled her state to receive millions of Syrian refugees with the single statement, "Wir schaffen das" *(We shall manage this*).

State maneuvering can only withstand public opposition so long: her battle with the hard-right nativist *Alternativ für Deutschland* would have ended in quick defeat in 2017 if civil society had not also joined to support the welcome. The state can fund structures like job training and housing; civil society must arise to lend the humanitarian workforce, the human warmth, the open interactions which are necessary to pull a new language learner into the community.

Ethnoreligious proximities are relatively immutable and path dependent. The migration of tomorrow relies on the success of the migrants of today. Socioeconomic possibilities for migrants can change if the rungs of society's ladder, such as labor demand, attainable quality education and reasonably priced healthcare are available to new migrants. Ukrainians are being hired into higher-education, higher-paid positions (Alderman & Cohen, 2022). Over the past decade, Syrians successfully took many of the jobs in skilled trades underpinning Germany's export-led economy, jobs which relied on the official apprenticeship programs established by the German state (Oltermann, 2020).

While the state can lead in easing migrant crises and structurally guiding migrants towards extent labor shortages, only civil society can communicate a culture of shared environmental risk. Churches, media, free associations, and volunteers can educate and influence society to see the common potential fate of hosts and migrants if they do not structure a managed response to the human effects of global warming on a mass scale. Responses must address the increased vulnerabilities not only of urban constituencies but also entire rural infrastructures of agriculture, and solutions must appropriately address the transnational nature of emerging climate problems (Dalby, 2013).

Proximities are not so inalterable that perceptions cannot be changed. The geopolitics of the Anthropocene, however, stands upon a knife edge of the demagogue: host-migrant distances

can be bridged by pro-social empathy and welcome, or the gulf can be widened to amass political power and impute blame elsewhere.

For the migrants of Bangladesh, as the walls around it rise, the surety of the ground beneath sinks away, and the wind rises, and the tide comes in, higher than ever before.

Works Cited

Acemoglu, D., & Robinson, J. A. (2020). *The Narrow Corridor: States, Societies, and the Fate of Liberty*. Penguin Publishing Group. https://books.google.com/books?id=wFT5DwAAQBAJ

Adger, W. N., de Campos, R. S., Codjoe, S. N. A., Siddiqui, T., Hazra, S., Das, S., Adams, H., Gavonel, M. F., Mortreux, C., & Abu, M. (2021). Perceived environmental risks and insecurity reduce future migration intentions in hazardous migration source areas. *One Earth*, *4*(1), 146–157. https://doi.org/10.1016/j.oneear.2020.12.009

Ahmed, R. (2014). Anxiety, Violence and the Postcolonial State: Understanding the "Anti-Bangladeshi" Rage in Assam, India. *Perceptions*, *19*(1), 55–70. ProQuest Central.

Ahmed, R. (2018). The NRC as "truth machine" in Assam. In *SouthAsia@LSE blog*. London School of Economics and Political Science.

Ahmed, Z., Guha, G. S., Shew, A. M., & Alam, G. M. M. (2021). Climate change risk perceptions and agricultural adaptation strategies in vulnerable riverine char islands of Bangladesh. *Land Use Policy*, *103*, 105295. https://doi.org/10.1016/j.landusepol.2021.105295

Ahmed, Z., Shew, A. M., Mondal, M. K., Yadav, S., Jagadish, S. V. K., Prasad, P. V. V., Buisson, M.-C., Das, M., & Bakuluzzaman, M. (2022). Climate risk perceptions and perceived yield loss increases agricultural technology adoption in the polder areas of Bangladesh. *Journal of Rural Studies*, *94*, 274–286. https://doi.org/10.1016/j.jrurstud.2022.06.008

Akter, S., Ahmed, K. R., Marandi, A., & Schüth, C. (2020). Possible factors for increasing water salinity in an embanked coastal island in the southwest Bengal Delta of Bangladesh.

Science of The Total Environment, *713*, 136668. https://doi.org/10.1016/j.scitotenv.2020.136668

Alderman, L., & Cohen, P. (2022). Fleeing War in Ukraine, They're Met With Employers Offering Paychecks. *New York Times (Online)*. https://go.exlibris.link/wthVDJlf

Arendt, H. (1951). *The Origins of Totalitarianism*. Harcourt Brace Jovanovich. https://books.google.com/books?id=8f2y0F2wzLoC

Assaduzzaman, M., Filatova, T., Coenen, F., & Lovett, J. (2020). Freedom of choice to migrate: Adaptation to climate change in Bangladesh. *International Journal of Sustainable Development & World Ecology*, *27*(7), 652–661. https://doi.org/10.1080/13504509.2020.1754959

Assefa, Y., Yadav, S., Mondal, M. K., Bhattacharya, J., Parvin, R., Sarker, S. R., Rahman, M., Sutradhar, A., Prasad, P. V. V., Bhandari, H., Shew, A. M., & Jagadish, S. V. K. (2021). Crop diversification in rice-based systems in the polders of Bangladesh: Yield stability, profitability, and associated risk. *Agricultural Systems*, *187*, 102986. https://doi.org/10.1016/j.agsy.2020.102986

Ayyub, R. (2021). Why Modi won't listen to India's farmers. *The Washington Post (Online)*, *Generic*. https://www.washingtonpost.com/opinions/2021/01/27/india-farmers-protests-delhi-police-violence-rana-ayyub/

Barnett, J. (2020). Global environmental change II: Political economies of vulnerability to climate change. *Progress in Human Geography*, *44*(6), 1172–1184. https://doi.org/10.1177/0309132519898254

Barnett, J., & O'Neill, S. (2010). Maladaptation. *Global Environmental Change*, *20*(2), 211–213. https://doi.org/10.1016/j.gloenvcha.2009.11.004

Birthal, P. S., Khan, T., Negi, D. S., & Agarwal, S. (2014). Impact of Climate Change on Yields of Major Food Crops in India: Implications for Food Security. *Agricultural Economics Research Review*, *27*(2), 145. https://doi.org/10.5958/0974-0279.2014.00019.6

Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. (2011a). *Migration and global environmental change: Future challenges and opportunities* (Final Project Report; p. 234). The Government Office for Science. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/287717/11-1116-migration-and-global-environmental-change.pdf

Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. (2011b). The effect of environmental change on human migration. *Global Environmental Change*, *21*, S3–S11. https://doi.org/10.1016/j.gloenvcha.2011.10.001

Black, R., Bennett, S. R. G., Thomas, S. M., & Beddington, J. R. (2011). Migration as adaptation. *Nature (London)*, *478*(7370), 447–449. https://doi.org/10.1038/478477a

Bonfanti, S. (2014). Towards a Migrant-Centred Perspective on International Migration: The Contribution of Amartya Sen's Capability Approach. *Social Work*, *12*(2), 13.

Borah, R. (2019). Politics of identity, sub-nationalism and citizenship: A case of national register of citizens in assam. *Journal of Legal Studies and Research*, *5*(2).

Borkakoti, J. (2013). Demographic invasion, Assamese identity and geopolitics. *Space and Culture, India*, *1*(1), 28–42.

Buhaug, H., & von Uexkull, N. (2021). Vicious Circles: Violence, Vulnerability, and Climate Change. *Annual Review of Environment and Resources*, *46*(1), annurev-environ-012220-014708. https://doi.org/10.1146/annurev-environ-012220-014708

Cagaptay, S. (2018, May 11). *How Nativism in Turkey Is Stifling Democracy*. The Washington Institute. https://www.washingtoninstitute.org/policy-analysis/how-nativism-turkey-stifling-democracy

Chakraborty, A. (2018). *Renegotiating boundaries: Exploring the lives of undocumented Bangladeshi women workers in india. From Borders and Mobility in South Asia and Beyond* (Jones & Ferdoush, Eds.). Amsterdam University Press. https://doi.org/10.1515/9789048535224-007

Charles, D. (2021, October 31). PHOTOS: Cyclones and salty water are a threat. These women are finding solutions. *NPR*. https://www.npr.org/sections/goatsandsoda/2021/10/31/1049752700/they-call-it-climate-injustice-heres-how-sufia-khatun-of-bangladesh-is-fighting-

Chatterji, J. (1999). The Fashioning of a Frontier: The Radcliffe Line and Bengal's Border Landscape, 1947–52. *Modern Asian Studies*, *33*(1), 185–242. https://doi.org/10.1017/S0026749X99003066

Chatterji, J. (2007). *The Spoils of Partition: Bengal and India, 1947–1967*. Cambridge University Press. 10.1017/CBO9780511497384

Chen, J. J., Mueller, V., Jia, Y., & Tseng, S. K.-H. (2017). Validating Migration Responses to Flooding Using Satellite and Vital Registration Data. *American Economic Review*, *107*(5), 441–445. https://doi.org/10.1257/aer.p20171052

Chen, J., & Mueller, V. (2018). Coastal climate change, soil salinity and human migration in Bangladesh. *Nature Climate Change*, *8*(11), 981–985. https://doi.org/10.1038/s41558-018-0313-8

Chen, J., & Mueller, V. (2019). Climate-induced cross-border migration and change in demographic structure. *Population and Environment*, *41*(2), 98–125. https://doi.org/10.1007/s11111-019-00328-3

Cornwall, W. (2018, March 1). As sea levels rise, Bangladeshi islanders must decide between keeping the water out—Or letting it in. *Science*. 10.1126/science.aat4495

Cundill, G., Singh, C., Adger, W. N., Safra de Campos, R., Vincent, K., Tebboth, M., & Maharjan, A. (2021). Toward a climate mobilities research agenda: Intersectionality, immobility, and policy responses. *Global Environmental Change*, *69*, 102315. https://doi.org/10.1016/j.gloenvcha.2021.102315

Dalby, S. (2013). The geopolitics of climate change. *Political Geography*, *37*(Journal Article), 38–47. https://doi.org/10.1016/j.polgeo.2013.09.004

Das, B., & Ansary, R. (2018). Bangladeshi and Inter-state Migrants: Differential Adaptation and Acceptance by the Locals in West Bengal, India. *Spatial Demography*, *6*(2), 159–178. https://doi.org/10.1007/s40980-017-0040-1

de Sherbinin, A. (2020). *Climate Impacts as Drivers of Migration*. 12.

Degroot, D., Anchukaitis, K., Bauch, M., Burnham, J., Carnegy, F., Cui, J., de Luna, K., Guzowski, P., Hambrecht, G., Huhtamaa, H., Izdebski, A., Kleemann, K., Moesswilde, E., Neupane, N., Newfield, T., Pei, Q., Xoplaki, E., & Zappia, N. (2021). Towards a rigorous understanding of societal responses to climate change. *Nature*, *591*(7851), 539–550. https://doi.org/10.1038/s41586-021-03190-2

Edmonds, D. A., Caldwell, R. L., Brondizio, E. S., & Siani, S. M. O. (2020). Coastal flooding will disproportionately impact people on river deltas. *Nature Communications*, *11*(1), 4741. https://doi.org/10.1038/s41467-020-18531-4

Emran, S.-A., Krupnik, T. J., Aravindakshan, S., Kumar, V., & Pittelkow, C. M. (2021). Factors contributing to farm-level productivity and household income generation in coastal Bangladesh's rice-based farming systems. *PLOS ONE*, *16*(9), e0256694. https://doi.org/10.1371/journal.pone.0256694

FAO. (2017). *Rice market monitor* (No. XX; 3, pp. 1–38). UN Food and Agriculture Organization.

Farhana, K. M., & Mannan, D. K. A. (2018). Determinants of Regional Rural Urban Migration in Bangladesh: A Model Test on Marginal Segment in Rajshahi City. *International Journal of Migration and Development*, *4*(3).

Fukuda-Parr, S., & Hulme, D. (2011). International Norm Dynamics and the "End of Poverty": Understanding the Millennium Development Goals. *Global Governance*, *17*(1), 17–36. https://doi.org/10.1163/19426720-01701002

Gleick, P. H. (2014). Water, Drought, Climate Change, and Conflict in Syria. *Weather, Climate, and Society*, *6*(3), 331–340. https://doi.org/10.1175/WCAS-D-13-00059.1

Gray, C. L., & Mueller, V. (2012). Natural disasters and population mobility in Bangladesh. *Proceedings of the National Academy of Sciences*, *109*(16), 6000–6005. https://doi.org/10.1073/pnas.1115944109

Gupta, A. D. (2001). MIGRATION, IDENTITY AND CONFLICT IN INDIA'S NORTH EAST. *Himalayan and Central Asian Studies*, *5*(3–4), 23.

Gupta, A. D. (2018). The myth of the Assamese Bangladeshi. *Himal Southasian Magazine*, *August 2000*. https://www.himalmag.com/the-myth-of-the-assamese-bangladeshi/

Hamilton, L. (2019). *Amartya Sen*. Polity Press.

Iakhnis, E., Rathbun, B., Reifler, J., & Scotto, T. J. (2018). Populist referendum: Was 'Brexit' an expression of nativist and anti-elitist sentiment? *Research & Politics*, *5*(2), 2053168018773964. https://doi.org/10.1177/2053168018773964

Iffat, I. (2021). *Trends in Conflict and Stability in the Indo-Pacific*. Institute of Development Studies (IDS). https://doi.org/10.19088/K4D.2021.009

Islam, M. A., Hoque, M. A., Ahmed, K. M., & Butler, A. P. (2019). Impact of Climate Change and Land Use on Groundwater Salinization in Southern Bangladesh—Implications for Other Asian Deltas. *Environmental Management*, *64*(5), 640–649. https://doi.org/10.1007/s00267-019-01220-4

Jones, R. (2009). Sovereignty and statelessness in the border enclaves of India and Bangladesh. *Political Geography*, *28*(6), 373–381. https://doi.org/10.1016/j.polgeo.2009.09.006

Jones, R. (2012). Spaces of Refusal: Rethinking Sovereign Power and Resistance at the Border. *Annals of the Association of American Geographers*, *102*(3), 685–699. https://doi.org/10.1080/00045608.2011.600193

Jones, R. (2016). *Violent Borders: Refugees and the Right to Move*. Verso Books. https://books.google.com/books?id=-BFyCwAAQBAJ

Jones, R., & Johnson, C. (2016). Border militarisation and the re-articulation of sovereignty. *Transactions - Institute of British Geographers*, *41*(2), 187–200. https://doi.org/10.1111/tran.12115

Kaczan, D. J., & Orgill-Meyer, J. (2020). The impact of climate change on migration: A synthesis of recent empirical insights. *Climatic Change*, *158*(3–4), 281–300. https://doi.org/10.1007/s10584-019-02560-0

Kelley, C. P., Mohtadi, S., Cane, M. A., Seager, R., Kushnir, Y., & Columbia Univ., N. Y., NY (United States). (2015). Climate change in the Fertile Crescent and implications of the recent Syrian drought. *Proceedings of the National Academy of Sciences - PNAS*, *112*(11), 3241–3246. https://doi.org/10.1073/pnas.1421533112

Khan, M. R., Huq, S., Risha, A. N., & Alam, S. S. (2021). High-density population and displacement in Bangladesh. *Science*, *372*(6548), 1290–1293. https://doi.org/10.1126/science.abi6364

Koubi, V. (2019). Climate Change and Conflict. *Annual Review of Political Science*, *22*, 343–360.

Lujala, P., Bezu, S., Kolstad, I., Mahmud, M., & Wiig, A. (2020). How do host–migrant proximities shape attitudes toward internal climate migrants? *Global Environmental Change*, *65*, 102156. https://doi.org/10.1016/j.gloenvcha.2020.102156

Mahmood, S., & Saleh, A. F. M. (2020). Assessment of the Impact of Agriculture on Livelihood of the Farmers in a Polder: A Case Study in the South-West Coastal Area of Bangladesh. In A. Haque & A. I. A. Chowdhury (Eds.), *Water, Flood Management and Water Security Under a Changing Climate* (pp. 343–360). Springer International Publishing. https://doi.org/10.1007/978-3-030-47786-8_24

Mainuddin, M., Karim, F., Gaydon, D. S., & Kirby, J. M. (2021). Impact of climate change and management strategies on water and salt balance of the polders and islands in the Ganges delta. *Scientific Reports*, *11*(1), 7041. https://doi.org/10.1038/s41598-021-86206-1

Mainuddin, M., Peña-Arancibia, J. L., Karim, F., Hasan, Md. M., Mojid, M. A., & Kirby, J. M. (2022). Long-term spatio-temporal variability and trends in rainfall and temperature

extremes and their potential risk to rice production in Bangladesh. *PLOS Climate*, *1*(3), e0000009. https://doi.org/10.1371/journal.pclm.0000009

Massey, D. S., Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A., & Taylor, J. E. (1993). Theories of International Migration: A Review and Appraisal. *Population and Development Review*, *19*(3), 431. https://doi.org/10.2307/2938462

Mondal, M. K., Tuong, T. P., Ritu, S. P., Choudhury, M. H. K., Chasi, A. M., Majumder, P. K., Islam, M. M., & Adhikary, S. K. (2006). Coastal water resource use for higher productivity: Participatory research for increasing cropping intensity in Bangladesh. In C. T. Hoanh, T. P. Tuong, J. W. Gowing, & B. Hardy (Eds.), *Environment and livelihoods in tropical coastal zones: Managing agriculture-fishery-aquaculture conflicts* (pp. 72–85). CABI. https://doi.org/10.1079/9781845931070.0072

Mondol, M. A. H., Zhu, X., Dunkerley, D., & Henley, B. J. (2021). Observed meteorological drought trends in Bangladesh identified with the Effective Drought Index (EDI). *Agricultural Water Management*, *255*, 107001. https://doi.org/10.1016/j.agwat.2021.107001

Mulder, N. (2021, June 24). The revolt against liberalism: What's driving Poland and Hungary's nativist turn? *The Guardian*. https://www.theguardian.com/world/2021/jun/24/revolt-against-liberalism-eastern-europe-poland-hungary-nativist-politics

Nordås, R., & Gleditsch, N. P. (2007). Climate change and conflict. *Political Geography*, *26*(6), 627–638. https://doi.org/10.1016/j.polgeo.2007.06.003

Nordqvist, P., & Krampe, F. (2018). *Climate change and violent conflict: Sparse evidence from South Asia and South East Asia*. Stockholm International Peace Research Institute.

Oza, R. (2007). The Geography of Hindu Right-Wing Violence in India. In *Violent geographies: Fear, terror, and political violence* (First, pp. 153–174). Routledge. https://go.exlibris.link/KRjWk8MZ

Palmer, A. W. (2022). They Came to Help Migrants. Now, Europe Has Turned on Them. *New York Times (Online)*. https://go.exlibris.link/b28KvdyL

Pape, R. A. (2021). What an analysis of 377 Americans arrested or charged in the Capitol insurrection tells us. *The Washington Post (Online)*. https://www.washingtonpost.com/opinions/2021/04/06/capitol-insurrection-arrests-cpost-analysis/

Petrova, K. (2021). Natural hazards, internal migration and protests in Bangladesh. *Journal of Peace Research*, *58*(1), 33–49. https://doi.org/10.1177/0022343320973741

Press, T. A. (2021, August 31). New Orleans Levees Passed Hurricane Ida's Test, But Some Suburbs Flooded. *NPR*. https://www.npr.org/2021/08/31/1032804634/new-orleans-levees-hurricane-ida-flooding

Rabbani, Md. G., Khan, Z. M., & Tuhin, M. H. (2015). *Climate Change and Migration in Bangladesh: Gender Perspective*. United Nations Women. https://asiapacific.unwomen.org/en/digital-library/publications/2016/01/climate-change-and-migration-in-bangladesh

Raj, K. (2020, February 21). How Nativist Populism Is Going Mainstream in Europe. *Human Rights Watch*. https://www.hrw.org/news/2020/02/21/how-nativist-populism-going-mainstream-europe

Rajagopalan, K. (2018). Of insiders, outsiders, and infiltrators: The politics of citizenship and inclusion in contemporary South Asia. In *Borders and mobility in south asia and beyond* (pp. 101–122). Amsterdam University Press. https://doi.org/10.1515/9789048535224-006

Rajaram, P., Suri, M., Mitra, E., Regan, H., & Sud, V. (2020). More than 80 killed in India and Bangladesh as Cyclone Amphan heaps misery on coronavirus-hit areas. *CNN Wire Service*. https://go.exlibris.link/QtnRYBpS

Ratcliffe, R. (2019, December 6). "This place used to be green": The brutal impact of oil in the Niger Delta. *The Guardian*. https://www.theguardian.com/global-development/2019/dec/06/this-place-used-to-be-green-the-brutal-impact-of-oil-in-the-niger-delta

Ravi, C. (2021). The 1971 Bangladesh War and Policy Lessons for Climate Refugee Management in South Asia. *Politics & Policy*, *49*(1), 248–274. https://doi.org/10.1111/polp.12392

Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., & Midgley, A. (2018). *Groundswell: Preparing for Internal Climate Migration*. World Bank. http://hdl.handle.net/10986/29461

Saikia, S. (2020). Saffronizing the periphery: Explaining the rise of the Bharatiya Janata Party in contemporary Assam. *Studies in Indian Politics*, *8*(1), 69–84.

Schwartz, J. (2021, June 4). A Million Years of Data Confirms: Monsoons Are Likely to Get Worse. *The New York Times*. https://www.nytimes.com/2021/06/04/climate/monsoons-climate-change.html

Sen, A. (2000). Development as freedom. *DEVELOPMENT IN PRACTICE-OXFORD-*, *10*(2), 258–258.

Shamshad, R. (2017). Bengaliness, Hindu nationalism and Bangladeshi migrants in West Bengal, India. *Asian Ethnicity*, *18*(4), 433–451. https://doi.org/10.1080/14631369.2016.1175918

Shew, A. M., Durand-Morat, A., Putman, B., Nalley, L. L., & Ghosh, A. (2019). Rice intensification in Bangladesh improves economic and environmental welfare. *Environmental Science & Policy*, *95*, 46–57. https://doi.org/10.1016/j.envsci.2019.02.004

Shew, A. M., & Ghosh, A. (2019). Identifying Dry-Season Rice-Planting Patterns in Bangladesh Using the Landsat Archive. *Remote Sensing*, *11*(10), 1235. https://doi.org/10.3390/rs11101235

Shew, A. M., Nalley, L. L., Durand-Morat, A., Meredith, K., Parajuli, R., Thoma, G., & Henry, C. G. (2021). Holistically valuing public investments in agricultural water conservation. *Agricultural Water Management*, *252*, 106900. https://doi.org/10.1016/j.agwat.2021.106900

Slater, J., & Masih, N. (2019). *Protests erupt across India against new citizenship law after police storm university campus*. https://search.proquest.com/docview/2327173732

Snyder, T. (2010). *Bloodlands: Europe Between Hitler and Stalin*. Basic Books. https://books.google.com/books?id=ks0WBQAAQBAJ

Special to The New York Times. (1980). Assam and West Bengal Feuding Over Emigrants: Students Boycott Classes. *New York Times (1923-)*, 18.

Stanley-Becker, I., Mekhennet, S., & Glucroft, W. N. (2022). Europe rewrote its migrant playbook for Ukrainian refugees. Some fear it's not enough. *The Washington Post*. https://www.washingtonpost.com/world/2022/03/19/refugees-ukraine-europe/

Stark, O., & Bloom, D. E. (1985). The new economics of labor migration. *The American Economic Review*, *75*(2), 173–178.

Sultana, Z. (2010). *Impact of Monga on Rural Urban Migration: Its Socio- Economic Consequences*. *4*(2), 17.

The Face of American Insurrection: Understanding the Rioters Who Stormed the US Capitol on January 6, 2021. (2022, January 7). *Chicago Project on Security and Threats at the University of Chicago*. https://storymaps.arcgis.com/stories/84fe30d503c742a692d05146d420c87f

The White House. (2021). *Report on the Impact of Climate Change on Migration* (p. 37). The White House. https://www.whitehouse.gov/wp-content/uploads/2021/10/Report-on-the-Impact-of-Climate-Change-on-Migration.pdf

Thomas, K. A. (2020). The Problem with Solutions: Development Failures in Bangladesh and the Interests They Obscure. *Annals of the American Association of Geographers*, *110*(5), 1631–1651. https://doi.org/10.1080/24694452.2019.1707641

Tobler, W. (2004). On the First Law of Geography: A Reply. *Annals of the Association of American Geographers*, *94*(2), 304–310. https://doi.org/10.1111/j.1467-8306.2004.09402009.x

TOI. (2020, February 18). Cash incentive for Bengali Hindus who marry into Assamese families. *The Times of India (Bombay, India)*. https://go.exlibris.link/rXPfhR8X

Tripathi, S. (2016, June 29). Illegal Immigration From Bangladesh to India: Toward a Comprehensive Solution. *Carnegie India*. https://carnegieindia.org/2016/06/29/illegal-immigration-from-bangladesh-to-india-toward-comprehensive-solution-pub-63931

Ullah, A. A. (2004). Bright City Lights and Slums of Dhaka city: Determinants of rural-urban migration in Bangladesh. *Migration Letters*, *1*(1), 26–41. Agricultural & Environmental Science Collection; ProQuest Central; Sociological Abstracts.

Vaidyanathan, R. (2019). Assam NRC: What next for 1.9 million “stateless” Indians? *BBC News (Online*. https://www.bbc.com/news/world-asia-india-49520593

Wischnath, G., & Buhaug, H. (2014). Rice or riots: On food production and conflict severity across India. *Political Geography*, *43*, 6–15. https://doi.org/10.1016/j.polgeo.2014.07.004

Woodard, C. (2012). *American Nations: A History of the Eleven Rival Regional Cultures of North America*. Penguin Publishing Group. https://books.google.com/books?id=Oc5VDwAAQBAJ

Yadav, S., Mondal, M. K., Shew, A., Jagadish, S. V. K., Khan, Z. H., Sutradhar, A., Bhandari, H., Humphreys, E., Bhattacharya, J., Parvin, R., Rahman, M., & Chandna, P. (2020). Community water management to intensify agricultural productivity in the polders of the coastal zone of Bangladesh. *Paddy and Water Environment*, *18*(2), 331–343. https://doi.org/10.1007/s10333-019-00785-4

Ziegler, A. (2013, August 13). India’s Assam Shows Second-Order, Dangerous Effects of Climate Change in South Asia. *NewSecurityBeat: The Blog of the Wilson Center’s Environmental Change and Security Program*. https://www.newsecuritybeat.org/2013/08/indias-assam-shows-order-dangerous-effects-climate-change-south-asia/