# Project Report

# Creating a political and social climate for climate change

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## Abstract

Climate change will in coming decades lead to increased frequency and severity of floods, drought and extreme weather events. As the more exposed areas of the world become increasingly inhospitable; this will lead to substantial climate induced displacement of people in developing countries. For affected countries and communities, this creates challenges in accommodating the displaced and in avoiding social tension and conflicts that may arise.

The aim of the project is to improve the basis for effective policy making in addressing displacement at the local, national and international levels. Its objectives are very much in line with the UN global development agenda as expressed in the first two targets of Sustainable Development Goal 13, to “strengthen resilience and adaptive capacity to climate-related hazards ... in all countries” and to “integrate climate change measures into national policies, strategies and planning”.

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**Abstract**

We present unique survey data on the migration predictions of 400 households in two extremely climate exposed unions of coastal Bangladesh. We have four main findings. First, despite having prospects no better than many low-lying pacific islands, few households in our two locations expect to relocate elsewhere over the coming five-year period. Second, to the extent that households predict they will move in the near future, they believe that fast onset events such as cyclones will be a main reason - not slow changing environmental factors like increasing soil salinity. Third, household migration predictions correlate non-linearly with household assets; the poorest and the richest households are the most likely to move. Fourth, results from an embedded discrete choice experiment suggest that the poor are more likely to migrate in scenarios where their wages are low, while the rich are more likely to migrate in scenarios where their earnings are high. One possible interpretation of these results is that the poor expect to migrate because and when they have to, while the rich expect to migrate because and when they can. Our discrete choice experiment confirms that households expect to move if there is considerable destruction of property from fast onset events, but not due to gradual erosion of environmental conditions. In sum, our results suggest that households in climate exposed regions to a limited extent perceive migration as an adaptation strategy to climate change.

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# 1. Introduction

Natural disasters displaced more than 17 million people worldwide in 2018.[1] In addition, a large number of people were displaced by long term environmental changes caused by increasing temperatures and changes in precipitation and rainfall patterns. Migration is seen as an important adaptation strategy to climate change, and considerable effort is going into predicting the scale of climate induced migration and displacement - who will move under which conditions, and to where? By some estimates, up to 143 million people in Africa, Asia, and Latin America will become internally displaced by 2050 as a result of climate change (Rigaud et al., 2018). While the accuracy of these estimates and the durability of displacement are debated (Boas et.al 2019), such predictions form an important basis for governments and the international community to prepare for and facilitate relocation. The decision to pack up and leave is typically made by individual households, however, and less is known about the predictions households in climate exposed areas make about future conditions and their likelihood of migrating. Yet it is the expectations and beliefs of these households about what the future looks like, and what opportunities and constraints they face in a given future situation, that influence their plans to move, and shape their level of preparedness for future relocation. To bridge this knowledge gap, complementing studies of macro level migration predictions with analyses of household level predictions and preparation, thus appears absolutely essential.

An important question in this regard is the extent to which migration is seen as an accessible adaptation strategy by the poor households living in climate exposed areas of the Global South. The livelihoods of these households may be the most vulnerable to climate change, and relocation a matter of survival. However, migration is also costly, which means that the poor may not have the resources or access to credit needed to move, a constraint that may become increasingly binding as environmental change erodes their assets and incomes. Poor households may also be less informed about climate change and its likely consequences. To this we can add high discount rates and cognitive limitations that come with being poor, which could mean that the poor have little space to consider and plan for future migration (Mani et al., 2013). Whereas general cognitive biases like a tendency to underestimate the effects of climate change, procrastination, or preferences such as attachment to place may cut across wealth levels, their impact on the mobility prospects of the poor may be more pronounced

[1] See https://www.internal-displacement.org/database/displacement-data

given the other obstacles they face (Mani et al., 2013; Li 2017). Thus, while the poorest households may need to relocate the most, they may face numerous barriers in doing so. The question is whether this makes the poor disregard migration as a prospective adaptation strategy, a question which has so far met with insufficient attention and analysis.

In this paper, we present results from a survey conducted in Gabura and Koyra, two unions of the Satkhira and Khulna districts, respectively, located in South-West Bangladesh. Bangladesh was the 7th most climate affected country during the period from 1998 to 2017[2] and is increasingly exposed to climate change risks in the years to come. The World Bank (2018:127) projects in a pessimistic climate scenario that there will be 13 million (with a range of 7-20 million) climate migrants, or 7.5 percent of the current population, in Bangladesh in 2050. Our data is from one of the most vulnerable parts of the country, and the unions in question are already experiencing the effects of climate change (Didar-Ul Islam et al. 2015; Islam and Hasan, 2016). The survey was designed to capture household projections of their own permanent relocation probabilities over the next five years and the household characteristics associated with high and low relocation predictions. The survey also embedded a discrete choice experiment through which we elicit household predictions of migration under different future slow and rapid onset climate related hazards. To our knowledge, this is the first study employing a choice experiment approach to understand household migration preferences amidst tradeoffs between economic, social and environmental factors.

Our results paint a rich and internally consistent picture of household migration predictions. Almost 90 per cent of households report a zero probability of moving over the next five years, and we estimate that the average probability of moving is less than 5 per cent. Given the increasingly marginal livelihoods and environmental risks faced by households in our study areas, this seems surprisingly low. Moreover, our survey and experimental results suggest that households see environmental changes as influential on mobility only in the shape of fast-onset events like cyclones that lead to destruction of property, or through an effect on wages and earnings. The effects of slow-onset changes on agricultural productivity are not perceived as important for future mobility.

We find that household predictions of their future mobility, and their responses in the discrete choice experiment, are heterogeneous in household wealth. However, in contrast to the

[2] https://reliefweb.int/sites/reliefweb.int/files/resources/Global%20Climate%20Risk%20Index%202019_2.pdf

literature suggesting that credit constraints limit the mobility of poor households, we find a u-shaped relationship between predicted household mobility and household wealth, suggesting that both the poorest and the wealthiest see themselves as more likely to move than those in the middle of the wealth distribution. This result is robust to controlling for a number of household and individual respondent characteristics, including household migration history and environmental shock experience, and respondent risk and time preferences. Moreover, in the discrete choice experiment, we find that poor households are more likely to move in scenarios where their wages are low, while the rich are more likely to migrate when earnings are high. These results differ from the findings of previous studies of migration intentions, including the inverse U-shaped relationship between assets and migration intentions found by Dustmann and Okatenka (2014) using cross-country data. Our within-country analysis hence indicate that their results may be driven by unobserved differences between countries.

Overall, our results suggest that not many households in our survey areas foresee using migration as an adaptation to climate change. However, changes in income or devastation by extreme weather events may increase the number who relocate. A loss of shelter or destruction of dwellings by cyclones may force household to leave. Nevertheless, the poor perceive themselves as relatively less trapped in place than suggested by a number of studies in the climate migration literature (Foresight 2011:14; Arongo, 2000; Adger et al 2015; Black et al, 2013; Adams, 2016). However, the implications of this finding should perhaps not be overstated as the migrating households will likely move over shorter distances (Islam and Hasan, 2016) and their situation after relocation is unlikely to be very favourable.

The paper is structured as follows. Section 2 presents a brief conceptual framework and the relation of our study to the literature. Section 3 discusses our data and empirical approach. Results from regression analyses of the correlates of household migration predictions are presented in Section 4, and the approach and results from the discrete choice experiment in Section 5. Section 6 concludes with a discussion of policy implications.

## 2. Conceptual framework

The focus of our analysis is household predictions that the entire household will relocate permanently in the near future (specified as the next five years). We are hence looking at more drastic relocation decisions than labour migration of individual household members, which is very common in Bangladesh. Although a household's assessment of the probability that it will

relocate is subjective and only an indication about an actual decision to migrate permanently, it serves as a key ex-ante measure of the household's adaptation strategy to climate change. A number of the determinants that affect actual migration likely also feature in household predictions and planning for future migration. However, there is a time span between planning or intending to move and actually migration, where updating of information and beliefs may play an important role for the final decision to migrate.

In considering the drivers of actual migration that may also influence households' migration predictions, Black et al. (2011) distinguish five categories of migration drivers. Firstly, economic factors will shape the relocation decision. These include expected relative income or wage differences between origin and destination localities (e.g. Harris and Todaro 1970) and the costs of related migration that may be difficult to overcome for households with credit or liquidity constraints (e.g., Dustmann and Okatenka, 2014). Income, lack of livelihood opportunities, wage differences and costs alone, however, do not explain the observed migration patterns, but the scale and direction of movement have also been linked to migrants' personal characteristics, their connections with people in planned destinations and the migration policy in place in a country (Black et al., 2011).

Secondly, therefore, demographic variables like age, education, and the composition of households (children) work as drivers of migration. Young people are generally more mobile than older people and the composition of the household determines the demand for public services such as health and education where services can vary across localities. Here we might also add personal preferences and psychological traits such as residence preferences (Adams, 2016), household assessments of risk and risk attitudes (Bryan et al, 2014) and potential endowment effects, where for instance investments made in the current location keep people in place (Clark and Lisowski, 2017).

Thirdly, and relatedly, there are also social drivers, including family expectations, cultural practices, past migration patterns and social network (McKenzie and Rapoport, 2007). Fourthly, political factors can influence migration, including a breakdown of governance, political uncertainty, civil conflict, or active relocation policies of governments. Since our focus is on individual household migration decisions in a concentrated area, we do not emphasize the political factors in the following, with the exception of perceptions of government policies towards vulnerable areas.

The fifth and final driver of migration according to Black et al. (2011) is environmental factors. These can influence the other drivers both directly and indirectly for instance through income from agriculture. The environmental characteristics at a place both affect population's exposure to *hazards* and the available ecosystem *services* which in turn determine whether migration occurs and whether it is permanent or temporary.

In the literature on climate migration, some *rapid-onset* events like floods are generally perceived as triggers of *temporary* displacement (migration) (Gray and Mueller, 2012; Perch-Nielsen, 2008; Koubi et al. 2016), while especially hurricanes induce permanent migration (Strobl, 2011), a pattern that generally also holds for Bangladesh. Studies of displacement effects of large cyclones such as Aila in 2009 and Sidr in 2007 indicate that households or individuals within households were permanently displaced (Mallick et al. 2017; Mallick and Vogt, 2014; Islam and Hasan 2016). In a study from Bangladesh based on self-reported data of floods and crop failure, Gray and Mueller (2012) found that flooding only had a modest impact on migration, while crop failure at the household level had a negative impact on migration. Using satellite data of inundation in Bangladesh combined with yearly migration data, Chen et al (2017) corroborate these findings. One reason for this can be that people are trapped (i.e., do not have the economic means to relocate) when affected by floods. An alternative explanation might be that floods are not perceived as unpredictable shocks as they occur regularly in many parts of Bangladesh, and households adapt to these events with protection measures often supported by the government and NGOs.

According to Black et al. (2011) ecosystem service provision in terms of agricultural production and gathering are threatened by rapid onset events, but more fundamentally by slow onset environmental dynamics like land degradation including salination. Climate change accelerates sea level rise, flooding and saline contamination of soils and thereby negatively impacts agricultural production. Findings from Bangladesh and Pakistan show that *slow onset* events induce permanent migration (Chen and Mueller 2018, Mueller et al. 2014). Salinity had a direct effect on migration even after controlling for income losses (Chen and Mueller, 2018).

The main objectives of our study is to analyze how environmental factors and vulnerabilities affect household migration predictions among inhabitants of highly exposed areas who are likely to see their lives and livelihoods worsen as a result of climate change over the coming years. Further, the analysis seeks to identify barriers for viewing migration as a viable adaption strategy to worsening environmental conditions. We use a combination of empirical strategies

to analyze these issues, presented in greater detail in the following section. Our survey contains direct questions on which types of environmental factors are more likely to make households to relocate and through a discrete choice experiment we assess the relative importance of these factors – compared to economic changes known to affect migration – in influencing prospective permanent household migration.

We use regression analysis to study how household vulnerability to climate change and experience of past shocks and household's level of wealth (to assess the effect of resource constraints) correlate with household migration predictions, controlling for a number of variables reflecting the above five drivers of migration. Although the existing literature mainly see moving as a *rational, informed* decision, recent studies suggest that psychological factors like cognitive biases affect peoples' migration decision, decreasing the likelihood of migration (Kokkolainen and Kyle, 2016). Such biases may include people underestimating risks to own household, denial of the coming changes, procrastination in taking measures, and an emotional attachment to place or an endowment effect (and, for all the above, associated confirmation biases).[3] A troubling implication of many of these mechanisms is that as well as reducing mobility, they may reduce preparative and precautionary activities that households take to address coming challenges. The role of these types of biases may be even more pronounced in making migration predictions than for actual migration decisions, and we therefore elicit and control for respondent's risk and time preferences and other psychological factors in our regression analysis of migration prediction.

## 3. Research design, data and empirical strategy

Climate change has already had a large impact on living conditions in Bangladesh, with people living in coastal areas particularly hard hit. For instance, an estimated 20 million people in coastal Bangladesh have had their health affected from saltwater intrusion into drinking water supplies.[4] The monsoon in the summer of 2017 submerged one third of Bangladesh, affected eight million people, and led to substantial damages to crops and homes.[5] The resulting flood

[3] There is for instance a solid literature suggesting that procrastination is a cognitive bias that matters in human decision making (Ariely and Wertenbroch, 2002).

[4] https://www.intechopen.com/books/agricultural-economics-current-issues/coastal-community-adaptation-to-climate-change-induced-salinity-intrusion-in-bangladesh

[5] https://www.nytimes.com/2017/08/29/world/asia/floods-south-asia-india-bangladesh-nepal-houston.html

was reportedly the worst in 40 years.[6] Although internal migration flows are already high in Bangladesh, climate migration may come to outpace other internal migration in the country. The government of Bangladesh expects that "the greatest single impact of climate change might be on human migration/displacement", estimating that "by 2050 one in every 7 people in Bangladesh will be displaced by climate change" (Comprehensive Disaster Management Programme, 2015:4).

### 3.1 Study area, sampling and survey design

Our sample comes from two South-Western districts of Bangladesh, in areas close to Sundarbans mangrove forest and among the most vulnerable parts of the country's coastal zone (Figure 1). Both districts are exposed to floods and cyclones and soil salinization is a rising problem. The Satkhira and Khulna districts were the worst hit by the dramatic Aila cyclone in 2009. According to the United Nations (2010), Aila led to 190 deaths, approximately 7,100 injuries, loss of about a hundred thousand livestock, the destruction of infrastructure and damage to about 350,000 acres of cropland, leaving over 3.9 million people affected.[7]

We conducted our surveys during March and April 2019 in two locations of these adjacent districts: Koyra union of the Koyra upazila in the Khulna district and Gabura union of the Shymnagar Upazilla in the Sathkhira district. Prior to the survey, we had conducted two rounds of qualitative interviews with households living in these and other areas in the two districts to inform our choice of survey locations. Observations of living conditions and findings from the interviews indicated that climate related changes are highly relevant factors in household adaptation strategies in these areas, including for their mobility decisions.

The total population in Koyra counts 7788 households, while Gabura has 6762 households. We included in our sample households from all villages in Koyra (9 villages) and Gabura (16 villages). Our sampling approach was based on the proportion of population in each village but designed to ensure that at least 10 households from each village was included. Further, we included similar percentages female and male respondents from the randomly selected households in each village. The households were selected through a skip routine where

[6] Temperatures in Bangladesh will most likely rise in the range of 2.6–4.8 degrees (C) by 2100 (Caesar et al., 2015). Sea surface temperature changes and sea level rise, both caused by temperature changes will increase the frequency and/or severity of tropical cyclones in Bangladesh and cause unanticipated shifts in the timing and intensity of the monsoon and flooding the Ganges-Brahmaputra-Meghna delta (World Bank, 2018:146).
[7] Islam and Hasan (2016) estimate that more than 2 million people in the region were displaced as a result of the 2009 cyclone Aila.

enumerators approached every 5th households starting from the north-west corner of the villages, circling inwards towards the center of the village.

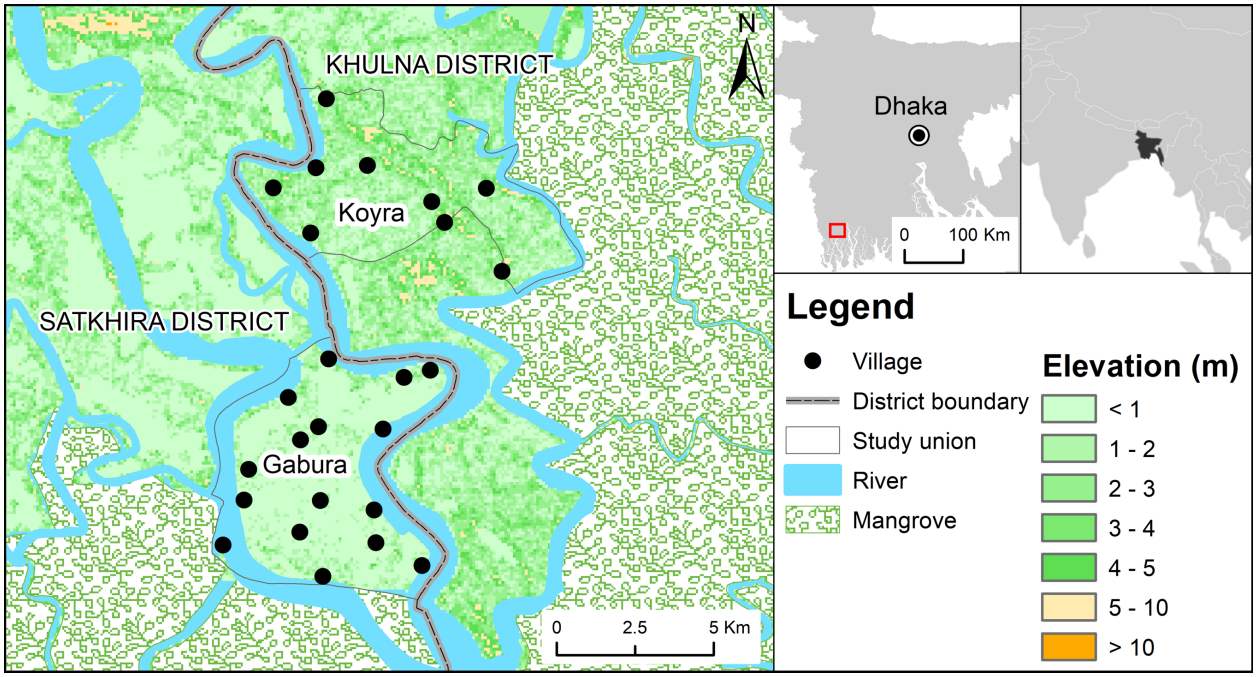


**Figure 1 Study Areas**

Our sample includes 205 respondents above 18 years from each of the two unions. The survey instrument consisted of two parts: i) a structured questionnaire that forms the basis of our regression analysis of household migration predictions (see below for empirical strategy and section 4 for results), and ii) an embedded discrete choice experiment to elicit households' migration predictions under alternative future scenarios (see section 5 for details and results). The survey instrument and choice scenarios were translated from English to Bengali (local language) and back translated by qualified translator to ensure the original meaning of the content. We conducted the surveys and choice experiments using open data kit (ODK) software. Trained enumerators conducted face-to-face interviews using hand-held tablet. Both the questionnaire and the choice sets for discrete choice experiment were thoroughly pre-tested and piloted.

### 3.2 Data and empirical approach

Our data from the survey of 410 respondents and the empirical approach for the regression analysis of the correlates of migration predictions are presented in the following. The discrete choice experiment is presented in Section 5. Appendix A includes the definitions for the variables used in our regression analysis (Table A1) and the descriptive statistics (Table A2). On average, our respondents are 44 years old and have lived 39 years in their community. Only

56% have completed primary or secondary school and the households are generally poor. Day labourers is the major occupational group (24%) and around 10% farm own land. The respondents have seldom (10%) moved themselves, but know others that have moved (14 households on average). On average, the respondents are risk averse, feel that they have already invested too much to move away and expect that their income will be lower if they move. But they also lack confidence in protection measures, particularly related to the protection of their house and livelihood. Respondents score low on the social network index; they report to have few people to ask for a major favour (70% lack this) and they lack relatives to help them if they move (76 % lack this). About a third of respondents (30% of the households) have experienced environmental shocks during the last five years.

Our dependent variable is based on the question "How likely is it that your household will move away permanently in the next five years?" The answer alternatives included five categories indicating probabilities for such a relocation (see Table 1 for the distribution of response). We use the reported probability of migration as our dependent variable in the subsequent regression analysis (i.e., 0%, 25%, 50%, 75% and 100%). Based on these categorical responses with associated probabilities, we calculated an indication of expected migration probabilities. As shown in Table 1, household predictions of their own mobility probabilities are very low. The reported average probability of moving is 4.4 percent, and 88.8 percent of the respondents find it certain that their household will stay in current place for the next five years. While the probability of moving among our respondents is higher than the actual internal migration rate in Bangladesh,[8] it seems very low given the environmental circumstances of our households.

**TABLE 1. PERCEIVED LIKELIHOOD OF MOVING A WAY PERMANENTLY FROM CURRENT LOCATION**

Question: How *likely is it that your household will move away permanently in the next five years?*

| Probability | N | Percent |
|---|---|---|
| Certain we will stay (0%) | 364 | 88.8 |
| More likely that we stay than that we move (25%) | 27 | 6.6 |
| As likely that we stay as that we move (50%) | 12 | 2.9 |
| More likely that we move than that we stay (75%) | 4 | 1.0 |
| Certain that we move (100%) | 3 | 0.7 |
| Total | 410 | 100.0 |

[8] While not directly comparable, the latest 2016 household income and expenditure survey (HIES, 2016) conducted by the government of Bangladesh estimates that 3.59% of rural, and 1.32% of urban respondents report at least one internal migrant from the household.

The following general specification is used in our analysis of reported migration probabilities:

$$y_{i,h,v} = \alpha_v + \boldsymbol{X_h}\boldsymbol{\beta_1} + \boldsymbol{X_i}\boldsymbol{\beta_2} + \varepsilon_{i,h,v} \quad (1)$$

The percentage probability of the household relocating permanently in the next five years $y_{i,h,v}$ according to individual *i* in household *h* in village *v* is regressed on a vector of household characteristics $\boldsymbol{X_h}$, controlling for a set of individual respondent characteristics $\boldsymbol{X_i}$, and village level fixed effects $\alpha_v$. The vector of household characteristics includes our main explanatory variables of interest, capturing household vulnerability to climate change and past experience of environmental shocks, as well as variables capturing potential barriers to future migration (in particular household assets and its square). The vector of individual characteristics includes a number of respondent controls likely to correlate with predictions, such as gender, age, education, occupation, and risk and time preferences). We estimate the above equation using ordinary least squares with robust standard errors. We show that our results are robust to treating our dependent variable as ordinal and using ordered logit and ordered probit estimation (Table A3 in Appendix A).

The inclusion of village fixed effects is motivated by the differences observed in the general level of vulnerability and opportunities in different locations. Descriptively, this is also reflected in responses on the migration prediction variable across the two unions. Households in Gabura are significantly more likely to predict moving in the next five years than households in Koyra. Additional data from the survey offers some clues to why. Households perceive that water access, schools, health conditions, early warning system and protection of dykes are better in Koyra than in Gabura. Koyra is also accessible by road, while Gabura is rather remote, low-lying river island (Figure 1), with no road connection to Shymnagar, the upazila centre. Patterns are not clear-cut, however, as households in Koyra report having experienced more environmental shocks leading to substantial damage to houses and livelihoods, and they predict a greater number of cyclones in future.

A further look into the expectations of our households of future adverse events and their consequences, makes the low proportion of households predicting that they will move, even more puzzling. In Table 2, we report the distribution of responses to the question "Do you think that extreme weather or soil salinity and degradation will have a devastating effect on our

household  in the near future or is this something that you prefer not to think about?" A large majority, almost 70 percent, answer in the affirmative and a further 20% preferred not to think about it, the expectations being more pessimistic in Gabura than Koyra. Interestingly, no respondents answered "no" to this question, but quite a few chose to avoid answering the question, which could be an indication of the level of denial. Similarly, a majority of respondents expect that their livelihood sources will be substantially damaged by flooding, salinization, river erosion, mangrove forest degradation, storm or cyclones (Table 3).

**TABLE 2. PERCEIVED IMPACT OF EXTREME WEATHER EVENTS**

*Question: Do you think that extreme weather or soil salinity and degradation will have a devastating effect on our household in the near future or is this something that you prefer not to think about?*

| | Koyra (%) | Gabura (%) | Total (%) |
|---|---|---|---|
| I prefer not to think about it | 31 | 9 | 20 |
| Yes, they will have a devastating effect on our household | 55 | 83 | 69 |
| No, they will not have a devastating effect on our household | 0 | 0 | 0 |
| Don't know | 14 | 8 | 11 |
| % | 100 | 100 | 100 |
| N | 205 | 205 | 410 |

Note: Percent of respondents choosing a particular response

Responses to the questions in Tables 2 and 3 clearly indicate that even though few of our respondents are knowledgeable about the formal concept of climate change (nearly 80 percent of the households do not know what climate change is and a similar percentage do not know how climate change will affect the community or their households in the coming 5 years), they are worried about the consequences of phenomena associated with it.

**TABLE 3. PERCEIVED LIKELIHOOD OF DAMAGES FROM CLIMATIC EVENTS**

*Question: How likely is it that your land or other livelihood sources will be substantially damaged from flooding salinization, river erosion, mangrove forest degradation, storm or cyclones?*

| | Koyra (%) | Gabura (%) | Total (%) |
|---|---|---|---|
| Almost certain that there will be substantial damage | 6 | 7 | 7 |
| More likely to have substantial damage than not to have | 38 | 60 | 49 |
| As likely that have substantial damage than not to have | 50 | 28 | 39 |
| More likely not to have substantial damage than to have | 5 | 1 | 3 |
| Almost certain that there will be no substantial damage | 1 | 3 | 2 |
| % | 100 | 99 | 100 |
| N | 205 | 205 | 410 |

Note. Percent of respondents choosing a particular response

In Table 4, we present some additional descriptive data on how respondents link the possibility of future adverse environmental events with migration. The following question was posed to respondents: “If your household moved away permanently in the next five years, what would be the main reason for it?”, with the available answers given in the first column. Two out of three persons perceive rapid onset events such as cyclones as the main reason for moving, while better economic opportunities elsewhere was the second most important reason. Notably, degradation of the soil was not among the main reasons for relocation. This suggests that of the environmental factors, fast onset events creating damage to homes and livelihoods are more closely associated with permanent mobility than slow changing environmental factors. We

address the relative importance of economic and different types of environmental changes for mobility predictions more closely through our discrete choice experiment analysis presented in Section 5.

**TABLE 4. REASONS FOR PERMANENT HOUSEHOLD RELOCATION**

Question: "If your household moved away permanently in the next five years, what would be the main reason for it?"

| Reason | Stay for sure | Might move | Total | % of all respondents |
|---|---|---|---|---|
| Better economic opportunites elsewhere | 97 | 7 | 104 | 25 |
| Better opportunities for children elsewhere | 6 | 10 | 16 | 4 |
| Be closer to other relatives | 4 | 3 | 7 | 2 |
| Be safe from cyclones and other life threatening natural events | 249 | 23 | 272 | 66 |
| Soil salinization and degradation in my community | 6 | 3 | 9 | 2 |
| Land owner will not allow to stay | 2 | 0 | 2 | 1 |
| Total | 364 | 46 | 410 | |
| % | 89 | 11 | 100 | 100 |

# 4. Results from the regression analysis of predicted migration

Table 5 reports the results from our regression analysis of the relation of household assets and other variables to predicted mobility. As discussed above, our respondents expect the consequences of climate related phenomena to be devastating and damaging to them and their livelihoods. At the same time, they report a low probability of migrating. One possible explanation for these responses can be that the households are unable to move due to a lack of resources. If this is the case, we should see lower predictions of migration among the less wealthy in our sample. The coefficients for our asset index and its square are both significant, and their signs suggest a u-shaped relationship of predicted mobility with wealth. In other words, the poorest and the wealthiest are more likely to predict that they will move in the near future than the mid-wealth households. The generally low predictions for mobility among our households are thus unlikely to be due to resource or credit constraints. Our results also suggest that the poor and the rich move for different reasons; decreasing wealth for the poor increases their mobility projections, while increasing wealth for the rich increases them. While caution is advised in interpreting our results in a causal manner, our results are consistent with the idea that the poor move because and when they have to, the rich because and when they can.

## TABLE 5. PREDICTED MOBILITY: RESULTS FROM OLS REGRESSION

| | (1) | (2) |
|---|---|---|
| Dependent variable: How likely is it that your household will move away permanently in the next five years? | | |
| Asset index | -0.043** | -0.036** |
| | (0.02) | (0.02) |
| Asset index squared | 0.004* | 0.004** |
| | (0.00) | (0.00) |
| House vulnerability index | 0.005 | 0.008 |
| | (0.01) | (0.01) |
| Shock experience index | 0.013 | 0.020* |
| | (0.01) | (0.01) |
| Household size | 0.000 | 0.001 |
| | (0.00) | (0.00) |
| Primary | 0.008 | 0.012 |
| | (0.02) | (0.02) |
| Secondary | 0.035 | 0.027 |
| | (0.03) | (0.02) |
| Higher secondary school | 0.153 | 0.128 |
| | (0.10) | (0.09) |
| Tertiary | 0.077* | 0.047 |
| | (0.05) | (0.06) |
| Farming own land | 0.034 | 0.038 |
| | (0.03) | (0.03) |
| Gathering | -0.006 | -0.016 |
| | (0.03) | (0.03) |
| Day labour | 0.008 | -0.009 |
| | (0.02) | (0.02) |
| Employee | -0.046 | -0.077 |
| | (0.06) | (0.07) |
| Selfemployed | -0.010 | -0.015 |
| | (0.03) | (0.03) |
| Male | 0.049* | 0.035 |
| | (0.03) | (0.03) |
| Age | -0.001 | -0.000 |
| | (0.00) | (0.00) |
| Head | -0.058** | -0.034 |
| | (0.02) | (0.02) |
| Years lived in community | 0.000 | -0.000 |
| | (0.00) | (0.00) |
| Times moved | 0.029 | 0.021 |
| | (0.02) | (0.02) |
| Impatience index | 0.003 | 0.006 |
| | (0.01) | (0.01) |
| Risk index | -0.009 | -0.010 |
| | (0.01) | (0.01) |
| Know others move | 0.000 | 0.000 |
| | (0.00) | (0.00) |
| Social network | -0.002 | 0.005 |
| | (0.01) | (0.01) |
| Confidence in protection measures | | 0.012 |
| | | (0.01) |
| Expected income if movement | | 0.027* |
| | | (0.01) |
| Endowment (sunk investment) | | -0.068** |
| | | (0.02) |
| Constant | 0.192** | 0.381*** |
| | (0.09) | (0.11) |
| Village fixed effect | Yes | Yes |
| r2 | 0.167 | 0.277 |
| N | 409 | 401 |

Note: Results from OLS regressions in columns (1) and (2) . Robust standard errors in parentheses. Variables as defined in Appendix 1. *** indicates significance at the 1% level, ** at 5%, * at 10%.

As shown in Table 5, the results for the asset variables are robust to a large set of other covariates at the household level and at the individual respondent level. The asset results are

hence not driven by e.g. social connections at the household level, or by education, occupation, or risk or time preferences of the respondent (both of which were elicited using series of hypothetical questions). Column one of Table 5 includes only covariates that, while based on self-reporting, have some factual basis. In column two we add three (admittedly highly endogenous) variables on future expectations; the asset results are qualitatively the same. As shown in Table A3 in Appendix A, the results are also robust to performing an ordered logit or an ordered probit analysis. Due to the uncovered heterogeneities in responses at different wealth levels, we further explore distinctions in responses to our discrete choice experiment by wealth group in Section 5.

As for environmental factors, none of our two main environmental variables are significantly related to predicted mobility. Past experience of environmental shocks is only significant conditional on the three attitude variables in column two. House vulnerability to climate change, indexed by a measure of house construction material and past flooding frequency, displays no relation to migration predictions.

In terms of demographic and social variables, few of our other household or individual level variables have any significant relation to predicted mobility; while the education variables have positive coefficients, they are too imprecise to be significant, and there is no consistent pattern across our occupation categories. Nor do we find that household social connections matter, nor respondent's gender, age, or risk and time preferences. Past migration history is significant in the ordered logit and probit analyses (see Table A3 in Appendix A), but not in our main results using OLS.

Of the attitude variables added in column two, we see that respondents who expect higher income if they move are more likely to predict moving. The final variable, which captures respondent agreement with having invested too much at the origin to leave, is negatively related to predicted mobility, which can be interpreted as an endowment effect (Clark and Lisowski, 2017).[9]

In sum, our regression results suggest that environmental factors play a minor direct role on the likelihood of moving, in spite of the very harsh conditions respondents are living under. To the extent that environmental changes matter, it would likely be indirectly through their impact

[9] We have also controlled for a measure of procrastination, but it is insignificant and does not have an impact on our result (results available on request).

on income and assets (cf. Cattaneo and Peri, 2016; Gray and Mueller, 2012). The main conclusion from this section is that household wealth seems to be closely associated with predicted mobility. We do not, however, find that the poor perceive themselves as trapped by their lack of assets.

# 5. Results from the discrete choice experiment

The results from the regression analysis indicate that changes to wealth or income can affect migration predictions; this is also reflected in the reasons for household relocation discussed in Section 3, where about a quarter of respondents noted economic conditions as an important reason if the household was to move. The descriptive results from Section 3 also indicate that fast onset events are seen as more important reasons for leaving than slow environmental changes like soil salinization. The above analysis has some limitations in assessing the relative importance of these factors for mobility. In order to get a better sense of this, we embedded a discrete choice experiment in the survey. A strength of the discrete choice experiment is that it is possible to reveal how the respondents consider and trade off many attributes at the same time in their migration choices.

We presented respondents with comparisons of two future scenarios describing conditions at their current location. An example of such a comparison, called choice-set, is given in Figure 2. The respondents were told to "Assume conditions are the same in the areas you could move to under the two scenarios and that the cost of moving remain the same. Under which scenario would you be more likely to move away permanently with your household?" The choice sets comprised seven attributes including wages/earnings at their current location, changes resulting from fast onset events such as damage to property, and changes due to slow changes such as reduced agricultural productivity, and several other relevant factors (Table 6). Each attribute is measured at two or three levels that are altered in each choice set the respondents is given. Through the respondents' choices of the scenarios under which they would be more likely to move, we can analyze the attributes that shape their choices.

| Attribute | Explanation | ScenarioA | ScenarioB |
|---|---|---|---|
| House | State of your house | Damaged, in need of considerable and costly repair | Destroyed, needs to be completely rebuilt |
| Wages/earnings | What you can earn in a day through employment or running a business | For every 100 Taka you earn today, you only earn 80 Taka | Same as today |
| Protection | Protection provided by, for example, shelters and dykes | Much worse than today | Same as today |
| Prospects for children/health and education | Prospects for the children and grandchildren in your household | Same as today | Much worse than today |
| Nature-based livelihood sources (other than agriculture) | Ability to use the natural environment to hunt, fish and gather | For every 10 kg hunted/fished/gathered today, only able to hunt/fish/gather 8 kg | Able to hunt/fish/gather half the quantities compared to today |
| Agricultural productivity | Agricultural production in your village | Same as today | For every 10 kg produced today, only able to produce 8 kg |
| Water | Access to clean drinking water | Price much higher or access much worse than today | Same as today |
| choice_set 23 block 4 | | | |

**Figure 2. Sample Choice Set in Discrete Choice Experiment**

For the experiment, the respondents were randomized into one of 10 blocks. Blocks were balanced across respondents with an equal number of respondents assigned to each block. Each respondent was given six comparison sets (one exemplified in Figure 2). The order of the attributes was randomized across blocks to avoid order effects and an orthogonal design approach was used to design the experiment in order to make the attribute levels independent. The design generates 12 observations (six comparisons of two scenarios) for each respondent. Thus, in total, we have 4920 observations in our sample.

**TABLE 6. ATTRIBUTES LEVELS AND VARIABLE TYPES IN DISCRETE CHOICE EXPERIMENT**

| Attribute | Explanation | Levels | Variable type |
|---|---|---|---|
| Wages/earnings | What you can earn in a day through employment or running a business | Same as today (1)<br>For every 100 Taka you earn today, you only earn 80 Taka (.8)<br>For every 100 Taka you earn today, you only earn 50 Taka (.5) | Continuous |
| House | State of your house | Intact<br>Damaged, in need of considerable and costly repair<br>Destroyed, needs to be completely rebuilt | Ordinal |
| Agricultural productivity | Agricultural production in your village | Same as today (1)<br>For every 10 kg produced today, only able to produce 8 kg (.8)<br>Able to produce half the food compared to today (.5) | Continuous |
| Nature-based livelihood sources (other than agriculture) | Ability to use the natural environment to hunt, fish and gather | As today (1)<br>For every 10 kg hunted/fished/gathered today, only able to hunt/fish/gather 8 kg (.8)<br>Able to hunt/fish/gather half the quantities compared to today (.5) | Continuous |
| Water | Access to clean drinking water | As today<br>Price much higher or access much worse than today | Dummy |
| Prospects for children / health and education | Prospects for the children and grandchildren in your household | As today<br>Much worse than today | Dummy |
| Protection | Protection provided by, for example, shelters and dykes | As today<br>Much worse than today | Dummy |

We use conditional logit estimation to analyse the effect of the attributes on the choice of scenario under which migration is more likely. Our specification is:

$$\Pr\left(y_{ijt} = 1 \middle| \boldsymbol{x}_{ijt}\right) = F(\alpha_{ij} + \boldsymbol{x}_{ijt}\beta) \qquad (2)$$

where $y_{ijt}$ is our dichotomous dependent variable indicating whether the household would be more likely to move under Scenario A or Scenario B, and $\boldsymbol{x}_{ijt}$ the vector of attribute levels for individual *i*'s choice set *j* and alternative *t*. This is essentially a logit estimation with fixed effects at the choice set level, where F is the cumulative logistic distribution $F(z) = \frac{\exp(z)}{1+\exp(z)}$. We also run estimations for of sub-groups of respondents to analyse heterogenous effects, in particular in terms of more and less wealthy respondents.

Our main results from the discrete choice experiment are presented in Table 7. The results are presented in terms of odds ratios, to ease interpretation. In other words, estimates above 1 for an attribute level makes scenarios including that level more likely to be chosen by our

respondents as the scenarios in which they would move, estimates below one makes the scenarios less likely to be chosen. The first column presents results for our full sample. The strongest finding here is that scenarios in which there is destruction of the household dwelling has a strong influence on prospective mobility; the odds of choosing a scenario under which the house is destroyed are almost 14 per cent higher than the odds of the excluded category, which is that the house is intact. This finding closely mirrors the results from our descriptive analysis in Section 3; large scale destruction brought by fast onset events are likely to make people move. Other environmental attributes reflecting slower environmental degradation, such as reduced agricultural productivity, reduced access to water as well as ecosystem services (i.e., nature-based livelihood sources attribute), appear to play a rather insignificant role in future migrant decisions.

More nuance can be added to these results when we break down the sample into those below and above median wealth according to our asset index. Columns two and three present results for the poor and the wealthy, respectively.[10] In column four, we re-run the analysis for our full sample including an interaction effect between the wages attribute and a dummy for whether a household has above median wealth. While the estimated effects of wages are not significant for either group, we note that the poor have odds ratios for this variable below one, and the rich above one, and the effect of this attribute is significantly larger for the rich than the poor as indicated by the significant interaction effect in column four. This is consistent with previous results from our regression analysis: The poor predict to move in low wage scenarios, when wages fall below their current level, while the rich predict towards moving in high wage scenarios. Again, this suggests that the poor predict to move when they have to, the rich when they can.

[10] The below median group counts more members that the above median group due to a large number of respondents at the median. Results are, however, robust to setting cut-off differently.

**TABLE 7. MAIN RESULTS FROM DISCRETE CHOICE EXPERIMENT: CONDITIONAL LOGIT ANALYSIS**

| | All | Poor | Rich | Interaction |
|---|---|---|---|---|
| Wages | 0.997 | 0.843 | 1.369 | 0.842 |
| | (0.11) | (0.12) | (0.27) | (0.12) |
| Wages_rich | | | | 1.604** |
| | | | | (0.39) |
| House damaged | 1.067 | 1.101 | 1.009 | 1.068 |
| | (0.06) | (0.08) | (0.10) | (0.06) |
| House destroyed | 1.139** | 1.224*** | 1.014 | 1.140** |
| | (0.07) | (0.09) | (0.10) | (0.07) |
| Agricultural productivity | 0.925 | 1.097 | 0.693* | 0.927 |
| | (0.11) | (0.16) | (0.13) | (0.11) |
| Nature livelyhood sources | 1.135 | 1.124 | 1.122 | 1.139 |
| | (0.13) | (0.16) | (0.21) | (0.13) |
| Access to water (higher price) | 0.993 | 1.039 | 0.920 | 0.991 |
| | (0.04) | (0.05) | (0.06) | (0.04) |
| Prospects children (getting worse) | 0.918** | 0.971 | 0.826*** | 0.918** |
| | (0.04) | (0.05) | (0.06) | (0.04) |
| Protection (getting worse) | 0.938 | 1.007 | 0.820*** | 0.937 |
| | (0.04) | (0.05) | (0.06) | (0.04) |
| r2_p | 0.004 | 0.005 | 0.019 | 0.005 |
| N | 4920 | 3120 | 1800 | 4920 |

Note: Odds ratios from conditional logit estimation, robust standard errors in parentheses, *** indicates significance at the 1% level, ** at 5%, * at 10%.

The results in columns two and three of Table 7 also indicate that it is the poor who foresee moving when their house is destroyed, which is consistent with their more vulnerable housing situation. The somewhat paradoxical result from our full sample that household are less likely to move in scenarios where local prospects for children are worse is attributable to wealthy households, and might be connected to local labour markets and use of child labour. It might also be a spurious finding.

Splitting the sample into poor and wealthy households also yields additional insights into the effect of agricultural degradation. Among the wealthy respondents, worse agricultural yields are associated with greater prospective mobility. It is possible that this is related to land ownership among the more wealthy. To examine this, we present results for our subsamples of land owning and non-land owning households in the first two columns of Table 8. Land ownership turns out not to be the explanation for our findings, as the result reflects choices among the land-less rather than the land-owning. Again, this suggests that the less well-off leave when they have to. In the final two columns of Table 8, we use cash holdings as an

alternative measure of wealth or liquidity constraints, and find a pattern consistent with the preceding wage results. Those with cash move when wage conditions are good, those without when wage conditions are bad. Results for the destruction of the household home are also clearly associated with the less well off in the alternative subsamples used in Table 8.

**TABLE 8. FURTHER HETEROGENOUS PREFERENCES IN DISCRETE CHOICE EXPERIMENT**

| | All | Own land | No land | Cash | No_cash |
|---|---|---|---|---|---|
| Wages | 0.997 | 1.018 | 0.974 | 1.760** | 0.866 |
| | (0.11) | (0.16) | (0.17) | (0.49) | (0.11) |
| House damaged | 1.067 | 1.106 | 1.026 | 0.937 | 1.102 |
| | (0.06) | (0.08) | (0.09) | (0.14) | (0.07) |
| House destroyed | 1.139** | 1.116 | 1.181* | 1.054 | 1.181*** |
| | (0.07) | (0.08) | (0.10) | (0.14) | (0.08) |
| Agricultural productivity | 0.925 | 1.108 | 0.735* | 0.933 | 0.927 |
| | (0.11) | (0.17) | (0.13) | (0.26) | (0.12) |
| Nature livelyhood sources | 1.135 | 1.154 | 1.103 | 1.469 | 1.095 |
| | (0.13) | (0.17) | (0.19) | (0.41) | (0.14) |
| Access to water (higher price) | 0.993 | 1.050 | 0.923 | 0.982 | 0.994 |
| | (0.04) | (0.06) | (0.06) | (0.10) | (0.04) |
| Prospects children (getting worse) | 0.918** | 0.886** | 0.965 | 0.750*** | 0.961 |
| | (0.04) | (0.05) | (0.06) | (0.07) | (0.04) |
| Protection (getting worse) | 0.938 | 0.954 | 0.916 | 0.779** | 0.977 |
| | (0.04) | (0.05) | (0.06) | (0.08) | (0.04) |
| r2_p | 0.004 | 0.005 | 0.008 | 0.035 | 0.003 |
| N | 4920 | 2820 | 2100 | 876 | 4044 |

*Note: Odds ratios from conditional logit estimation, robust standard errors in parentheses, *** indicates significance at the 1% level, ** at 5%, * at 10%.*

## 6. Conclusions

Climate induced displacement and migration is a huge policy concern internationally and more so in countries heavily exposed to negative consequences of climate change such as Bangladesh. A lack of substantive data and evidence on the likelihood and drivers of climate induced migration, i.e. which households are likely to choose migration as an adaptation strategy and under what conditions, remain a challenge for appropriate and effective policy making (Boas et al., 2019). In particular, we need to better understand how the level of preparedness of households in vulnerable areas is shaped by their assessment of future changes and the constraints they face. Our analysis provides a window into these types of considerations.

Overall, our results suggest that not many households in our survey areas foresee using migration as an adaptation strategy to climate change even though a majority is concerned about climate related environmental changes in their area and their impacts on their livelihoods. Moreover, our survey and experimental results suggest that households see environmental changes as influential on mobility only in the shape of fast-onset events like cyclones that lead to destruction of property, or through their impact on wages and earnings. One reason for this can be that people's preparedness strategies are different for cyclones, floods and shocks in agriculture (e.g., salination). Cyclones are unpredictable while floods are common in Bangladesh and might therefore be easier to adapt to. Furthermore, while cyclones kill, and devastate your house, and is associated with soil contamination (storm surge brings salt water inland), flooding rarely kills (at least directly), and brings fresh water (only) and the fertile silt. As regarding salination, shifting to other livelihoods like shrimp farming represent an alternative adaptation strategy.

Since our results suggest that low reported probabilities of moving are not due to constraints in wealth or resources, households appear to have a low level of preparedness for other reasons. Given the extreme vulnerability these households have to damage to an already marginal existence, the level of preparedness seems sub-optimally low. This raises a number of challenges for public policy in the area, along two main dimensions. The first dimension concerns how to improve private adaptation decisions of households in the area. While providing information on coming changes and risks is key in this respect, this type of information has to be delivered in a way through which it is internalized by vulnerable households. Given the biases individuals have in taking in and act upon information that is both difficult and foreboding, interventions in this respect have to be designed accordingly.

The second dimension concerns efforts to increase public capacity to safeguard vulnerable households to coming changes. Given the low level of preparedness for leaving vulnerable areas, in the shorter term there seems to be a case for improved public measures to protect households from damage, and further facilitate in-site adaptation to climate change. In addition to providing adequate public shelters in disaster prone areas, poor people need assistance in building stronger houses to reduce their vulnerability to physical damages. In this, however, there is also a paradox that needs to be faced. Facilitating in-site adaptation also reduces the incentives for households to see migration as a necessary adaptation strategy. These types of paradoxes need to be explicitly considered, and a realistic path for adaption in areas of extreme

vulnerability to climate change must be mapped out. This includes considering efforts to reduce coordination problems and increase capacity in resettling those that need to migrate to other areas (Kolstad et al., 2019). While our results suggest that poverty is not an impediment to moving, this should not be taken to indicate that the situation of the poor is a good one in our study areas; migration in their case is likely to reflect a choice between evils, and their humanitarian needs should not be under-estimated.

Our study has some limits that should be addressed in further studies. Although migration predictions can be indicative of actual migration flows in the future (Creighton 2013), as noted by Lu (1999), actual migration decisions are constrained by conditions, available information and resources at a given time. There are also cognitive biases in household migration decisions that should be explored in more details in future studies. People may move despite claiming they are not planning to do so (for instance due to an unexpected destruction of their house), or they may stay when having planned to move or when one would expect from traditional economic models that they would move.[11] Existing studies focusing on the link between climate and migration do not clearly separating separate environmental drivers from other drivers (Black 2011). Besides asking people to predict their future permanent migration probabilities and their correlates, we employed a choice experimental approach to understand the tradeoffs people make between important livelihood and environmental conditions, when choosing permanent migration as future adaptation strategy. The methodological challenge of endogeneity of the drivers should be more comprehensively addressed in future studies. The external validity of our study should also be confirmed with studies focusing on other climate related hazards conducted in other contexts.

**References**

Adams, H. (2016). "Why populations persist: mobility, place attachment and climate change." *Population and Environment* 37 (4):429-448.

[11] Manchin and Orazbayev (2018) show that these types of potential bias are reduced if households have prior experience with migration.

Adger, W. N., N. W. Arnell, R. Black, S. Dercon, A. Geddes, and D.S.G Thomas (2015). "Focus on environmental risks and migration: causes and consequences." *Environmental Research Letters* 10(6).

Arango, J. (2000). "Explaining migration: A critical view." *International Social Science Journal*. 52(165): 283-296.

Ariely, D. and K. Wertenbrock (2002). "Procrastination, deadlines, and performance: Self-control by precommitment". *Psychological Science* 13(3): 219-224.

Black, R., N. W. Arnell, W. N. Adger, D. Thomas, and A. Geddes (2013). "Migration, immobility and displacement outcomes following extreme events". *Environmental Science & Policy* 27:S32-S43

Black, R., W. N. Adger, N. W. Arnell, S. Dercon, A. Geddes, and D. S. G. Thomas (2011). "The effect of environmental change on human migration." *Global Environmental Change-Human and Policy Dimensions* 21:S3-S11.

Boas, I., C. Farbotko, H. Adams, H. Sterly, S. Bush, K. van der Geest, ……. and M. Hulme (2019). "Climate migration myths." *Nature Climate Change* 9 (12):901-903

Bryan, G., S. Chowdhury, and A. M. Mobarak (2014). "Underinvestment in a profitable technology: The case of seasonal migration in Bangladesh." *Econometrica*, 82(5): 1671-1748.

Cattaneo, C. and G. Peri (2016). "The migration response to increasing temperatures." *Journal of Development Economics 122:* 127-146.

Caesar, J., T. Janes, A. Lindsay, and B. Bhaskaran (2015). "Temperature and Precipitation Projections over Bangladesh and the Upstream Ganges, Brahmaputra and Meghna Systems." *Environmental Science: Processes & Impacts* 17 (6): 1047–56.

Chen, J. J., V. Mueller; Y.Y. Jia and S.K.H. Tseng (2017). "Validating Migration Responses to Flooding Using Satellite and Vital Registration Data." *American Economic Review* **107**(5): 441-445.

Chen, J. and V. Mueller (2018). "Coastal climate change, soil salinity and human migration in Bangladesh." *Nature Climate Change* **8**(11): 981-+.

Clark, W. A. V. and W. Lisowski (2017). "Prospect theory and the decision to move or stay." *Proceedings of the National Academy of Sciences of the United States of America* **114**(36): E7432-E7440.

Comprehensive Disaster Management Programme (2015). National Strategy on the Management of Disaster and Climate Induced Internal Displacement, Dhaka: Ministry of Disaster Management and Relief.

Creighton, M. J. (2013). "The role of aspirations in domestic and international migration." *Social Science Journal* 50(1): 79-88

Didar-Ul Islam, S. M., M. A. H. Bhuiyan, and A. Ramanathan (2015). "Climate Change Impacts and Vulnerability Assessment in Coastal Region of Bangladesh: A Case Study on Shyamnagar Upazila of Satkhira District." *Journal of Climate Change* 1 (1-2):37-45.

Dustmann, C. and A. Okatenko (2014). "Out-migration, wealth constraints, and the quality of local amenities." *Journal of Development Economics* 110: 52-63.

Foresight: Migration and Global Environmental Change (2011) Final Project Report. The Government Office for Science, London

Gray, C. L. and V. Mueller (2012). "Natural disasters and population mobility in Bangladesh." *Proceedings of the National Academy of Sciences of the United States of America* 109(16): 6000-6005.

Harris, J. R., and M. P. Todaro (1970). "Migration, unemployment and development - 2-sector analysis". *American Economic Review* 60 (1):126-142.

HIES (2016), Report of the Household Income and Expenditure Survey, Bangladesh Bureau of Statistics, Dhaka

Islam, M. R., and. Hasan H. (2016). "Climate-induced human displacement: a case study of Cyclone Aila in the south-west coastal region of Bangladesh". *Natural Hazards*, 81, 2, 1051-1071.

Kolstad I., S. Bezu, P. Lujala, M. Mahmud, and A. Wiig (2019). "Does changing the narrative improve host community attitudes to climate migrants? Experimental evidence from Bangladesh" Bergen: Chr. Michelsen Institute (CMI Working Paper WP 2019:3) 25 p.

Koikkalainen, S., and D. Kyle (2016). “Imagining mobility: the prospective cognition question in migration research”. *Journal of Ethnic and Migration Studies* 42 (5):759-776.

Koubi, V., G. Spilker, L. Schaffer and T. Bernauer (2016). "Environmental Stressors and Migration: Evidence from Vietnam." *World Development* **79**: 197-210.

Li, C. (2017). “Are the poor worse at dealing with ambiguity?” *Journal of Risk and Uncertainty* 54 (3):239-268.

Lu, M. (1999). "Do people move when they say they will? Inconsistencies in individual migration behavior." *Population and Environment* 20(5): 467-488.

Mallick, B., and J. Vogt (2014). “Population displacement after cyclone and its consequences: empirical evidence from coastal Bangladesh.” *Natural Hazards* 73 (2):191-212.

Mallick, B., B. Ahmed, and J. Vogt (2017). “Living with the Risks of Cyclone Disasters in the South-Western Coastal Region of Bangladesh.” *Environments* 4 (1).

Manchin, M. and S. Orazbayev (2018). "Social networks and the intention to migrate." *World Development* 109: 360-374.

Mani, A., S. Mullainathan, E. Shafir, and J. Y. Zhao (2013). “Poverty Impedes Cognitive Function.” *Science* 341 (6149):976-980.

McKenzie, D. and H. Rapoport (2007). "Network effects and the dynamics of migration and inequality: Theory and evidence from Mexico." *Journal of Development Economics* 84(1): 1-24.

Mueller, V., C. Gray, K. Kosec (2014). "Heat stress increases long-term human migration in rural Pakistan." *Nature Climate Change* **4**(3): 182-185.

Perch-Nielsen, S., M. Battig, et al. (2008). "Exploring the link between climate change and migration." *Climatic Change* **91**(3-4): 375-393.

Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Midgley, A. (2018). Groundswell: Preparing for Internal Climate Migration. Retrieved from https://openknowledge.worldbank.org/handle/10986/29461

Strobl, E. (2011). "The Economic Growth Impact of Hurricanes: Evidence from U.S. Coastal Counties." *Review of Economics and Statistics* **93**(2): 575-589.

World Bank (2018). "Internal climate migration in South Asia." Groundswell – Preparing for Internal Climate Migration Policy Note #2. Washington D.C.: World Bank.

## TABLE A1. DEFINITION OF MAIN VARIABLES FOR REGRESSION ANALYSIS

| Variable | Explanation |
|---|---|
| Dependent: Probability to move | Respondent responses to question "How likely is it that your household will move away permanently in the next five years?" ( 0% - Certain I will stay, 25% - More likely that I stay than that I move, 50% - As likely that I stay as that I move, 75% - More likely that I move than that I stay, |
| Asset index | Household asset index based on factor analysis of the following asset variables: ownership of house, bicycle, radio, TV, motor vehicle or motorcycle, mobile phone, computer, number of rooms the household occupies and land owned |
| House vulnerability index | House vulnerability index based on factor analysis of the following questions: "What is the main construction material for the walls of your house?", "What is the main construction materials of the roof?" (dummy variable, 1 -hard material, 0 -soft material); How many times has your house been flooded in last five years? (rescaled). |
| Shock experience index | Shock experience index based on factor analysis on the following questions: "During the last five years, did you or your household experience environmental shocks leading to substantial damage to your house because of flooding, river erosion, storm or cyclones?", " During the last five years, did you or your household experience environmental shocks leading to substantial damage to land or other livelihood sources because of flooding, salinization, river erosion, mangrove forest degradation, storm or cyclones? " During the last five years, did you or your household experience environmental shocks leading to substantial damage to land or other livelihood sources because of flooding, salinization, river erosion, mangrove forest degradation, storm or cyclones? " (dummy variables, 1 -yes, 0-no) |
| Household size | Total number of household members |
| Primary education | Respondent has completed primary school (dummy variable, 1 – Yes, 0 – No) |
| Secondary education | Respondent has completed secondary school (dummy variable, 1 – Yes, 0 – No) |
| Higher secondary school | Respondent has completed higher secondary school (dummy variable, 1 – Yes, 0 – No) |
| Tertiary education | Respondent has completed tertiary school (dummy variable, 1 – Yes, 0 – No) |
| Farming own land | Occupation farming, fish/shrimp production, on own land (dummy variable, 1 – Yes, 0 – No) |
| Day labour (incl. on farm) | Occupation day labourer or on farm or fish/shrimp production labourer (dummy variable, 1 – Yes, 0 – No) |
| Gathering | Occupation gathering/foraging/hunting (dummy variable, 1 – Yes, 0 – No) |
| Self-employed | Occupation self-employed (owns business ) (dummy variable, 1 – Yes, 0 – No) |
| Employee | Occupation employee (skilled or non-skilled) (dummy variable, 1 – Yes, 0 – No) |
| Age | Age of respondent (number of years) |
| Male | Gender of respondent (dummy variable, 1 – male, 0 – female) |
| Head of household | Respondent is head of household (dummy variable, 1 – Yes, 0 – No) |
| Years lived in the village | Number of years respondent has resided in community |
| Times moved (Migration history) | Migration history of household (how many times has the household relocated from one union to another) |
| Impatience index | Based on a sequence of questions defining an index from 1 to 4 index from 1 to 4 where 1 is most impatient |
| Risk index | Based on a sequence of questions defining an index from 1 to 4 where 1 is risk averse and 4 is risk lover |
| Knowledge others moved | How many households do you know of who have moved away from your community permanently? |
| Social network (help) | Base on factor analysis of the two question: "How many people do you know who you could ask for a major favour?" " If your household had to move permanently, do you have relatives elsewhere who would help you?" ' |
| Expected income if movement | "If your household moved permanently elsewhere, how would this affect the income of your household?" (1-Very negatively, 2-Negatively, 3-The same as today, 4- Better than today, 5- Much better than today) |
| Confidence in protection measure | Confidence in protection index based on factor analysis of scores on the following questions " To what extent do you agree with the following statement: I am confident that dykes and other protections provide adequate protection of my house and livelihood in an emergency.", "To what extent do you agree with the following statement: I am confident that early warning systems and protection measures will protect life and health in this community in an emergency." (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |
| Endowment (sunk investment) | To what extent do you agree with the following statement: We have invested too much in our livelihood and lives at this location, for us to move away permanently. (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |
| Village fixed effects | Dummy variables for each of the 25 villages |

## TABLE A2. DESCRIPTIVE STATISTICS (N= 401)

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| Asset index | 1.96649 | 1.00238 | 5.95e-07 | 9.412746 |
| Asset index squared | 4.869342 | 6.363346 | 3.54e-13 | 88.59979 |
| House vulnerability index | -.0011817 | 1.000412 | -2.802607 | .6052558 |
| Shock experience index | .0022678 | 1.003415 | -.668325 | 4.281949 |
| Household size | 5.044888 | 2.514554 | 1 | 35 |
| Primary | .3566085 | .4795962 | 0 | 1 |
| Secondary | .2119701 | .4092143 | 0 | 1 |
| Higher secondary | .0249377 | .1561299 | 0 | 1 |
| Tertiary | .0224439 | .1483072 | 0 | 1 |
| Farming own land | .1022444 | .3033479 | 0 | 1 |
| Gathering | .084788 | .278914 | 0 | 1 |
| Day labour | .2493766 | .4331926 | 0 | 1 |
| Employee | .0174564 | .1311279 | 0 | 1 |
| Self-employed | .0947631 | .2932533 | 0 | 1 |
| Male | .5087282 | .5005483 | 0 | 1 |
| Age | 44.21696 | 13.68577 | 19 | 86 |
| Head | .5760599 | .4947984 | 0 | 1 |
| Years lived in community | 38.96259 | 17.17996 | 3 | 86 |
| Times moved | .1371571 | .6353274 | 0 | 10 |
| Impatience index | 1.882793 | 1.14618 | 1 | 4 |
| Risk index | 1.438903 | .914813 | 1 | 4 |
| Know others move | 13.78055 | 22.54799 | 0 | 150 |
| Social network | .0081464 | 1.006431 | -.5847926 | 6.857891 |
| Expected income if movement | 2.221945 | .702223 | 1 | 5 |
| Confidence in protection measure | .0005399 | 1.002334 | -1.396536 | 2.475215 |
| Endowment | 3.798005 | .7852363 | 2 | 5 |

## TABLE A3. ROBUSTNESS ANALYSIS: ORDERED LOGIT AND ORDERED PROBIT ESTIMATION

| | Ordered Logit | Ordered Probit |
|---|---|---|
| Dependent variable: How likely is it that your household will move away permanently in the next five years? | | |
| Asset index | -1.661** | -0.839** |
| | (0.83) | (0.37) |
| Asset index squared | 0.253* | 0.122* |
| | (0.14) | (0.07) |
| Shock experience index | 0.315 | 0.195 |
| | (0.25) | (0.12) |
| Household size | 0.010 | 0.006 |
| | (0.06) | (0.03) |
| Years lived in community | 0.019 | 0.010 |
| | (0.03) | (0.01) |
| Times moved | 1.657*** | 0.811*** |
| | (0.57) | (0.26) |
| Know others move | 0.010 | 0.005 |
| | (0.01) | (0.00) |
| Social network | -0.001 | 0.011 |
| | (0.24) | (0.12) |
| House vulnerability index | -0.031 | -0.005 |
| | (0.28) | (0.12) |
| Primary | -0.192 | 0.017 |
| | (0.60) | (0.29) |
| Secondary | 0.646 | 0.432 |
| | (0.61) | (0.29) |
| Higher secondary school | 1.807 | 1.126* |
| | (1.38) | (0.61) |
| Tertiary | 1.894 | 1.230** |
| | (1.26) | (0.58) |
| Farming own land | 1.008 | 0.593* |
| | (0.65) | (0.34) |
| Gathering | -0.196 | -0.033 |
| | (0.94) | (0.45) |
| Day labour | 0.031 | 0.181 |
| | (0.75) | (0.36) |
| Employee | -0.135 | -0.149 |
| | (1.25) | (0.62) |
| Selfemployed | 0.486 | 0.244 |
| | (1.14) | (0.48) |
| Male | 1.083 | 0.517 |
| | (1.55) | (0.59) |
| Age | -0.027 | -0.015 |
| | (0.03) | (0.01) |
| Head | -1.681 | -0.824* |
| | (1.24) | (0.46) |
| Impatience index | 0.023 | 0.036 |
| | (0.21) | (0.10) |
| Risk index | -0.522 | -0.238 |
| | (0.45) | (0.17) |
| Constant | | |
| r2_p | 0.243 | 0.240 |
| r2 | | |
| N | 409 | 409 |

Note: Variables as defined in Table A1. Robust standard errors in parentheses; *** indicates significance at the 1% level, ** at 5%, * at 10%.

We present unique survey data on the migration predictions of 400 households in two extremely climate exposed unions of coastal Bangladesh. We have four main findings. First, despite having prospects no better than many low-lying pacific islands, few households in our two locations expect to relocate elsewhere over the coming five-year period. Second, to the extent that households predict they will move in the near future, they believe that fast onset events such as cyclones will be a main reason - not slow changing environmental factors like increasing soil salinity. Third, household migration predictions correlate non-linearly with household assets; the poorest and the richest households are the most likely to move. Fourth, results from an embedded discrete choice experiment suggest that the poor are more likely to migrate in scenarios where their wages are low, while the rich are more likely to migrate in scenarios where their earnings are high. One possible interpretation of these results is that the poor expect to migrate because and when they have to, while the rich expect to migrate because and when they can. Our discrete choice experiment confirms that households expect to move if there is considerable destruction of property from fast onset events, but not due to gradual erosion of environmental conditions. In sum, our results suggest that households in climate exposed regions to a limited extent perceive migration as an adaptation strategy to climate change.



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# How do host–migrant proximities shape attitudes toward internal climate migrants?

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**How do host–migrant proximities shape attitudes toward internal climate migrants?**
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## ABSTRACT

Countries in Latin America, Asia, and Africa exposed to the environmental consequences of climate change are predicted to see voluntary and forced internal migration on an unprecedented scale in the coming decades. This will likely put a great strain on host communities receiving the internally displaced. In many communities, the long-term residents may be skeptical toward the internal climate migrants, creating grounds for heightened tensions and even violent conflict. To alleviate such tensions, it is important to understand how attitudes toward internal climate migrants among host community members form, an issue that has thus far received little attention in climate research. To promote research on host communities receiving internal climate migrants in developing countries, this article develops a conceptual framework which seeks to map key factors influencing attitudes toward climate migrants. It proposes that distance between migrants and host community members along multiple dimensions is central to understanding how such attitudes form. The framework categorizes the different dimensions of distance into spatial, attitudinal, experiential, and social proximity. The article applies the framework to a survey conducted among over 630 long-term host community residents in the climate exposed Satkhira District of Bangladesh and finds evidence that variables reflecting these categories of proximity shape attitudes toward internal climate migrants.

## HIGHLIGHTS

- Host–migrant proximities shape attitudes toward internal climate migrants
- Attitudes toward internal climate migrants are inherently relational
- Attitudes toward climate migrants worsen with increased spatial and social distance
- Values and worldviews influence perceptions about internal climate migrants

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# 1. Introduction

The tropical cyclone Idai that struck the South-West coast of Mozambique in March 2019 lasted only one day. However, it left almost two million people in need of assistance as it displaced almost 150,000 people and wreaked an estimated $1 billion worth of damage to agriculture, buildings, and infrastructure (UN, 2019; UNHCR, 2019). This worst storm in Mozambique's history was most likely only a harbinger of a future where storms of such unprecedented force become commonplace and 'normal' storms increasingly frequent (IPCC, 2018). Besides increasing the intensity and frequency of rapid-onset hazards (i.e., storms, flooding, wildfires, etc.), human-induced climate change is changing the environment in more gradual ways, through changes in temperatures and precipitation, ocean acidification, and sea-level rise. Such slow-onset hazards, leading to droughts, desertification, soil erosion and salinization, and changes in seasons, rainfall patterns, and flora and fauna, are expected to displace up to 143 million people internally in Africa, Asia, and Latin America by 2050 (Rigaud et al., 2018).[1]

As people affected by climate change, often living in rural areas in poor countries, will increasingly look for more viable and safer places to live, many of them moving internally and over short distances (Government Office for Science, 2011), countries need to prepare for the coming increase in internal migration flows. Under some scenarios, the degradation brought by climate change could trigger migration on a scale not previously experienced and that may happen simultaneously in many developing countries. Most likely, the scope and scale of the climate-induced migration will not only test the limits of the national and international governance and cooperation in helping those in need, but also the limits of the host communities experiencing an influx of migrants. At worst, this can cause major disruptions and instability if the tensions between the displaced and host communities due to, for example, competition over scarce resources or human distrust and mutual suspicion, intensify and escalate (Burke, Hsiang, & Miguel, 2015; Economist, 2019; Vivekananda, Wall, Sylvestre, & Nagarajan, 2019)(REF).

An important part of the preparation for the anticipated future climate migration is to address the infrastructural, social, and other needs of locations where the displaced are likely to settle. Another, and equally vital part, is to prepare the hearts and minds of the host communities receiving the displaced. For the latter, a thorough understanding of how host community members' attitudes toward climate migrants form is needed, an issue that thus far has been a neglected area within climate change research (Boas et al., 2019).

To promote research on the formation of host community attitudes toward internal climate migrants, this article makes two main contributions: First, it develops a conceptual framework on how different aspects of host-migrant proximity impact host community members' attitudes toward internal climate migrants. Second, it tests the framework using a household survey of over 630 respondents from potential host communities in the climate-exposed Satkhira District in Bangladesh. This context has the advantage of being ethnically and religiously homogeneous, allowing us to study host-migrant disparities free of the influence of ethnicity, which has been highlighted as an important source of migration-related conflict (Fearon & Laitin, 2011; Krcmaric, 2014).

Drawing on literature on international migration, natural hazards, and climate change and its consequences, our conceptual framework posits that four types of proximities can be salient for host community members' views on internal climate migrants: i) their geographic distance to highly exposed areas from where the migrants are likely to come (spatial proximity); ii) their values and worldviews concerning fellow citizens (attitudinal proximity); iii) the extent to which they have experiences similar to those of migrants (experiential proximity); and iv) their social similarity with the migrants in terms of education, wealth, and occupation (social proximity).

Our empirical results from Bangladesh show that perceived community capacity to settle migrants is positively related to the willingness of host communities to do so. In other words, physical and economic capacities of host communities do matter. However, the key insight our analysis brings to light is that attitudes toward migrants are inherently relational, and map into

[1] A person's or household's decision to migrate is influenced by many factors, such as socio-economic, cultural, and political aspects, and is only rarely solely based on degrading environmental conditions. Due to the complex and not yet well understood relationship between climate change and migration, all estimations of future climate migration are characterized by great uncertainty (Boas et al., 2019; Cattaneo et al., 2019).

spatial, attitudinal, experiential, and social proximities. Moreover, our results suggest that these aspects may be highly positional; we find that attitudes toward migrants worsen with increased social distance to them. These results suggest that attitudes toward internal climate migrants are not reducible to simple theories of resource and labor market competition.

This article contributes to three distinct bodies of literature. First, to our knowledge, this article is among the first to study how host community members' attitudes toward climate migrants form (Boas et al., 2019). The analysis complements that of Kolstad et al. (2019), which finds that attitudes toward internal climate migrants are difficult to change, but has less to say about how such attitudes form. Second, although there is a large body of literature on attitudes toward international migrants among citizens of the Global North (Hainmueller et al., 2015), studies on immigration perceptions in countries in the Global South are much more scarce (Barcelo, 2016; Buehler & Han, 2019; Ruedin, 2019). Our results, in particular on the effects of social distance, provide support for earlier results showing that factors influencing anti-immigrant sentiments in the Global South can be different from those in the Global North (Harris, Findley, Nielson, & Noyes, 2018). Third, more generally, we complement the relatively understudied area of climate change perceptions in developing countries, which mainly has focused on agriculture (Dang, Li, Nuberg, & Bruwer, 2019). Some of these studies evoke distance (for example, from a water source) or experience of a hazard event as a factor in farmers' perceptions of risk and adaptation (Azadi, Yazdanpanah, & Mahmoudi, 2019; Dang, Li, Nuberg, & Bruwer, 2014; Oremo, Mulwa, & Oguge, 2019; Rizwan et al., 2019) and other studies show that exposure and past experiences of a hazard event influence the formation of risk perceptions toward future events and, to some extent, climate change attitudes (Adelekan & Asiyanbi, 2016; Mind'je et al., 2019; Ngo, Poortvliet, & Feindt, 2019).

The article proceeds as follows. Section 2 presents the conceptual framework for categorizing the factors related to proximity that may affect how the host community members perceive internal climate migrants. Section 3 describes the study area, data, and methods and Section 4 the results. Section 5 discusses the key results and Section 6 concludes with some remarks on directions for further research and policy implications.

## 2. Conceptual framework

The findings from the quantitative and qualitative research on how attitudes toward immigrants, refugees, natural hazards and their victims, and climate change, its consequences, and climate actions suggest that a range of factors related to proximity may influence attitudes among host community members toward internal climate migrants. For many – in the Global North at least – climate change and its consequences are (still) abstract phenomena that primarily affect other people, in other places, and in a somewhat distant and uncertain future, that is, they are psychologically distant[2] (Ballew et al., 2019; Bruegger, Dessai, Devine-Wright, Morton, & Pidgeon, 2015; de Guttry, Susser, & Doering, 2019; McDonald, Chai, & Newell, 2015; Alexa Spence, Poortinga, & Pidgeon, 2012). Similarly, the literature on immigration suggests that psychological distance between hosts and migrants influences hosts' attitudes toward migration (Hainmueller, Hiscox, & Margalit, 2015; Rustenbach, 2010) and the literature on disasters that increased psychological distance to a disaster and its victims influences helping and prosocial behavior (Andrighetto, Baldissarri, Lattanzio, Loughnan, & Volpato, 2014; Zagefka, 2018).

We thus propose that when seeking to understand how host community members' attitudes toward internal climate migrants form, one should consider host community members' proximity to climate migrants in terms of their own distance to potentially highly exposed areas (spatial proximity), personal values and worldviews that shrink or expand the compassion shown to fellow citizens (attitudinal proximity), experiences of similar life events (experiential proximity), and educational, economic and occupational similarity with the potential migrants (social proximity) (Table 1).

[2] Psychological distance refers to the extent to which an object or event is removed from the self here and now. The ways in which the object or event can be removed from this reference point include time, space, and social distance, constituting different distance dimensions (Trope & Liberman, 2010).

Table 1. Proximity aspects influencing attitudes toward climate migrants

| Spatial proximity | Attitudinal proximity | Experiential proximity | Social proximity |
|---|---|---|---|
| • Distance to places highly exposed to climate-related hazard events | • Values and personality<br>• Attribution bias<br>• In- and outgroup attitudes | • Similar past experiences<br>• Similar present experiences<br>• Similar (anticipated) future experiences | • Educational similarity<br>• Economic similarity<br>• Occupational similarity |

## Spatial proximity

Physical distance to areas exposed to climate-related hazards has in many studies been shown to be relevant when it comes to people's concern for climate change, its consequences, and support for mitigation and adaptation measures (Bhattachanu et al., 2019; Brody, Zahran, Vedlitz, & Grover, 2008; A Spence, Poortinga, Butler, & Pidgeon, 2011; Verlynde, Voltaire, & Chagnon, 2019). In particular, people living in the proximity of highly exposed areas or having personal experience of being harmed by a hazard event tend to be more concerned about climate change and support climate action (P. Lujala, Lein, & Rød, 2015; McDonald et al., 2015; Alexa Spence et al., 2012; Zanocco, Boudet, Nilson, & Flora, 2019) such as reducing energy use (Ogunbode, Liu, & Tausch, 2017; A Spence et al., 2011), preparing and taking individual measures in the anticipation of future weather-related events (Demski, Capstick, Pidgeon, Sposato, & Spence, 2017; Päivi Lujala & Lein, 2020), accepting restrictions like curtailing coastal development (Ray, Hughes, Konisky, & Kaylor, 2017), and adopting new farming techniques (Azadi et al., 2019). In disaster studies, the spatial proximity to (potential) disaster events has been shown to be related to higher levels of prosocial and helping behavior (Drury, Brown, Gonzalez, & Miranda, 2016; Li, Li, Decety, & Lee, 2013; Maki et al., 2019).

Reduced geographic distance to weather-related hazards may induce people to update their beliefs when it comes to both the likelihood and the potential consequences of future – climate change augmented – weather-related events for themselves and others. Further, those living closer to the most exposed areas may have a more realistic idea of how powerless the affected communities can be when faced by, for example, a tropical cyclone or devastating flooding, leading to increased compassion and understanding toward those migrating out of harm's way.

## Attitudinal proximity

Attitudes toward immigrants and asylum seekers are mediated through values, worldviews, and personality (Dinesen, Klemmensen, & Norgaard, 2016; Hainmueller & Hangartner, 2013; Hainmueller & Hiscox, 2007), as are perceptions of climate change (Hornsey, Harris, Bain, & Fielding, 2016; Poortinga, Whitmarsh, Steg, Bohm, & Fisher, 2019) and disaster victims (Zagefka, Noor, Brown, de Moura, & Hopthrow, 2011). In particular, people holding self-transcending values such as altruism, forgiveness, respect, and benevolence, as well as egalitarian views on division of resources, tend to be more concerned about climate change and support ameliorative action (Corner, Markowitz, & Pidgeon, 2014). In the context of welcoming climate migrants to one's own community, such values can be related to perceptions that climate migrants are not responsible for their own misfortune, but are migrating due hardship caused by external factors that are beyond their own control or are the result of randomness or fate (Harell, Soroka, & Iyengar, 2017); they may thus be perceived as more worthy of assistance (Marjanovic, Greenglass, Struthers, & Faye, 2009; Zagefka et al., 2011).

Shorter interpersonal distance, in the form of trust in other people, has been shown to predict more positive attitudes toward immigrants (Chang & Kang, 2018; Herreros & Criado, 2009; Rustenbach, 2010; van der Linden, Hooghe, de Vroome, & Van Laar, 2017). Such trust may be related to a person's own altruistic values and expectations that the new community members will behave decently, have or acquire with time the same values as the host community members, and in general contribute to the wellbeing of their new homeplace. In particular, a wider cultural distance has been shown to be a strong predictor of opposition to immigration as many individuals perceive immigrants as a threatening (e.g., ethnic or religious) outgroup (Card, Dustmann, & Preston, 2012; Malhotra, Margalit, & Mo, 2013; Thomsen & Rafiqi, 2019). Strong

ingroup social identity may thus predict skepticism toward internal climate migrants, especially if the migrants have a different sociocultural background.

Humanistic values and viewing others more like oneself and being trustworthy and deserving should thus decrease attitudinal distance to fellow citizens and lead to a greater willingness to accommodate internal climate migrants.

### Experiential proximity

Distance between the host community members and climate migrants may also be reduced through similar life experiences that evoke feelings of solidarity and empathy toward migrants. As noted above (see spatial proximity), within climate perception and hazard victim studies, geographic closeness to highly exposed areas and experiences of hazard events have been shown to promote concern for climate change and support climate-friendly and prosocial behavior. Within migration studies, however, the impact of sharing life-experiences with the immigrants remains largely unstudied (Sarrasin, Green, Bolzman, Visintin, & Politi, 2018). The few exceptions have focused on how people with an immigrant background view immigration, finding that recent immigrants tend to have more positive attitudes while those who have been born in the country but having foreign roots have views more similar to the natives (Braakmann, Waqas, & Wildman, 2017; Just & Anderson, 2015; Sarrasin et al., 2018). One likely explanation is that people who have migrated themselves are better able to understand the choices made by the migrants, why they migrate, and the difficulties and diverse challenges involved in the relocation. Related to this, previous research has shown that interventions that foster sympathy and empathy enhance prosocial behavior and tendency to assist others (Eisenberg, Eggum, & Di Giunta, 2010) and willingness to help disaster victims (Andrighetto et al., 2014).

Thus, we would expect that host community members with life experiences similar to the migrants would express more positive opinions toward internal climate migrants. Besides their own migration history, other types of shared experiences and vulnerabilities may be salient as well, for example, having close relatives living in highly exposed areas, having a personal experience with a hazard event, or personal anticipation of future migration.

### Social proximity

Climate hazard studies suggest that people who believe that people like themselves are threatened by climate change are more likely to support climate action (Hart & Nisbet, 2012; McDonald et al., 2015). Similarly, it can be the case that when people perceive climate migrants to be like themselves, they are more willing to accommodate them. In our case, in which the highly exposed areas tend to be poorer than the less exposed areas and the poor and least educated constitute the most vulnerable population segments within these areas (Mallick, Ahmed, & Vogt, 2017), this would imply that the poorer and less educated host community members would be the most welcoming toward internal climate migrants, as could also be those with similar occupations as the migrants. Conversely, class distinctions could make wealthier host community members more critical of migrants, as could expectations of tax increases on the wealthy to accommodate the migrants or erosion of their political influence in the host community.

In contrast to the above, studies on immigration and climate change perceptions – mainly conducted in Western countries – show that the more educated tend to support immigration and to be more concerned about climate change and supportive of climate action (Chang & Kang, 2018; Hainmueller & Hiscox, 2007; Poortinga et al., 2019; Rustenbach, 2010). Similarly, labor market competition is thought to cause more negative attitudes toward immigrants among those who fear for their jobs (Mayda, 2006).[3] Several studies from Western countries, however, show conflicting support for the labor market competition thesis (Hainmueller & Hiscox, 2010; Malhotra et al., 2013; Rustenbach, 2010), and provide evidence that high-skilled workers tend to be more positive about migrants, irrespective of a migrant's skill level (Hainmueller et al., 2015). At least

[3] Labor market competition theories predict that people are more hostile to migrants when perceived as competitors for jobs held by them, e.g. low-skilled native workers who fear competition from low-skilled immigrants. Similarly, those with low family incomes are expected to hold more negative attitudes toward migrants due to (perceived) direct competition for economic resources and public services and (a fear of) migrants driving down real wages in low-skilled occupations.

one study, conducted in Hong Kong and assessing attitudes toward mainland Chinese migrants, found that local laborers had a more positive attitude toward low-skilled immigrants than high-skilled professionals (Lee, Vyas, & Chou, 2017).

## 3. Research design and data

The quantitative analysis is based on a survey conducted in March–April 2019 in the Satkhira District located in southwest Bangladesh (Figure 1). The design of the quantitative survey was informed by two rounds of qualitative fieldwork (in May and September 2018) conducted in the study location and nearby areas including over 40 informal interviews and discussions with local government officials, scientists, NGO representatives, and community members to understand migration patterns and host community perceptions on migration in the area. The analysis draws also on another survey including 410 participants conducted in two areas in the coastal Satkhira (Gabura) and Khulna districts (Koyra) (Figure 1), both extremely exposed to weather-related events and both of which constitute catchment areas of climate migrants to other unions in the Satkhira district (Wiig, Bezu, Kolstad, Lujala, & Mahmud, 2020).

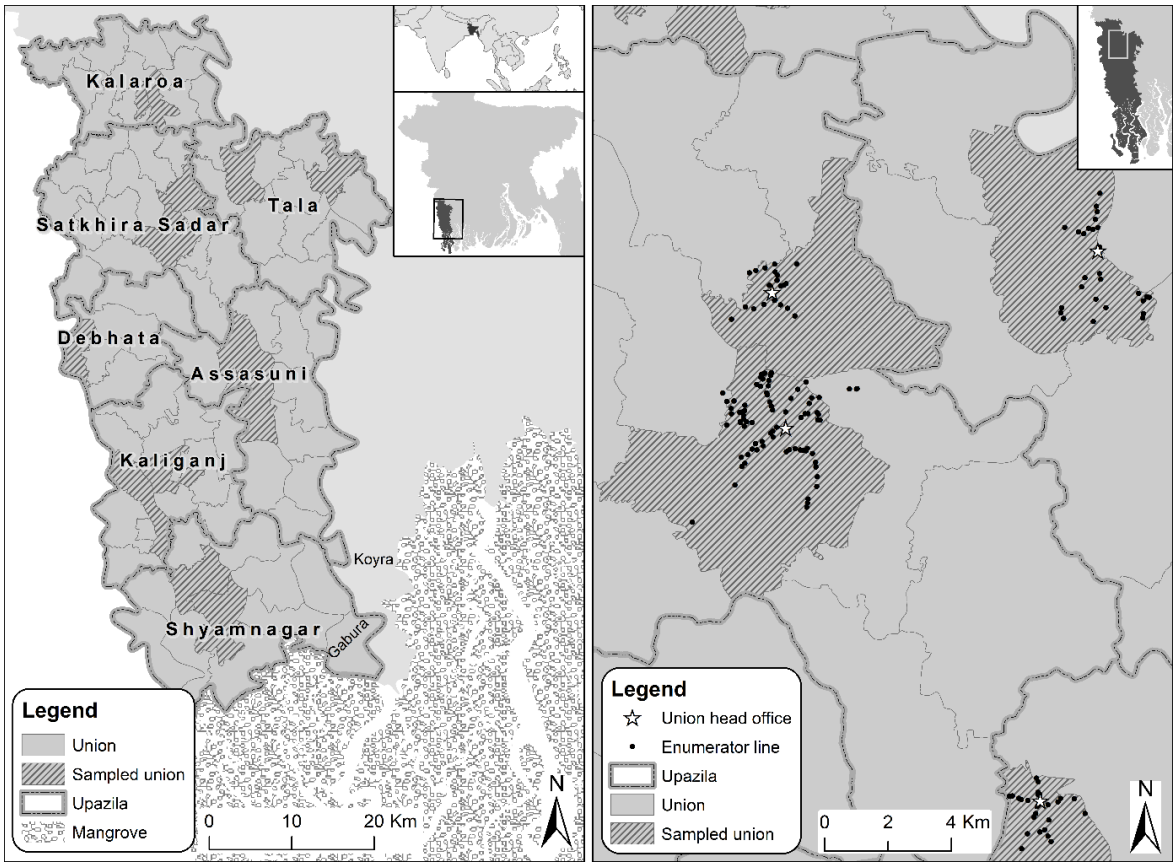


Figure 1. Sampled unions in Satkhira District (A) and examples of enumerator lines (B).

### Study area

Bangladesh is one of the most exposed and vulnerable countries to climate change in the world. According to the Long-Term Climate Risk Index (Eckstein, Hutfils, & Winges, 2018, p. 8), the country was ranked among the ten most affected countries in the world for the period 1998–2017, with 190 registered weather-related hazard events. The coastal Satkhira District, which is located on the Ganges floodplain, north of the Sundarbans mangrove forest, is expected to suffer increasingly from climate change exacerbated riverine flooding, strong winds, storm surge, salt water intrusion, and changing weather patterns, the first effects being already felt now in southern Satkhira (Islam et al., 2019). The Satkhira District has over 2 million inhabitants and its population relies mainly on agriculture and pisciculture, the main exports from the district being shrimp, paddy, and jute.

Satkhira district is interlaced by rivers and waterways that bring fresh, fertile silty water to the floodplain, but which also in the southernmost areas channel salty tidal and sea surge water upstream. Riverine flooding in the deltaic floodplain area is a natural phenomenon and supports the intensive agriculture that is based on the fertile silt brought by the rivers and spread by flooding to the paddy fields. Although the heavy damages to houses and crops caused by sudden flooding and waterlogging are partially caused by extensive embankments and insufficient water drainage (Fenton, Paavola, & Tallontire, 2017), glacier melt and changes in rainfall patterns, in particular increasingly heavy rains during the monsoon period, are likely to result in even more extensive floods and riverbank erosion in the future.

Other climate change-related threats in the coastal Satkhira include frequent cyclones and storm surges, the latter exacerbated by the sea level rise. Although not as deadly as they used to be, thanks to improved evacuation routines (Sadik et al., 2018), tropical cyclones like Sidr in 2007, Aila in 2009, and Bulbul in 2019[4] cause economic havoc among the Bangladesh's coastal communities as the strong winds and flash floods destroy buildings and crops, and the accompanying storm surges push salty seawater upstream, breaking through the embankments to the surrounding areas, causing not only direct damage but, notably, contaminating the soil for several years (Haldar, Saha, Ahmed, & Islam, 2017; Mallick et al., 2017; Subhani & Ahmad, 2019).

In southern Satkhira, the increasingly worsening conditions for agriculture, the threat of periodic destruction of houses and crops, and fear for life and health can over time cause economic and mental burdens that can be difficult to bear and alleviate, leading to increased voluntary and forced migration to nearby areas and beyond.

## Survey design

The survey was conducted in 13 of the 78 administrative unions in Satkhira, covering all seven sub-districts (upazila; Figure 1).[5] The unions were selected based on their attractiveness for migrants due to the existence of relevant job opportunities (e.g. day labor, rickshaw pulling) and limited exposure to waterlogging and soil salinization. The number of respondents in each unit was set proportionally to the unit's total population, which ranged from a little over 8'000 (Kaila) to 113'000 inhabitants (Satkhira City, district capital). The survey targeted long-term residents, defined as persons who had been born in the community or had lived there for at least 20 years or as persons who had lived in the community at least five years in addition to being married to a person born in the community.

The data for the analysis was collected as part of a randomized field experiment. The purpose of the field experiment was to study how a narrative stressing the repeated nature of climate change-related natural hazard events, and the repeated waves of human displacement induced by the events, affect host community members' willingness to accept internal climate migrants. Since the experimental treatment showed no discernible effect on attitude questions, we include both the treatment and control group in the sample analyzed here. The sample hence consists of 633 adults (18 years and over).[6] Similar estimates are obtained when analyzing only the control group, but with an obvious decrease in statistical power (see Supplementary Appendix, SA Tables 4–6 for the results).

[4] Sidr killed at least 4,000 and affected nearly 9 million people, causing USD 2.3 billion in damages (International Federation of Red Cross and Red Crescent Societies, 2008). Aila killed less than 200 people, but affected nearly 5 million people and damaged nearly 150,000 hectares of cropland, and in Gabura Union, for example, it damaged every house (UNDP, 2010; Walton-Ellery, 2009). Bulbul affected over 700,000 people, of which almost 250,000 were living in the Satkhira District, over 100,000 houses, and nearly 120,000 hectares of crops, and caused the evacuation of over 2 million people (International Federation of Red Cross and Red Crescent Societies, 2019).

[5] Bangladesh is divided into eight divisions. These are divided into districts (zila) and further into sub-districts (upazila). In rural areas, the subdistricts are further subdivided into unions.

6 Another field experiment, conducted simultaneously by the same research team, sought to understand how narratives attributing the responsibility for climate migrants to other actors and forces affect the host community members' attitudes toward migrants. The results are detailed in Kolstad et al., (2019). The two field experiments share the same control group while the attribution experiment included three additional treatment groups of a size of approximately 310 respondents each.

The respondents were interviewed face-to-face by trained enumerators using the local language (Bengali).[7] A team of four to six enumerators conducted the interviews in each union, starting from the union head office building and following pre-determined, evenly spaced lines on the map (Figure 1).[8] Starting from the sixth dwelling building from the union office building, the enumerators interviewed a member of one household in every sixth building with habitation, respecting the union borders. In the case of reaching the union border, the enumerators were instructed to turn left and follow the perimeter of the union border until about halfway to the next enumerator line, and then to turn back inwards toward the union office building. Each enumerator alternated in interviewing female and male respondents from one interview to the next one.

After determining whether the respondent was eligible (i.e., a long-term resident of the community), the first part of the survey focused on the respondent's background and household characteristics. These questions were followed by questions on the respondent's level of climate change knowledge and their personality traits. The topic of climate change and climate migration was then introduced by showing the respondent a video on the tablet used for data collection.[9] After watching the video, the respondent was asked questions related to the video, his/her attitudes toward migrants and climate change, as well as questions pertaining to respondents' values and worldviews and economic conditions in the community.

## Data

Summary statistics, survey questions, answer alternatives, and variable definitions are provided in Appendix 1.

### Dependent variables

Our first outcome variable (Attitude I) is based on the respondent's level of agreement with the statement: "It is a good thing that new migrants settle permanently in my home community." The responses were measured on a 5-point Likert scale ranging from 1 (Disagree very strongly) to 5 (Agree very strongly). Our second outcome variable (Attitude II), is a starker version of the first one, conditioning the future migration on a large present migration: "Even if our community were to receive many new migrants this year, I would still think that it is a good thing that new migrants settle here in the future", the response alternatives being the same as for the first outcome variable. Although our outcome questions do not explicitly evoke the term 'internal climate migrant', the framing was evident to the respondent from the video shown to the respondent right before the outcome questions were asked.

The distributions of responses to the two questions suggest that few respondents are indifferent about migration, but there are also relatively few holding extreme positions. Perhaps not surprisingly, people tend to agree more with the general statement than with the conditional one, the mean score declining from 3.2 to 2.9. The two scores are correlated at the 0.73 level. 36% of our respondents disagreed with the first outcome statement (Attitude I) while 47% disagreed with the second statement (Attitude II), the share of those disagreeing very strongly with the statement almost doubling (Figure 2). While 58% agreed with the first statement, it dropped to 46% in the case of the stronger version. In both cases, a mere 5% and 7% chose to remain indifferent i.e., neither disagreeing nor agreeing (score 3) with the statements, respectively.

[7] Bengali is the predominant and official language in Bangladesh. 98% of Bangladeshi people are of the same ethnic group and almost 90% are Muslims, Islam being the state religion.

[8] The approximate location for the last interview was recorded each day. To preserve anonymity, we did not record the interview locations.

[9] As part of the field experiment, two different videos were shown to the treatment and control group. Both videos included the same general introduction to climate change and its likely consequences, particularly in terms of population displacements. The treatment group video additionally contained a segment stressing the repeated nature of climate-related events and subsequent migration. We found no impact from the treatment on attitudes toward climate migrants and including a treatment dummy variable in our estimations had no impact on results reported in this article (these results can be obtained from the authors).

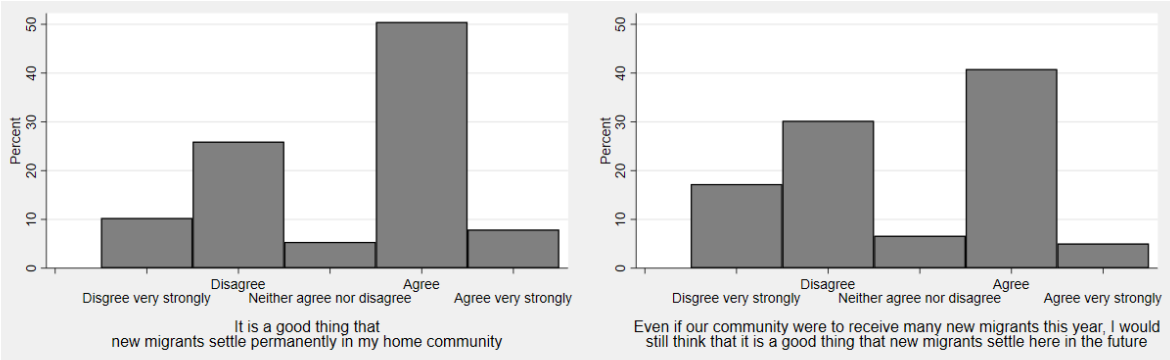


Figure 2. Agreement with the outcome statements, Attitude I and II.

Independent variables

We measure the respondent's spatial proximity to climate-related hazards in three ways. Our first variable measures the distance from the union head office to the closest occurrence of mangrove forest as an approximation for the distance to the most exposed coastal areas due to strong winds, cyclones, storm surges, sea level rise, and increasing soil salinization (Figure 3). To include the proximity to low-lying areas (i.e., the flood-prone areas), we generated a second variable that measures the mean elevation in the union and a third variable for mean elevation within a 20 km buffer zone around the union (excluding the union itself and the area extending to India) using the Digital Elevation Model (DEM) with a spatial resolution of approximately 30 meters on the equator (Figure 3) (Jarvis, Reuter, Nelson, & Guevara, 2008).

On average, the union head offices are located 33 kilometers from mangrove forest, the distance ranging from 9 to 56 kilometers. The mean union elevation ranges from 2 to 7 meters and the mean elevation for the surrounding area from 3 to 6 meters. As the three measures are highly correlated, but still partially measuring different aspects of distance to the most exposed areas, they were combined into one index, distance to exposure, using factor analysis.

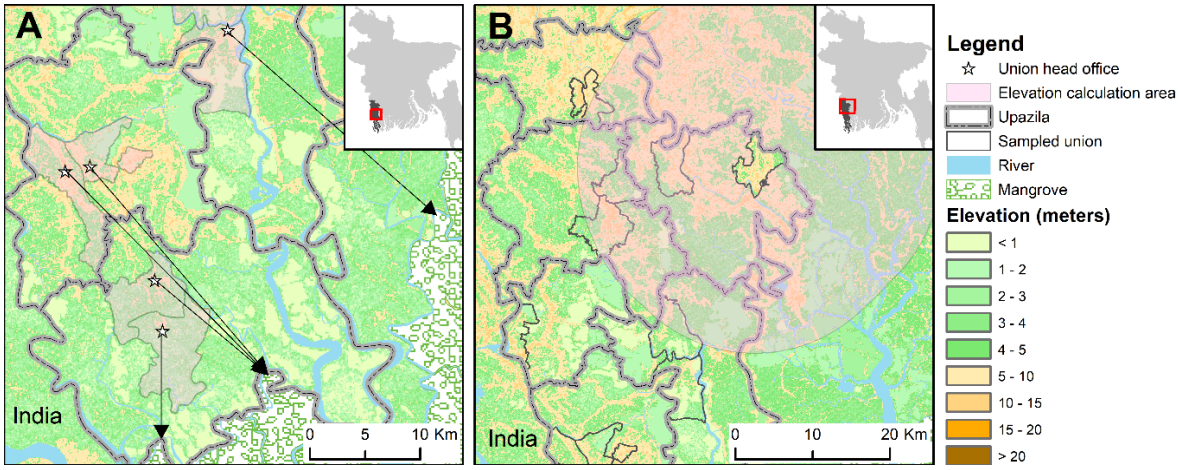


Figure 3. Spatial proximity to exposed areas. (A) Distance to the coast (arrows) and elevation in the sampled unions. (B) Elevation of the surrounding area, using a 20km buffer around the union (buffer shown for one union). Source for the elevation data: Jarvis et al. (2008).

We have several variables at our disposal as proxies for attitudinal proximity. We measure the degree the respondent trusts other people using the respondent's agreement with the statement "I see myself as someone who is generally trusting" (trust; 5-point Likert scale). Attribution bias is measured using the respondent's perception on to what degree s/he thinks it is people's own fault if they repeatedly experience bad luck (repeated bad luck own fault, 5-point Likert scale). Similarly, we include a dummy variable that measures the respondent's attitudes toward persons being accountable for their mistakes (accountability), the variable taking the value of 1 if the respondent shows a relatively strong preference for the accountability principle. We also asked a question that captures the strength of the respondent's religious beliefs (religious attitudes; 5-point Likert scale). Finally, perceptions on community identity, a proxy for in-group bias, are gauged via a question on

similarities between the respondent and their fellow community members compared to migrants (host community identification; 5-point Likert scale).

In general, people tend to trust other people (92% trust others at least to some extent), but think that those who repeatedly face bad luck should bear responsibility for it (71% agreeing with the statement that "If people have bad luck once, it is not their fault, but if they have bad luck repeatedly, it is their fault"). 64% agree with the statement "When people are displaced by climate change, that is the will of God, and there is little we can do" and 43% of the respondents would prefer the responsible person to receive a 1000 Taka (USD 12) fine for damage to a machine rather than fining two persons 100 Taka each (the culpable and one innocent), even when it means a reduction of 800 Taka in total fine. Finally, 80% of the respondents agree that they have more in common with the members of their community than with migrants.

As measures for experiential proximity, we include the respondent's own household's migration history (household migration history) and whether s/he has relatives living in an exposed area (extended family exposure). Nearly one-fourth of the households had moved from one union to another one in the past, the maximum number of such moves being 10. Almost 40% of the respondents had extended family members living in areas that were very exposed to climate change.

To measure social proximity, we include measures for the respondent's education level, occupation, and household wealth. Education is measured on a scale from no completed formal education (0) to completed tertiary level (4). In our sample, 23% have not completed primary schooling and 22% have completed upper secondary schooling or more. On average, our respondents have higher educational attainment than people living in the aforementioned coastal migrant catchment areas surveyed in Wiig et al. (2020); in these areas, 39% have no completed schooling and only 5% have completed upper secondary schooling or more.

Our household asset index is based on factor analysis of the ownership of the following assets: house, bicycle, radio, TV, motor vehicle or motorcycle, mobile phone, computer, and number of rooms occupied by the household (household assets). Again, on average, our respondents are wealthier than people living in the coastal migrant catchment areas: the shares are 20 percentage points higher for land ownership, 50 for bicycle, over 60 for TV, and 16 for motorbike ownership while also the number of rooms occupied by the household is higher (2.4 compared to 1.9).

In the coastal migrant catchment areas, the most common occupations are farming (inclusive fish and shrimp production; 10%), farm or fish/shrimp production laborer (9%), gathering, foraging, and hunting (9%), self-employment with no non-family employees (9%), and day laborers (15%). Therefore, we construct a dummy variable for those in our sample with the same occupations (the two studies use the same occupational categories; occupation). In total, 32% of our sample falls within these occupational categories (due to a high number of females included in the studies, over 40% of the respondents were housewives).

### Control variables

As controls, we include gender and age, which have been associated with attitudes toward migrants and climate change in previous studies. Our average respondent is 41-years old and is as likely to be a male as a female. To control for the impact of community resources on attitudes, we include (self-reported) ease of getting a job (ease of getting job) and perceived resources available in the community to accommodate migrants (community resources). Both responses are measured using the 5-point Likert scale. People tend to disagree with the statement that it is easy for someone like him/her to get a job in the community (87%) and 46% agree and 40 % disagree with the statement that their community can hardly afford to receive new migrants.

## Empirical strategy

We apply our conceptual framework on how host-migrant proximities influence host community members' attitudes toward internal climate migrants to our survey data from Satkhira District, Bangladesh, by estimating the following model:

$$y_i = \alpha + \beta_{SP} SP_j + \beta_A A_i + \beta_E E_i + \beta_S S_i + \sigma X_i + \varepsilon_i \quad (1)$$

where our outcome variable y is the respondent's stated attitude toward new internal climate migrants coming to their community. Our data is mostly at individual level i with the exception of our measure for spatial proximity SP which is at union level j. Our interest is in all coefficients $\beta$ that capture the effects of our independent variables measuring spatial, attitudinal A, experiential E, and social S proximity. The vector X includes our control variables. We use OLS regressions, as it is straight forward to interpret the results, and report robust standard errors clustered on enumerator-union. As a robustness check, we also run ordered logit estimations. Stata 15.1 was used in all analyses. Replication data and instructions will be made available through Mendeley Data upon publication of the article.

## 4. Results

Tables 2 and 3 show the main results using OLS regressions and Appendix 2 robustness checks. The Supplementary Appendix provides the order logit results for all estimations (SA Tables 1–3) and results of the analysis using only the control group as the sample (SA Tables 4–6).

Table 2 shows the main results for both dependent variables, attitude toward new internal climate migrants (Attitude I; Models 1–3) and its stronger variant which conditions the statement on the community receiving many new migrants in the current year (Attitude II; Models 4–6). Models 1 and 4 include the variables included in our conceptual framework and controls for age and gender. To these, in Models 2 and 5 we add the controls for the local economic conditions and in Models 3 and 6 the variable for ingroup identity (home community identification). The latter variable is not related to our outcome variables, its impact on estimated coefficients for other variables is small, and its inclusion does not increase the overall performance of the model (measured as R-squared) while at the same time its inclusion decreases the sample size by over 70 observations. Therefore, we use Models 2 and 5 as our base models in the further analysis (Table 3) and robustness checks.

Table 2. Attitudes toward internal climate migrants

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Attitude I | | | Attitude II | | |
| Distance to exposure (index) | -0.209*** | -0.211*** | -0.188** | -0.474*** | -0.471*** | -0.482*** |
| | (-2.71) | (-2.99) | (-2.43) | (-5.77) | (-5.62) | (-5.45) |
| | 0.009 | 0.004 | 0.019 | 0.000 | 0.000 | 0.000 |
| Trust | 0.370*** | 0.229** | 0.119 | 0.429*** | 0.328*** | 0.292*** |
| | (3.15) | (2.66) | (1.45) | (4.52) | (4.17) | (3.92) |
| | 0.003 | 0.010 | 0.153 | 0.000 | 0.000 | 0.000 |
| Repeated bad luck own fault | -0.095* | -0.054 | -0.074* | -0.106** | -0.077 | -0.070 |
| | (-1.85) | (-1.36) | (-1.89) | (-2.15) | (-1.62) | (-1.42) |
| | 0.070 | 0.178 | 0.065 | 0.036 | 0.111 | 0.161 |
| Religious attitudes | 0.298*** | 0.280*** | 0.241*** | 0.214*** | 0.201*** | 0.186*** |
| | (4.51) | (5.25) | (4.68) | (3.71) | (4.02) | (3.81) |
| | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Accountability | -0.306** | -0.240** | -0.262** | -0.308** | -0.249* | -0.230 |
| | (-2.43) | (-2.14) | (-2.24) | (-2.28) | (-1.96) | (-1.59) |
| | 0.019 | 0.037 | 0.029 | 0.027 | 0.055 | 0.119 |
| Household migration history | -0.042 | -0.039 | -0.038 | -0.124 | -0.119* | -0.108 |
| | (-0.35) | (-0.41) | (-0.40) | (-1.45) | (-1.76) | (-1.63) |
| | 0.727 | 0.684 | 0.692 | 0.154 | 0.085 | 0.110 |
| Extended family exposure | 0.040 | -0.054 | -0.046 | -0.193* | -0.257** | -0.265** |
| | (0.37) | (-0.61) | (-0.51) | (-2.00) | (-2.50) | (-2.36) |
| | 0.711 | 0.542 | 0.613 | 0.051 | 0.016 | 0.023 |
| Education | -0.105* | -0.109*** | -0.085* | -0.041 | -0.046 | -0.024 |
| | (-1.93) | (-2.81) | (-1.84) | (-0.63) | (-0.81) | (-0.40) |
| | 0.059 | 0.007 | 0.071 | 0.534 | 0.419 | 0.691 |
| Household assets (index) | -0.140** | -0.135** | -0.161*** | -0.132** | -0.125** | -0.124** |
| | (-2.39) | (-2.50) | (-2.68) | (-2.53) | (-2.55) | (-2.17) |
| | 0.021 | 0.016 | 0.010 | 0.014 | 0.014 | 0.035 |
| Occupation | -0.146 | -0.098 | -0.046 | 0.013 | 0.055 | 0.108 |
| | (-1.10) | (-0.83) | (-0.43) | (0.13) | (0.53) | (1.14) |
| | 0.277 | 0.410 | 0.672 | 0.901 | 0.596 | 0.260 |
| Age | -0.000 | -0.001 | 0.001 | 0.002 | 0.002 | 0.004 |
| | (-0.13) | (-0.13) | (0.12) | (0.60) | (0.48) | (0.88) |
| | 0.901 | 0.894 | 0.908 | 0.552 | 0.631 | 0.382 |
| Male | -0.069 | -0.105 | -0.153* | -0.110 | -0.123 | -0.196** |
| | (-0.67) | (-1.13) | (-1.76) | (-1.21) | (-1.39) | (-2.45) |
| | 0.505 | 0.264 | 0.085 | 0.232 | 0.171 | 0.018 |
| Community resources | | -0.382*** | -0.426*** | | -0.281*** | -0.280*** |
| | | (-6.08) | (-7.04) | | (-3.93) | (-3.71) |
| | | 0.000 | 0.000 | | 0.000 | 0.001 |
| Ease of getting job | | 0.096* | 0.118** | | 0.044 | 0.090 |
| | | (1.91) | (2.02) | | (0.76) | (1.29) |
| | | 0.062 | 0.049 | | 0.450 | 0.204 |
| Host community identification | | | 0.038 | | | 0.000 |
| | | | (0.50) | | | (0.00) |
| | | | 0.617 | | | 0.998 |
| Observations | 625 | 620 | 546 | 625 | 620 | 546 |
| Clusters | 52 | 52 | 50 | 52 | 52 | 50 |
| R-squared | 0.250 | 0.356 | 0.356 | 0.324 | 0.374 | 0.375 |

OLS estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Attitudes toward internal climate migrants, additional analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Attitude I | | | | Attitude II | | | |
| Distance to exposure (index) | | | | -0.209*** | | | | -0.469*** |
| | | | | (-3.01) | | | | (-5.63) |
| | | | | 0.004 | | | | 0.000 |
| Trust | 0.223** | 0.242*** | 0.231** | 0.233*** | 0.308*** | 0.362*** | 0.331*** | 0.333*** |
| | (2.62) | (2.79) | (2.64) | (2.74) | (4.29) | (4.30) | (4.22) | (4.21) |
| | 0.012 | 0.007 | 0.011 | 0.009 | 0.000 | 0.000 | 0.000 | 0.000 |
| Repeated bad luck own fault | -0.056 | -0.055 | -0.051 | -0.056 | -0.083* | -0.080 | -0.072 | -0.080 |
| | (-1.43) | (-1.36) | (-1.29) | (-1.41) | (-1.79) | (-1.57) | (-1.45) | (-1.67) |
| | 0.159 | 0.180 | 0.201 | 0.165 | 0.080 | 0.124 | 0.153 | 0.102 |
| Religious attitudes | 0.282*** | 0.271*** | 0.278*** | 0.281*** | 0.211*** | 0.178*** | 0.199*** | 0.202*** |
| | (5.30) | (5.16) | (5.12) | (5.24) | (4.49) | (3.57) | (3.72) | (4.03) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| Accountability | -0.220* | -0.271** | -0.250** | -0.232** | -0.189 | -0.326** | -0.266* | -0.234* |
| | (-1.91) | (-2.61) | (-2.14) | (-2.04) | (-1.57) | (-2.51) | (-1.92) | (-1.85) |
| | 0.062 | 0.012 | 0.038 | 0.046 | 0.122 | 0.015 | 0.060 | 0.070 |
| Household migration history | -0.035 | -0.050 | -0.045 | -0.037 | -0.102 | -0.150** | -0.130* | -0.117* |
| | (-0.37) | (-0.50) | (-0.46) | (-0.38) | (-1.57) | (-2.02) | (-1.82) | (-1.71) |
| | 0.716 | 0.617 | 0.645 | 0.702 | 0.123 | 0.048 | 0.074 | 0.093 |
| Extended family exposure | -0.051 | -0.060 | -0.039 | -0.059 | -0.256** | -0.260** | -0.227** | -0.267** |
| | (-0.59) | (-0.67) | (-0.45) | (-0.67) | (-2.63) | (-2.32) | (-2.17) | (-2.55) |
| | 0.560 | 0.505 | 0.657 | 0.506 | 0.011 | 0.025 | 0.035 | 0.014 |
| Education | -0.105** | -0.113*** | -0.121*** | | -0.030 | -0.063 | -0.070 | |
| | (-2.67) | (-2.96) | (-3.16) | | (-0.55) | (-1.07) | (-1.22) | |
| | 0.010 | 0.005 | 0.003 | | 0.582 | 0.288 | 0.227 | |
| Household assets (index) | -0.136** | -0.132** | -0.142** | -0.130** | -0.125** | -0.125** | -0.140*** | -0.117** |
| | (-2.55) | (-2.43) | (-2.67) | (-2.34) | (-2.62) | (-2.41) | (-2.90) | (-2.34) |
| | 0.014 | 0.019 | 0.010 | 0.023 | 0.012 | 0.020 | 0.005 | 0.023 |
| Occupation | -0.097 | -0.086 | -0.107 | -0.086 | 0.055 | 0.081 | 0.033 | 0.074 |
| | (-0.83) | (-0.73) | (-0.89) | (-0.72) | (0.54) | (0.77) | (0.30) | (0.71) |
| | 0.413 | 0.468 | 0.377 | 0.473 | 0.589 | 0.446 | 0.763 | 0.481 |
| Age | -0.000 | -0.001 | -0.001 | -0.001 | 0.003 | 0.001 | 0.001 | 0.002 |
| | (-0.07) | (-0.19) | (-0.30) | (-0.17) | (0.75) | (0.25) | (0.15) | (0.41) |
| | 0.943 | 0.854 | 0.763 | 0.863 | 0.458 | 0.807 | 0.884 | 0.684 |
| Male | -0.115 | -0.105 | -0.088 | -0.116 | -0.152* | -0.117 | -0.086 | -0.139 |
| | (-1.23) | (-1.13) | (-0.95) | (-1.25) | (-1.73) | (-1.24) | (-1.00) | (-1.59) |
| | 0.223 | 0.262 | 0.348 | 0.219 | 0.090 | 0.222 | 0.323 | 0.118 |
| Community resources | -0.377*** | -0.392*** | -0.381*** | -0.384*** | -0.265*** | -0.304*** | -0.278*** | -0.284*** |
| | (-5.91) | (-6.29) | (-5.91) | (-6.21) | (-3.84) | (-4.15) | (-3.77) | (-4.03) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ease of getting job | 0.095* | 0.084 | 0.101** | 0.095* | 0.044 | 0.015 | 0.058 | 0.044 |
| | (1.91) | (1.60) | (2.05) | (1.93) | (0.82) | (0.23) | (1.05) | (0.77) |
| | 0.061 | 0.116 | 0.045 | 0.059 | 0.418 | 0.821 | 0.300 | 0.446 |
| Distance to mangrove (km) | -0.017*** | | | | -0.040*** | | | |
| | (-3.11) | | | | (-6.53) | | | |
| | 0.003 | | | | 0.000 | | | |
| Elevation, union (m) | | -0.131*** | | | | -0.259*** | | |
| | | (-2.82) | | | | (-4.37) | | |
| | | 0.007 | | | | 0.000 | | |
| Elevation, around union (m) | | | -0.196** | | | | -0.452*** | |
| | | | (-2.66) | | | | (-5.25) | |
| | | | 0.011 | | | | 0.000 | |
| No education | | | | 0.398** | | | | 0.267 |
| | | | | (2.46) | | | | (1.33) |
| | | | | 0.017 | | | | 0.190 |
| Primary education | | | | 0.327** | | | | 0.250 |
| | | | | (2.02) | | | | (1.46) |
| | | | | 0.048 | | | | 0.151 |
| Lower secondary education | | | | 0.112 | | | | 0.076 |
| | | | | (0.65) | | | | (0.51) |
| | | | | 0.518 | | | | 0.613 |
| Tertiary education | | | | 0.060 | | | | 0.225 |
| | | | | (0.40) | | | | (1.55) |
| | | | | 0.693 | | | | 0.127 |
| Observations | 620 | 620 | 620 | 620 | 620 | 620 | 620 | 620 |
| Clusters | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| R-squared | 0.357 | 0.352 | 0.351 | 0.358 | 0.399 | 0.334 | 0.356 | 0.378 |

OLS estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

Spatial proximity

Physical proximity is related to attitudes: those who live in areas further from the coast and on more elevated ground are less welcoming to migrants. Moreover, the coefficients are considerably larger for Attitude II, the change in the coefficients being statistically highly significant, suggesting

that the proximity to the most exposed areas is even more salient when people consider welcoming migrants in the hypothetical case of already receiving substantial numbers of migrants. When the different measures for proximity to most hazard-prone areas are included separately (Table 3, Models 1–3 and 5–7), all three measures predict attitudes toward migrants, with higher statistical significance levels and larger impact sizes on Attitude II.

The effect sizes are considerable: For each ten kilometers one moves away from the coastline, the attitudes toward migrants increase in negativity by 0.17 points for Attitude I (Table 3, Model 1) and by 0.4 points for Attitude II (Table 3, Model 5). This means that, moving from the union located closest to the coast (9 km) to the union located furthest (56 km), we would expect the attitudes go from the score 3.8 to 2.0 on the Likert scale for Attitude II, keeping all the other variables at their means. Elevation has an equally strong impact on attitudes: A one-meter increase in the elevation of the surrounding area (incidentally, one meter equals one standard deviation for this variable) predicts a decrease of 0.2 and 0.45 in the scores for Attitude I and II, respectively.

Attitudinal proximity

Of our measures for attitudinal proximity to fellow citizens, we find that those who generally are trusting are more likely to welcome migrants. There is some indication that the effect size for trust could be larger for Attitude II, but the difference is not statistically significant across all specifications. Respondents with strong religious attitudes are also more positive toward migrants. People who think that people should be held accountable for their own errors clearly have more negative attitudes toward climate migrants (accountability), and there is some indication that those who believe that repeated bad luck is one's own fault are more skeptical toward migrants. As noted earlier, host community identification is not related to migration attitudes.

When it comes to effect sizes, a one standard deviation (0.6) increase in trust increases the score for Attitude II by 0.2 (Table 2, Model 5) and a one standard deviation (1.2) increase in religious attitudes increases the score for Attitude II by 0.25. Accountability (a dummy) – i.e. holding others strongly accountable for their mistakes – decreases the score for Attitude II by 0.25.

Experiential proximity

Contrary to expectations discussed in the conceptual framework section, shared experiences or vulnerabilities with migrants do not seem to generate more positive attitudes toward them. There is in fact some evidence that those who have relatives living in highly exposed areas (extended family exposure) are less welcoming to new migrants when it comes to Attitude II. Coefficients for household migration history have also a negative sign throughout the estimations, but in most estimations the coefficients are not significant at the conventional level (and never when ordered logit estimations are used; see Supplementary Appendix).

Social proximity

The results for household assets show that respondents from poorer households are consistently more welcoming, and those from wealthier households less favorably inclined, toward internal climate migrants. Less-educated respondents are also more positive toward climate migrants, although this is only true for Attitude I. For Attitude II we find no impact of education. Adding the different educational categories separately in the estimations (Table 3, Models 4 and 8), using completed upper secondary education as the reference category, reveals that those without formal education and those who have only completed primary school are clearly more positive toward climate migrants than the others. The differences for the three higher education categories are not statistically significantly different from each other. Our dummy for people with occupations prevalent in the potential migrant sending areas is not significantly related to our dependent variables.

Control variables and further robustness checks

Age is not related to attitudes toward climate migrants, nor do we find any evidence for a non-linear relationship (results not shown). The coefficient for gender (male) is consistently negative, but it fails in most estimations to reach the conventional significance level. Those who think that their community can hardly afford to receive new migrants (community resources) are

considerably less welcoming to climate migrants. Those who find it easy for someone like them to get a job in the community tend to be more positive about welcoming migrants, although this effect dissipates for Attitude II.

Appendix 2 shows robustness analysis when adding the control for treatment video status (Models 1 and 6), previous knowledge on climate change (Models 2 and 7), belief of typical migrants' level of wealth (Models 3 and 8), and believed number of future migrants (Models 4 and 9). Models 5 and 10 include further characteristics of the respondent (whether the household owns land, respondent's residency history in the community, and respondent's status in the household).[10] Inclusion of these variables has no substantial impacts on the size or significance levels of the other variables and none of them predict our outcome variables.

## 5. Discussion

Drawing on existing literature on perceptions of immigration, climate change, and natural hazards, we developed a conceptual framework centered on multi-dimensional migrant-host proximities as key aspects in shaping peoples' attitudes toward internal climate migrants. We tested four distinct, yet related dimensions of proximity using unique survey data from southwest coastal Bangladesh. Taken together, the study provides evidence that host–migrant proximities are important in understanding attitudes toward internal climate migrants in a developing country like Bangladesh. While results for our control variables suggest that perceived capacity to receive migrants matters for attitudes toward them,[11] results for our proximity variables underscore that these attitudes are not just a matter of capacities, they are also heavily relational, positional, and complex.

In our study, likely sending and receiving areas are spatially very close to each other, at maximum 60 km apart. The fact that there seems to be an impact of distance even over such short distances implies that one's own experience, or the threat of being directly affected, of a hazard can be salient in forming attitudes toward internal climate migrants. This result is in line with extant studies, conducted mainly in developed countries showing that one's own experience and short spatial distance to being impacted by climate change or a weather related hazard event tend to be related to concern over climate change, its consequences, and support for climate action (Bhattachanu et al., 2019; Brody et al., 2008; A Spence et al., 2011; Verlynde et al., 2019).

Similarly, our findings on values and worldviews are mostly in line with previous studies on perceptions of climate change and immigrants: 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. In one respect, however, our results are perhaps surprising: we do not find evidence that stronger ingroup identity predicts more hostile attitudes toward migrants. One plausible explanation for this result is that the society we studied is very homogenous – the potential migrants and host community members speak the same language and have the same ethnicity and religion – and that we focused on short-distance migration, where sociocultural differences between the host community members and the migrants may be smaller than across larger geographic distances. Regarding our measure for religious attitudes, we found that those who thought that "when people are displaced by climate change, that is the will of God, and there is little we can do", were more likely to welcome new migrants. It is possible that this is related to the strength of people's religious beliefs and/or related humanistic values, but it is equally possible that the variable captures the effect of people feeling more empathy toward people who they believe cannot be blamed for their misfortune (Harell et al., 2017) or the effect of religious people perhaps being more inclined to accept other people of the same religious group (Bansak, Hainmueller, & Hangartner, 2016).

Contrary to expectations, we found little evidence that experiential proximity to migrants, measured as shared experiences of migration and extended family exposure, was positively related to attitudes toward migrants. We even found evidence that shared experience to some degree predicted more negative attitudes toward climate migrants, as having extended family

[10] See the summary statistics table for details on these measures (Appendix 1).

[11] These results are in line with recent studies conducted in Morocco (Buehler & Han, 2019) and South Africa (Harris et al., 2018).

members living in highly exposed areas was consistently related to more negative views. One possible explanation for this is that people in the studied region tend to rely on their extended family when migrating (Boas, 2019). Therefore, it is possible that the respondents with relatives living in exposed areas perhaps 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. The fact that we find significant results for this variable only for the second, more strongly phrased attitudinal outcome variable, supports such an interpretation.

In contrast to many previous studies on migration and climate change perceptions (Chang & Kang, 2018; Hainmueller & Hiscox, 2007; Mayda, 2006; Poortinga et al., 2019; Rustenbach, 2010), we found that the less wealthy and the less educated were considerably more positive about receiving internal climate migrants. As noted, this finding suggests the positional nature of attitudes toward migrants, with attitudes becoming more negative as socio-economic or class differences increase. In general, we also see little evidence that labor market competition has a strong influence on attitudes in our case; respondents with occupations similar to those prevalent in migrant sending areas were no more critical of migrants than those in other occupations.

## 6. Conclusion

This article is one of the first studies examining host community attitudes toward internal climate migrants in developing countries. The study was motivated by the lack of research on the host communities that will be on the front lines in receiving substantial numbers of internal climate migrants in the coming decades, should the pessimistic predictions of hundreds of millions of people being driven from their homes and lands materialize (Boas et al., 2019). Understanding how the receiving communities view migrants and how those views are shaped is crucial in designing policies that seek to lessen tensions between the host communities and the displaced and to improve resettlement outcomes.

The article posits that psychological distance to internal climate migrants is important in determining perceptions of them, conceptually dividing the different dimensions of distance into spatial, attitudinal, experiential, and social proximity. In particular, we provide evidence that spatial distance to highly exposed areas, views related to trust, attribution bias and religion, and social proximity in terms of education level and wealth are salient for host community members' attitudes toward migrants moving over short distances due to climate change-related environmental changes in southwest Bangladesh.

This study is not without limitations. The study is unique in its focus on host communities in a highly climate-exposed region, but its external validity should be assessed in further studies. Although the study provides evidence that host–migrant proximity is an important factor in understanding how host community members perceive internal climate migrants, none of the specific findings can be taken as an established result until they have been studied in more depth across different contexts, inclusive of ethnically diverse societies. Basically, are the individual factors identified in this study consequently relevant when other data and/or better-defined variables are used? Related to this, there are likely to be several other factors, falling within the four proposed proximity categories, that can be relevant, but which were not included in this study. When it comes to spatial distance, a shortcoming in this study was the lack of individual distance to the 'threat', it thus being measured at the union level. Future studies should aim at measuring individual distance to highly exposed areas and places. Another import avenue for future research is to investigate how formation of perceptions of internal climate migrants can be influenced (Kolstad et al., 2019).

When it comes to policy implications, the study provides some tentative advice. First, the strong positive impact of spatial proximity on the areas most exposed to impacts of climate change suggest that a more realistic perception of natural hazards, as well as the helplessness of the affected communities, can improve empathy and support toward the displaced. Programs and campaigns focusing on creating awareness concerning the impact of climate change on displacement may thus contribute to improving attitudes toward migrants and create support for resettlement initiatives. Second, appealing to people's humanistic values and limited options faced

by those most adversely affected by climate-related environmental change may also positively impact people's attitudes toward internal climate migrants. Third, portraying the potential migrants as like 'oneself' may help in bridging the psychological distance between the host communities and the displaced.

# 7. References


Adelekan, I. O., & Asiyanbi, A. P. (2016). Flood risk perception in flood-affected communities in Lagos, Nigeria. NATURAL HAZARDS, 80(1), 445–469. https://doi.org/10.1007/s11069-015-1977-2

Andrighetto, L., Baldissarri, C., Lattanzio, S., Loughnan, S., & Volpato, C. (2014). Human-itarian aid? Two forms of dehumanization and willingness to help after natural disasters. BRITISH JOURNAL OF SOCIAL PSYCHOLOGY, 53(3), 573–584. https://doi.org/10.1111/bjso.12066

Azadi, Y., Yazdanpanah, M., & Mahmoudi, H. (2019). Understanding smallholder farmers' adaptation behaviors through climate change beliefs, risk perception, trust, and psychological distance: Evidence from wheat growers in Iran. JOURNAL OF ENVIRONMENTAL MANAGEMENT, 250. https://doi.org/10.1016/j.jenvman.2019.109456

Ballew, M. T., Leiserowitz, A., Roser-Renouf, C., Rosenthal, S. A., Kotcher, J. E., Marlon, J. R., … Maibach, E. W. (2019). Climate Change in the American Mind: Data, Tools, and Trends. Environment: Science and Policy for Sustainable Development, 61(3), 4–18. https://doi.org/10.1080/00139157.2019.1589300

Bansak, K., Hainmueller, J., & Hangartner, D. (2016). How economic, humanitarian, and religious concerns shape European attitudes toward asylum seekers. SCIENCE, 354(6309), 217–222. https://doi.org/10.1126/science.aag2147

Barcelo, J. (2016). Attitudes toward immigrants and immigration policy in Asia and the Pacific: a quantitative assessment of current theoretical models beyond western countries. ASIAN JOURNAL OF POLITICAL SCIENCE, 24(1), 87–123. https://doi.org/10.1080/02185377.2015.1136228

Bhattachanu, A., Jurjonas, M. D., Morris, P. R., Taillie, P. J., Smart, L. S., Emanuel, R. E., & Seekamp, E. L. (2019). Linking residential saltwater intrusion risk perceptions to physical exposure of climate change impacts in rural coastal communities of North Carolina. NATURAL HAZARDS, 97(3), 1277–1295. https://doi.org/10.1007/s11069-019-03706-0

Boas, I. (2019). Social networking in a digital and mobile world: the case of environmentally-related migration in Bangladesh. JOURNAL OF ETHNIC AND MIGRATION STUDIES. https://doi.org/10.1080/1369183X.2019.1605891

Boas, I., Farbotko, C., Adams, H., Sterly, H., Bush, S., van der Geest, K., … Hulme, M. (2019). Climate migration myths. NATURE CLIMATE CHANGE, 9(12), 901–903. https://doi.org/10.1038/s41558-019-0633-3

Braakmann, N., Waqas, M., & Wildman, J. (2017). Are Immigrants in Favour of Immigration? Evidence from England and Wales. B E JOURNAL OF ECONOMIC ANALYSIS & POLICY, 17(1). https://doi.org/10.1515/bejeap-2016-0029

Brody, S. D., Zahran, S., Vedlitz, A., & Grover, H. (2008). Examining the Relationship Between Physical Vulnerability and Public Perceptions of Global Climate Change in the United States. Environment and Behavior, 40(1), 72–95. https://doi.org/10.1177/0013916506298800

Bruegger, A., Dessai, S., Devine-Wright, P., Morton, T. A., & Pidgeon, N. F. (2015). Psychological responses to the proximity of climate change. NATURE CLIMATE CHANGE, 5(12), 1031–1037. https://doi.org/10.1038/NCLIMATE2760

Buehler, M., & Han, K. J. (2019). Divergent opposition to sub-Saharan African and Arab migrants in Morocco's Casablanca Region: prejudice from the pocketbook? BRITISH JOURNAL OF MIDDLE EASTERN STUDIES. https://doi.org/10.1080/13530194.2019.1651633

Burke, M., Hsiang, S. M., & Miguel, E. (2015). Climate and Conflict. In Arrow, KJ and Bresnahan, TF (Ed.), ANNUAL REVIEW OF ECONOMICS, VOL 7 (p. 577+). https://doi.org/10.1146/annurev-economics-080614-115430

Card, D., Dustmann, C., & Preston, I. (2012). Immigration, Wages, and Compositional Amenities. Journal of the European Economic Association, 10(1), 78–119. https://doi.org/10.1111/j.1542-4774.2011.01051.x

Cattaneo, C., Beine, M., Froehlich, C. J., Kniveton, D., Martinez-Zarzoso, I., Mastrorillo, M., … Schraven, B. (2019). Human Migration in the Era of Climate Change. REVIEW OF ENVIRONMENTAL ECONOMICS AND POLICY, 13(2), 189–206. https://doi.org/10.1093/reep/rez008

Chang, H. Il, & Kang, W. C. (2018). Trust, Economic Development and Attitudes toward Immigration. CANADIAN JOURNAL OF POLITICAL SCIENCE-REVUE CANADIENNE DE SCIENCE POLITIQUE, 51(2), 357–378. https://doi.org/10.1017/S0008423917001378

Corner, A., Markowitz, E., & Pidgeon, N. (2014). Public engagement with climate change: the role of human values. WILEY INTERDISCIPLINARY REVIEWS-CLIMATE CHANGE, 5(3), 411–422. https://doi.org/10.1002/wcc.269

Dang, H. Le, Li, E., Nuberg, I., & Bruwer, J. (2014). Understanding farmers' adaptation intention to climate change: A structural equation modelling study in the Mekong Delta, Vietnam. Environmental Science & Policy, 41, 11–22. https://doi.org/https://doi.org/10.1016/j.envsci.2014.04.002

Dang, H. Le, Li, E., Nuberg, I., & Bruwer, J. (2019). Factors influencing the adaptation of farmers in response to climate change: a review. CLIMATE AND DEVELOPMENT, 11(9), 765–774. https://doi.org/10.1080/17565529.2018.1562866

de Guttry, C., Susser, D., & Doering, M. (2019). Situating climate change: Psychological distances as tool to understand the multifaceted dimensions of climate change meanings. GEOFORUM, 104, 92–100. https://doi.org/10.1016/j.geoforum.2019.06.015

Demski, C., Capstick, S., Pidgeon, N., Sposato, R. G., & Spence, A. (2017). Experience of extreme weather affects climate change mitigation and adaptation responses. CLIMATIC CHANGE, 140(2), 149–164. https://doi.org/10.1007/s10584-016-1837-4

Dinesen, P. T., Klemmensen, R., & Norgaard, A. S. (2016). Attitudes Toward Immigration: The Role of Personal Predispositions. POLITICAL PSYCHOLOGY, 37(1), 55–72. https://doi.org/10.1111/pops.12220

Drury, J., Brown, R., Gonzalez, R., & Miranda, D. (2016). Emergent social identity and observing social support predict social support provided by survivors in a disaster: Solidarity in the 2010 Chile earthquake. EUROPEAN JOURNAL OF SOCIAL PSYCHOLOGY, 46(2), 209–223. https://doi.org/10.1002/ejsp.2146

Eckstein, D., Hutfils, M.-L., & Winges, M. (2018). Global Climate Risk Index 2019. Who Suffers Most From Extreme Weather Events? Weather-related Loss Events in 2017 and 1998 to 2017. Retrieved from https://germanwatch.org/sites/germanwatch.org/files/Global Climate Risk Index 2019_2.pdf

Economist. (2019, May 23). How climate change can fuel wars. The Economist. Retrieved from https://www.economist.com/international/2019/05/23/how-climate-change-can-fuel-wars

Eisenberg, N., Eggum, N. D., & Di Giunta, L. (2010). Empathy-Related Responding: Associations with Prosocial Behavior, Aggression, and Intergroup Relations. SOCIAL ISSUES AND POLICY REVIEW, 4(1), 143–180. https://doi.org/10.1111/j.1751-2409.2010.01020.x

Fearon, J. D., & Laitin, D. D. (2011). Sons of the Soil, Migrants, and Civil War. WORLD DEVELOPMENT, 39(2, SI), 199–211. https://doi.org/10.1016/j.worlddev.2009.11.031

Fenton, A., Paavola, J., & Tallontire, A. (2017). Autonomous adaptation to riverine flooding in Satkhira District, Bangladesh: implications for adaptation planning. Regional Environmental Change, 17(8), 2387–2396. https://doi.org/https://doi.org/10.1007/s10113-017-1159-8

Government Office for Science. (2011). Foresight: Migration and Global Environmental Change. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/287717/11-1116-migration-and-global-environmental-change.pdf

Hainmueller, J., & Hangartner, D. (2013). Who Gets a Swiss Passport? A Natural Experiment in Immigrant Discrimination. AMERICAN POLITICAL SCIENCE REVIEW, 107(1), 159–187. https://doi.org/10.1017/S0003055412000494

Hainmueller, J., & Hiscox, M. J. (2007). Educated preferences: Explaining attitudes toward immigration in Europe. INTERNATIONAL ORGANIZATION, 61(2), 399–442. https://doi.org/10.1017/S0020818307070142

Hainmueller, J., & Hiscox, M. J. (2010). Attitudes toward Highly Skilled and Low-skilled Immigration: Evidence from a Survey Experiment. AMERICAN POLITICAL SCIENCE REVIEW, 104(1), 61–84. https://doi.org/10.1017/S0003055409990372

Hainmueller, J., Hiscox, M. J., & Margalit, Y. (2015). Do concerns about labor market competition shape attitudes toward immigration? New evidence. JOURNAL OF INTERNATIONAL ECONOMICS, 97(1), 193–207. https://doi.org/10.1016/j.jinteco.2014.12.010

Haldar, P. K., Saha, S. K., Ahmed, M. F., & Islam, S. N. (2017). Coping strategy for rice farming in Aila affected South-West region of Bangladesh. Journal of Science, Technology and Environment Informatics, 4(2), 313–326. https://doi.org/https://doi.org/10.18801/jstei.040217.34

Harell, A., Soroka, S., & Iyengar, S. (2017). Locus of Control and Anti-Immigrant Sentiment in Canada, the United States, and the United Kingdom. POLITICAL PSYCHOLOGY, 38(2), 245–

260. https://doi.org/10.1111/pops.12338
Harris, A. S., Findley, M. G., Nielson, D. L., & Noyes, K. L. (2018). The Economic Roots of Anti-immigrant Prejudice in the Global South: Evidence from South Africa. POLITICAL RESEARCH QUARTERLY, 71(1), 228–241. https://doi.org/10.1177/1065912917734062
Hart, P. S., & Nisbet, E. C. (2012). Boomerang Effects in Science Communication: How Motivated Reasoning and Identity Cues Amplify Opinion Polarization About Climate Mitigation Policies. COMMUNICATION RESEARCH, 39(6), 701–723. https://doi.org/10.1177/0093650211416646
Herreros, F., & Criado, H. (2009). Social Trust, Social Capital and Perceptions of Immigration. POLITICAL STUDIES, 57(2), 337–355. https://doi.org/10.1111/j.1467-9248.2008.00738.x
Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. NATURE CLIMATE CHANGE, 6(6), 622+. https://doi.org/10.1038/NCLIMATE2943
International Federation of Red Cross and Red Crescent Societies. (2008). Bangladesh: Cyclone SIDR. Emergency appeal n° MDRBD003. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/4EF71C7A44E0DF3E852574EA0050B8B7-Full_Report.pdf
International Federation of Red Cross and Red Crescent Societies. (2019). Emergency Plan of Action (EPoA). Bangladesh: Cyclone Bulbul. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/MDRBD023do.pdf
IPCC. (2018). Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change,. Retrieved from www.ipcc.ch/sr15/
Islam, S. M., Naher, N., Roy, N., Mahmud, M. K., Hossain, M. D., & Modak, S. (2019). Agricultural Adaptation Options against Adverse Effect of Climate Change in Shyamnagar Upazila in the Satkhira District, Bangladesh. Asian Journal of Research in Agriculture and Forestry, 2(3), 1–12. https://doi.org/https://doi.org/10.9734/AJRAF/2018/46438
Jarvis, A., Reuter, H. I., Nelson, A., & Guevara, E. (2008). Hole-filled seamless SRTM data V4. Retrieved from http://srtm.csi.cgiar.org
Just, A., & Anderson, C. J. (2015). Dual Allegiances? Immigrants' Attitudes toward Immigration. JOURNAL OF POLITICS, 77(1), 188–201. https://doi.org/10.1086/678388
Kolstad, I., Bezu, S., Lujala, P., Mahmud, M., & Wiig, A. (2019). Does changing the narrative improve host community attitudes to climate migrants? Experimental evidence from Bangladesh (No. 2019:3). Retrieved from https://www.cmi.no/publications/7065-does-changing-the-narrative-improve-host-community-attitudes-to-climate-migrants
Krcmaric, D. (2014). Refugee Flows, Ethnic Power Relations, and the Spread of Conflict. SECURITY STUDIES, 23(1), 182–216. https://doi.org/10.1080/09636412.2014.874201
Lee, S., Vyas, L., & Chou, K. (2017). Welcoming Immigrants with Similar Occupational Interests: Experimental Survey Evidence from Hong Kong. POLITICAL STUDIES, 65(2), 391–412. https://doi.org/10.1177/0032321716654923
Li, Y., Li, H., Decety, J., & Lee, K. (2013). Experiencing a Natural Disaster Alters Children's Altruistic Giving. PSYCHOLOGICAL SCIENCE, 24(9), 1686–1695. https://doi.org/10.1177/0956797613479975
Lujala, P., Lein, H., & Rød, J. K. (2015). Climate change, natural hazards, and risk perception: the role of proximity and personal experience. Local Environment, 20(4). https://doi.org/10.1080/13549839.2014.887666
Lujala, Päivi, & Lein, H. (2020). The role of personal experiences in Norwegian perceptions of climate change. Norsk Geografisk Tidsskrift-Norwegian Journal of Geography. https://doi.org/10.1080/00291951.2020.1731850
Maki, A., Dwyer, P. C., Blazek, S., Snyder, M., Gonzalez, R., & Lay, S. (2019). Responding to natural disasters: Examining identity and prosociality in the context of a major earthquake. BRITISH JOURNAL OF SOCIAL PSYCHOLOGY, 58(1), 66–87. https://doi.org/10.1111/bjso.12281
Malhotra, N., Margalit, Y., & Mo, C. H. (2013). Economic Explanations for Opposition to Immigration: Distinguishing between Prevalence and Conditional Impact. AMERICAN JOURNAL OF POLITICAL SCIENCE, 57(2), 391–410. https://doi.org/10.1111/ajps.12012
Mallick, B., Ahmed, B., & Vogt, J. (2017). Living with the Risks of Cyclone Disasters in the South-Western Coastal Region of Bangladesh. ENVIRONMENTS, 4(1). https://doi.org/10.3390/environments4010013
Marjanovic, Z., Greenglass, E. R., Struthers, C. W., & Faye, C. (2009). Helping Following Natural

Disasters: A Social-Motivational Analysis. JOURNAL OF APPLIED SOCIAL PSYCHOLOGY, 39(11), 2604–2625. https://doi.org/10.1111/j.1559-1816.2009.00540.x

Mayda, A. M. (2006). Who is against immigration? A cross-country investigation of individual attitudes toward immigrants. REVIEW OF ECONOMICS AND STATISTICS, 88(3), 510–530. https://doi.org/10.1162/rest.88.3.510

McDonald, R. I., Chai, H. Y., & Newell, B. R. (2015). Personal experience and the `psychological distance' of climate change: An integrative review. JOURNAL OF ENVIRONMENTAL PSYCHOLOGY, 44, 109–118. https://doi.org/10.1016/j.jenvp.2015.10.003

Mind'je, R., Li, L., Amanambu, A. C., Nahayo, L., Nsengiyumva, J. B., Gasirabo, A., & Mindje, M. (2019). Flood susceptibility modeling and hazard perception in Rwanda. INTERNATIONAL JOURNAL OF DISASTER RISK REDUCTION, 38. https://doi.org/10.1016/j.ijdrr.2019.101211

Ngo, C. C., Poortvliet, P. M., & Feindt, P. H. (2019). Drivers of flood and climate change risk perceptions and intention to adapt: an explorative survey in coastal and delta Vietnam. JOURNAL OF RISK RESEARCH. https://doi.org/10.1080/13669877.2019.1591484

Ogunbode, C. A., Liu, Y., & Tausch, N. (2017). The moderating role of political affiliation in the link between flooding experience and preparedness to reduce energy use. Climatic Change, 145(3), 445–458. https://doi.org/10.1007/s10584-017-2089-7

Oremo, F., Mulwa, R., & Oguge, N. (2019). Knowledge, Attitude and Practice in Water Resources Management among Smallholder Irrigators in the Tsavo Sub-Catchment, Kenya. RESOURCES-BASEL, 8(3). https://doi.org/10.3390/resources8030130

Poortinga, W., Whitmarsh, L., Steg, L., Bohm, G., & Fisher, S. (2019). Climate change perceptions and their individual-level determinants: A cross-European analysis. GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS, 55, 25–35. https://doi.org/10.1016/j.gloenvcha.2019.01.007

Ray, A., Hughes, L., Konisky, D. M., & Kaylor, C. (2017). Extreme weather exposure and support for climate change adaptation. GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS, 46, 104–113. https://doi.org/10.1016/j.gloenvcha.2017.07.002

Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., … Midgley, A. (2018). Groundswell: Preparing for Internal Climate Migration. Retrieved from https://openknowledge.worldbank.org/handle/10986/29461

Rizwan, M., Ping, Q., Saboor, A., Ahmed, U. I., Zhang, D., Deyi, Z., & Teng, L. (2019). Measuring rice farmers' risk perceptions and attitude: Evidence from Pakistan. HUMAN AND ECOLOGICAL RISK ASSESSMENT. https://doi.org/10.1080/10807039.2019.1602753

Ruedin, D. (2019). Attitudes to immigrants in South Africa: personality and vulnerability. JOURNAL OF ETHNIC AND MIGRATION STUDIES, 45(7), 1108–1126. https://doi.org/10.1080/1369183X.2018.1428086

Rustenbach, E. (2010). Sources of Negative Attitudes toward Immigrants in Europe: A Multi-Level Analysis. INTERNATIONAL MIGRATION REVIEW, 44(1), 53–77. https://doi.org/10.1111/j.1747-7379.2009.00798.x

Sadik, M. S., Nakagawa, H., Rahman, R., Shaw, R., Kawaike, K., & Fujita, K. (2018). A Study on Cyclone Aila Recovery in Koyra, Bangladesh: Evaluating the Inclusiveness of Recovery with Respect to Predisaster Vulnerability Reduction. International Journal of Disaster Risk Science, 9(1), 28–43. https://doi.org/10.1007/s13753-018-0166-9

Sarrasin, O., Green, E. G. T., Bolzman, C., Visintin, E. P., & Politi, E. (2018). Competition- and Identity-based Roots of Anti-immigration Prejudice among Individuals with and without an Immigrant Background. INTERNATIONAL REVIEW OF SOCIAL PSYCHOLOGY, 31(1). https://doi.org/10.5334/irsp.155

Spence, A, Poortinga, W., Butler, C., & Pidgeon, N. F. (2011). Perceptions of climate change and willingness to save energy related to flood experience. NATURE CLIMATE CHANGE, 1(1), 46–49. https://doi.org/10.1038/NCLIMATE1059

Spence, Alexa, Poortinga, W., & Pidgeon, N. (2012). The Psychological Distance of Climate Change. RISK ANALYSIS, 32(6), 957–972. https://doi.org/10.1111/j.1539-6924.2011.01695.x

Subhani, R., & Ahmad, M. M. (2019). Socio-Economic Impacts of Cyclone Aila on Migrant and Non-Migrant Households in the Southwestern Coastal Areas of Bangladesh. GEOSCIENCES, 9(11). https://doi.org/10.3390/geosciences9110482

Thomsen, J. P. F., & Rafiqi, A. (2019). Ideological Biases Weaken the Impact of Social Trust on Ethnic Outgroup Threat. POLITICAL STUDIES. https://doi.org/10.1177/0032321719862751

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. Psychological

Review, 117(2), 440–463. https://doi.org/10.1037/a0018963
UN. (2019, May 29). Mozambique cyclones a 'wake-up call' to boost resistance: UN weather agency. UN News. Retrieved from https://news.un.org/en/node/1039381/mozambique-cyclones-a-wake-up-call-to-boost-resistance-un-weather-agency-2
UNDP. (2010). Cyclone Aila: Joint UN multi-sector assessment and response framework. Retrieved from https://id.scribd.com/document/79662690/Aila-UN-Assessment-Framework-FINAL
UNHCR. (2019). UNHCR FACTSHEET Cyclone IDAI. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/69558.pdf
van der Linden, M., Hooghe, M., de Vroome, T., & Van Laar, C. (2017). Extending trust to immigrants: Generalized trust, cross-group friendship and anti-immigrant sentiments in 21 European societies. PLOS ONE, 12(5). https://doi.org/10.1371/journal.pone.0177369
Verlynde, N., Voltaire, L., & Chagnon, P. (2019). Exploring the link between flood risk perception and public support for funding on flood mitigation policies. JOURNAL OF ENVIRONMENTAL PLANNING AND MANAGEMENT, 62(13), 2330–2351. https://doi.org/10.1080/09640568.2018.1546676
Vivekananda, J., Wall, M., Sylvestre, F., & Nagarajan, C. (2019). Shoring Up Stability. Addressing climate and fragility risks in the Lake Chad region. Retrieved from https://shoring-up-stability.org/wp-content/uploads/2019/06/Shoring-up-Stability.pdf
Walton-Ellery, S. (2009). A Review of the Cyclone Aila Response 2009. IFRC-led Emergency Shelter Coordination Group. Retrieved from https://www.ifrc.org/docs/evaluations/Evaluations2010/Asia Pacific/Bangladesh/Review_of_cyclone_Aila_Response__22 03 10SWE.pdf
Wiig, A., Bezu, S., Kolstad, I., Lujala, P., & Mahmud, M. (2020). Trapped households in climate exposed areas of Bangladesh. Working Paper. Chr. Michelsen Institute, Norway.
Zagefka, H. (2018). It could have been me: Proximity motivates disaster giving. INTERNATIONAL JOURNAL OF NONPROFIT AND VOLUNTARY SECTOR MARKETING, 23(1). https://doi.org/10.1002/nvsm.1587
Zagefka, H., Noor, M., Brown, R., de Moura, G. R., & Hopthrow, T. (2011). Donating to disaster victims: Responses to natural and humanly caused events. EUROPEAN JOURNAL OF SOCIAL PSYCHOLOGY, 41(3), 353–363. https://doi.org/10.1002/ejsp.781
Zanocco, C., Boudet, H., Nilson, R., & Flora, J. (2019). Personal harm and support for climate change mitigation policies: Evidence from 10 US communities impacted by extreme weather. GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS, 59. https://doi.org/10.1016/j.gloenvcha.2019.101984

Appendix 1. Summary statistics and variable definitions

| Variable | Obs | Mean | St. dev. | Min | Max | Definition / Question and answer alternatives |
|---|---|---|---|---|---|---|
| Attitude I | 632 | 3.2 | 1.2 | 1 | 5 | To what extent do you agree with the following statement: It is a good thing that new migrants settle permanently in my home community. 1 Disagree very strongly; 2 Disagree; 3 Neither agree nor disagree; 4 Agree; 5 Agree very strongly |
| Attitude II | 632 | 2.9 | 1.3 | 1 | 5 | To what extent do you agree with the following statement: Even if our community were to receive many new migrants this year, I would still think that it is a good thing that new migrants settle here in the future. Answer alternatives as for Attitude I |
| Distance to exposure (index) | 633 | 0.0 | 1.0 | -1.7 | 1.8 | Factor analysis: Distance to mangrove forest; Elevation (union); Elevation (around union) |
| Distance to mangrove (km) | 633 | 33.9 | 13.1 | 9.4 | 56.3 | Distance to closest mangrove forest |
| Elevation, union (m) | 633 | 4.9 | 1.5 | 2.0 | 7.0 | Mean elevation of the union, calculated based on DEM. |
| Elevation, around union (m) | 633 | 4.2 | 1.0 | 2.9 | 6.1 | Mean elevation of the area surrounding the union (20km buffer), calculated based on DEM. |
| Trust | 630 | 4.2 | 0.6 | 2 | 5 | How well does the following statement describe your personality: I see myself as someone who is generally trusting. Answer alternatives as for Attitude I |
| Repeated bad luck own fault | 630 | 3.8 | 1.0 | 1 | 5 | To what extent do you agree with the following statement: If people have bad luck once, it is not their fault, but if they have bad luck repeatedly, it is their fault. Answer alternatives as for Attitude I |
| Religious attitudes | 633 | 3.4 | 1.2 | 1 | 5 | To what extent do you agree with the following statement: When people are displaced by climate change, that is the will of God, and there is little we can do. Answer alternatives as for Attitude I |
| Accountability | 633 | 0.4 | 0.5 | 0 | 1 | Imagine two people doing the same job in a factory. One day, one person damages the machine they are working at. The factory manager fines both workers 100 Taka; both the person who broke the machine and the other worker. You can instead decide to give a fine of 1000 Taka to the worker who broke the machine, and no fine to the other worker. If you were to choose between these two options, which one would you choose? 0: Let the first person be fined 100 Taka and the second person be fined 100 Taka. In total they are fined 200 Taka. 1: Let the first person be fined 1000 Taka and the second person nothing. In total they are fined 1000 Taka. |
| Host community identification | 550 | 3.8 | 0.9 | 1 | 5 | To what extent do you agree with the following statement: I have more in common with the members of my community than with migrants that arrive here. Answer alternatives as for Attitude I |
| Household migration history | 633 | 0.2 | 0.8 | 0 | 10 | How many times has your household moved from one union to another? |

| | | | | | | |
|---|---|---|---|---|---|---|
| Extended family exposure | 632 | 0.4 | 0.5 | 0 | 1 | Do you have extended family members who currently live in areas very vulnerable to climate change? 0 No; 1 Yes |
| Education | 633 | 1.5 | 1.2 | 0 | 4 | What level of education have you completed? 0 None or other education; 1 Primary; 2 Secondary; 3 Higher secondary; 4 Tertiary |
| Household assets (index) | 632 | 0.0 | 1.0 | -2.2 | 4.2 | Factor analysis: ownership of house, bicycle, radio, TV, motor vehicle or motorcycle, mobile phone, computer, number of rooms the household occupies. |
| Occupation | 633 | 0.3 | 0.5 | 0 | 1 | Respondents' occupation: Farming or fish/shrimp production on own land, Day laborer, Farm or fish/shrimp production laborer or day laborer, Gathering/foraging/hunting or Self-employed (owns business with no non-family employees) |
| Age | 633 | 41.0 | 13.8 | 18 | 89 | Age in years |
| Male | 633 | 0.5 | 0.5 | 0 | 1 | 1 Male; 0 Female |
| Ease of getting job | 631 | 1.9 | 0.9 | 1 | 5 | How easy is it for someone like you to get a job in this community? 1 Very difficult; 2 Difficult; 3 Neither difficult nor easy; 4 Easy; 5 Very easy |
| Community resources | 628 | 3.1 | 1.0 | 1 | 5 | To what extent do you agree with the following statement: Our community can hardly afford to receive new migrants. Answer alternatives as for Attitude I |
| Video treatment | 633 | 0.5 | 0.5 | 0 | 1 | 1 Received treatment video; 0 Received placebo video |
| Climate change knowledge | 633 | 1.3 | 1.0 | 0 | 3 | Can you explain what climate change is, or is this something you have not yet had the opportunity to learn about? The enumerator counted how many of the options the respondent mentioned: Buildup of CO2 and other greenhouse gases in the atmosphere that causes climate to change; Increasing temperatures; Changes in rain and seasons / unstable weather; More extreme weather events; Rising sea levels. 0: None; 1: 1 aspect: 2: 2 aspects; 3: 3 or more aspects. [Partially correct answers were counted as correct answers.] |
| Migrant wealth | 576 | 2.3 | 0.8 | 1 | 5 | The typical migrant to my community is likely to be _____? 1 Extremely poor; 2 Poor; 3 Neither poor nor rich; 4 Rich; 5 Extremely rich |
| Migration size | 633 | 3.8 | 0.6 | 2 | 5 | Do you think the number of migrants to this community in 5 years will be _____? 1 much smaller than today; 2 smaller than today; 3 the same as today; 4 larger than today; 5 much larger than today |
| Household landowner | 632 | 0.8 | 0.4 | 0 | 1 | 1 Household owns land; 0 No |
| Born in community | 633 | 0.6 | 0.5 | 0 | 1 | 1 Yes; 0 No |

| | | | | | |
|---|---|---|---|---|---|
| Residency time | 633 | 33.61 | 5 | 89 | Time the respondent has lived in the community (years) |
| Household head | 633 | 0.4 | 0.5 | 0 | 1 1 The respondent is the household head; 0 The respondent is not the household head |

## Appendix 2. Attitudes toward internal climate migrants, robustness analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Attitude I | | | | | Attitude II | | | | |
| Distance to exposure (index) | -0.211*** | -0.212*** | -0.176** | -0.207*** | -0.214*** | -0.471*** | -0.469*** | -0.467*** | -0.458*** | -0.467*** |
| | (-2.99) | (-2.95) | (-2.44) | (-2.89) | (-3.00) | (-5.61) | (-5.43) | (-5.28) | (-5.53) | (-5.51) |
| | 0.004 | 0.005 | 0.018 | 0.006 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Trust | 0.230*** | 0.229** | 0.135 | 0.224*** | 0.230** | 0.328*** | 0.328*** | 0.300*** | 0.314*** | 0.322*** |
| | (2.70) | (2.66) | (1.66) | (2.74) | (2.62) | (4.20) | (4.16) | (3.91) | (3.83) | (3.99) |
| | 0.009 | 0.011 | 0.103 | 0.008 | 0.011 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Repeated bad luck own fault | -0.055 | -0.054 | -0.089** | -0.055 | -0.051 | -0.077 | -0.079 | -0.089 | -0.082* | -0.077 |
| | (-1.37) | (-1.36) | (-2.52) | (-1.43) | (-1.29) | (-1.61) | (-1.64) | (-1.66) | (-1.71) | (-1.57) |
| | 0.176 | 0.179 | 0.015 | 0.158 | 0.202 | 0.113 | 0.107 | 0.102 | 0.094 | 0.123 |
| Religious attitudes | 0.280*** | 0.280*** | 0.238*** | 0.279*** | 0.279*** | 0.201*** | 0.202*** | 0.192*** | 0.198*** | 0.204*** |
| | (5.24) | (5.27) | (5.09) | (5.28) | (5.24) | (4.03) | (4.09) | (4.11) | (4.07) | (3.96) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Accountability | -0.239** | -0.241** | -0.258** | -0.233** | -0.246** | -0.249* | -0.247* | -0.233* | -0.224* | -0.250* |
| | (-2.14) | (-2.15) | (-2.18) | (-2.04) | (-2.19) | (-1.97) | (-1.93) | (-1.75) | (-1.77) | (-2.00) |
| | 0.038 | 0.036 | 0.034 | 0.047 | 0.034 | 0.054 | 0.059 | 0.086 | 0.083 | 0.050 |
| Household migration history | -0.039 | -0.040 | -0.030 | -0.037 | -0.035 | -0.120* | -0.118* | -0.112* | -0.113* | -0.111* |
| | (-0.41) | (-0.41) | (-0.33) | (-0.39) | (-0.37) | (-1.76) | (-1.75) | (-1.77) | (-1.79) | (-1.72) |
| | 0.686 | 0.684 | 0.741 | 0.695 | 0.714 | 0.084 | 0.086 | 0.084 | 0.079 | 0.092 |
| Extended family exposure | -0.054 | -0.055 | -0.033 | -0.045 | -0.051 | -0.257** | -0.253** | -0.255** | -0.229** | -0.254** |
| | (-0.62) | (-0.62) | (-0.36) | (-0.51) | (-0.59) | (-2.48) | (-2.43) | (-2.41) | (-2.26) | (-2.53) |
| | 0.538 | 0.541 | 0.720 | 0.611 | 0.555 | 0.017 | 0.019 | 0.020 | 0.028 | 0.014 |
| Education | -0.110*** | -0.111*** | -0.093** | -0.107*** | -0.107*** | -0.046 | -0.038 | -0.039 | -0.038 | -0.044 |
| | (-2.81) | (-2.85) | (-2.29) | (-2.80) | (-2.72) | (-0.81) | (-0.72) | (-0.65) | (-0.70) | (-0.77) |
| | 0.007 | 0.006 | 0.026 | 0.007 | 0.009 | 0.421 | 0.476 | 0.519 | 0.490 | 0.443 |
| Household assets (index) | -0.136** | -0.135** | -0.146** | -0.132** | -0.130** | -0.125** | -0.124** | -0.104** | -0.118** | -0.125** |
| | (-2.53) | (-2.50) | (-2.55) | (-2.38) | (-2.22) | (-2.56) | (-2.52) | (-2.10) | (-2.22) | (-2.34) |
| | 0.014 | 0.016 | 0.014 | 0.021 | 0.031 | 0.013 | 0.015 | 0.041 | 0.031 | 0.023 |
| Occupation | -0.096 | -0.097 | -0.025 | -0.101 | -0.100 | 0.055 | 0.051 | 0.104 | 0.046 | 0.045 |
| | (-0.82) | (-0.83) | (-0.25) | (-0.85) | (-0.86) | (0.52) | (0.49) | (1.10) | (0.45) | (0.46) |
| | 0.419 | 0.411 | 0.804 | 0.401 | 0.392 | 0.603 | 0.623 | 0.278 | 0.656 | 0.650 |
| Age | -0.001 | -0.001 | -0.000 | -0.001 | -0.012 | 0.002 | 0.002 | 0.003 | 0.002 | -0.005 |
| | (-0.16) | (-0.14) | (-0.05) | (-0.15) | (-0.88) | (0.49) | (0.51) | (0.67) | (0.44) | (-0.39) |
| | 0.874 | 0.890 | 0.960 | 0.884 | 0.381 | 0.628 | 0.615 | 0.505 | 0.665 | 0.699 |
| Male | -0.104 | -0.106 | -0.150* | -0.101 | -0.133 | -0.124 | -0.119 | -0.162* | -0.111 | -0.212 |
| | (-1.13) | (-1.10) | (-1.75) | (-1.06) | (-0.86) | (-1.39) | (-1.31) | (-1.93) | (-1.23) | (-1.41) |
| | 0.265 | 0.276 | 0.086 | 0.295 | 0.393 | 0.171 | 0.197 | 0.059 | 0.225 | 0.166 |
| Community resources | -0.383*** | -0.383*** | -0.418*** | -0.384*** | -0.383*** | -0.281*** | -0.280*** | -0.292*** | -0.284*** | -0.277*** |
| | (-6.07) | (-6.19) | (-6.58) | (-6.03) | (-6.02) | (-3.92) | (-3.96) | (-3.81) | (-3.99) | (-3.88) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ease of getting job | 0.095* | 0.096* | 0.087 | 0.093* | 0.094* | 0.044 | 0.043 | 0.061 | 0.036 | 0.037 |
| | (1.89) | (1.90) | (1.67) | (1.87) | (1.81) | (0.78) | (0.76) | (0.98) | (0.64) | (0.63) |
| | 0.065 | 0.064 | 0.101 | 0.067 | 0.076 | 0.438 | 0.452 | 0.330 | 0.527 | 0.532 |
| Video treatment | -0.031 | | | | | 0.010 | | | | |
| | (-0.45) | | | | | (0.10) | | | | |
| | 0.653 | | | | | 0.921 | | | | |
| Climate change knowledge | | 0.004 | | | | | -0.021 | | | |
| | | (0.07) | | | | | (-0.40) | | | |
| | | 0.945 | | | | | 0.691 | | | |
| Migrant wealth | | | -0.049 | | | | | 0.019 | | |
| | | | (-0.67) | | | | | (0.26) | | |
| | | | 0.509 | | | | | 0.799 | | |
| Migration size | | | | -0.061 | | | | | -0.188 | |
| | | | | (-0.49) | | | | | (-1.46) | |
| | | | | 0.629 | | | | | 0.151 | |
| Household land owner | | | | | -0.036 | | | | | 0.026 |
| | | | | | (-0.36) | | | | | (0.20) |
| | | | | | 0.718 | | | | | 0.844 |
| Born in community | | | | | -0.202 | | | | | -0.039 |
| | | | | | (-0.70) | | | | | (-0.14) |
| | | | | | 0.489 | | | | | 0.893 |
| Residency time | | | | | 0.011 | | | | | 0.007 |
| | | | | | (0.91) | | | | | (0.58) |
| | | | | | 0.366 | | | | | 0.565 |
| Household head | | | | | 0.056 | | | | | 0.080 |
| | | | | | (0.39) | | | | | (0.49) |
| | | | | | 0.695 | | | | | 0.624 |
| Observations | 620 | 620 | 571 | 620 | 619 | 620 | 620 | 571 | 620 | 619 |
| Clusters | 52 | 52 | 51 | 52 | 52 | 52 | 52 | 51 | 52 | 52 |
| R-squared | 0.356 | 0.356 | 0.342 | 0.357 | 0.357 | 0.374 | 0.374 | 0.360 | 0.380 | 0.375 |

OLS estimations with robust t-statistics in parentheses, clustering in enumerator-union

*** p<0.01, ** p<0.05, * p<0.1

Supplementary Appendix (will be made available online)

SA Table 1. Attitudes toward internal climate migrants, ordered logit estimations

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | | Attitude I | | | Attitude II | |
| Distance to exposure (index) | -0.372** | -0.407*** | -0.373** | -0.836*** | -0.873*** | -0.912*** |
| | (-2.46) | (-2.76) | (-2.19) | (-4.86) | (-4.71) | (-4.60) |
| | 0.014 | 0.006 | 0.028 | 0.000 | 0.000 | 0.000 |
| Trust | 0.895*** | 0.686*** | 0.405** | 0.881*** | 0.731*** | 0.678*** |
| | (3.43) | (3.18) | (2.08) | (4.07) | (4.15) | (3.81) |
| | 0.001 | 0.001 | 0.038 | 0.000 | 0.000 | 0.000 |
| Repeated bad luck own fault | -0.089 | -0.024 | -0.101 | -0.197** | -0.150* | -0.150 |
| | (-0.82) | (-0.25) | (-1.13) | (-2.23) | (-1.68) | (-1.54) |
| | 0.411 | 0.799 | 0.260 | 0.026 | 0.093 | 0.122 |
| Religious attitudes | 0.622*** | 0.639*** | 0.553*** | 0.449*** | 0.436*** | 0.429*** |
| | (4.46) | (5.31) | (4.58) | (3.69) | (4.07) | (3.76) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Accountability | -0.555** | -0.475** | -0.494* | -0.530** | -0.469* | -0.430 |
| | (-2.32) | (-2.02) | (-1.95) | (-2.05) | (-1.84) | (-1.42) |
| | 0.020 | 0.043 | 0.051 | 0.040 | 0.066 | 0.156 |
| Household migration history | -0.123 | -0.090 | -0.086 | -0.188 | -0.171 | -0.153 |
| | (-0.48) | (-0.46) | (-0.43) | (-0.84) | (-1.05) | (-0.94) |
| | 0.632 | 0.644 | 0.665 | 0.400 | 0.291 | 0.348 |
| Extended family exposure | 0.087 | -0.108 | -0.076 | -0.302 | -0.439** | -0.464** |
| | (0.45) | (-0.65) | (-0.43) | (-1.63) | (-2.16) | (-2.06) |
| | 0.654 | 0.513 | 0.665 | 0.104 | 0.030 | 0.040 |
| Education | -0.218** | -0.236*** | -0.172 | -0.102 | -0.123 | -0.068 |
| | (-2.19) | (-2.78) | (-1.64) | (-0.83) | (-1.05) | (-0.55) |
| | 0.028 | 0.005 | 0.100 | 0.408 | 0.296 | 0.580 |
| Household assets (index) | -0.222* | -0.213* | -0.286** | -0.225** | -0.215** | -0.234** |
| | (-1.96) | (-1.86) | (-2.20) | (-2.34) | (-2.26) | (-2.07) |
| | 0.050 | 0.062 | 0.028 | 0.019 | 0.024 | 0.038 |
| Occupation | -0.280 | -0.174 | -0.096 | -0.002 | 0.136 | 0.203 |
| | (-1.13) | (-0.69) | (-0.39) | (-0.01) | (0.71) | (1.09) |
| | 0.260 | 0.490 | 0.693 | 0.991 | 0.478 | 0.277 |
| Age | -0.001 | -0.002 | 0.001 | 0.004 | 0.003 | 0.008 |
| | (-0.13) | (-0.20) | (0.10) | (0.46) | (0.36) | (0.92) |
| | 0.898 | 0.839 | 0.923 | 0.646 | 0.717 | 0.359 |
| Male | -0.118 | -0.216 | -0.295 | -0.154 | -0.226 | -0.327** |
| | (-0.58) | (-1.03) | (-1.40) | (-0.90) | (-1.34) | (-2.10) |
| | 0.564 | 0.302 | 0.161 | 0.366 | 0.182 | 0.035 |
| Community resources | | -0.752*** | -0.866*** | | -0.566*** | -0.574*** |
| | | (-5.28) | (-6.18) | | (-3.81) | (-3.63) |
| | | 0.000 | 0.000 | | 0.000 | 0.000 |
| Ease of getting job | | 0.195* | 0.233* | | 0.089 | 0.205 |
| | | (1.75) | (1.73) | | (0.74) | (1.39) |
| | | 0.080 | 0.083 | | 0.461 | 0.164 |
| Host community identification | | | 0.152 | | | 0.064 |
| | | | (0.92) | | | (0.33) |
| | | | 0.355 | | | 0.738 |
| Observations | 625 | 620 | 546 | 625 | 620 | 546 |
| Clusters | 52 | 52 | 50 | 52 | 52 | 50 |
| R-squared | 0.12 | 0.17 | 0.17 | 0.14 | 0.17 | 0.18 |

Ordered logit estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

SA Table 2. Attitudes toward internal climate migrants, ordered logit estimations, additional analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Attitude I | | | | Attitude II | | | |
| Distance to exposure (index) | | | | -0.403*** | | | | -0.876*** |
| | | | | (-2.77) | | | | (-4.72) |
| | | | | 0.006 | | | | 0.000 |
| Trust | 0.674*** | 0.704*** | 0.693*** | 0.700*** | 0.709*** | 0.774*** | 0.731*** | 0.745*** |
| | (3.15) | (3.22) | (3.16) | (3.21) | (4.19) | (4.27) | (4.17) | (4.20) |
| | 0.002 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Repeated bad luck own fault | -0.028 | -0.027 | -0.020 | -0.026 | -0.163* | -0.139 | -0.136 | -0.152* |
| | (-0.31) | (-0.28) | (-0.21) | (-0.28) | (-1.86) | (-1.52) | (-1.53) | (-1.71) |
| | 0.758 | 0.778 | 0.835 | 0.780 | 0.062 | 0.128 | 0.127 | 0.087 |
| Religious attitudes | 0.648*** | 0.621*** | 0.627*** | 0.643*** | 0.479*** | 0.374*** | 0.419*** | 0.440*** |
| | (5.24) | (5.33) | (5.19) | (5.37) | (4.49) | (3.71) | (3.80) | (4.14) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Accountability | -0.432* | -0.540** | -0.491** | -0.455* | -0.342 | -0.619** | -0.485* | -0.441* |
| | (-1.80) | (-2.45) | (-2.01) | (-1.92) | (-1.38) | (-2.42) | (-1.80) | (-1.74) |
| | 0.072 | 0.014 | 0.045 | 0.055 | 0.168 | 0.016 | 0.071 | 0.082 |
| Household migration history | -0.077 | -0.115 | -0.104 | -0.080 | -0.145 | -0.218 | -0.190 | -0.168 |
| | (-0.40) | (-0.56) | (-0.54) | (-0.40) | (-0.92) | (-1.22) | (-1.13) | (-1.03) |
| | 0.688 | 0.575 | 0.592 | 0.688 | 0.357 | 0.222 | 0.256 | 0.302 |
| Extended family exposure | -0.107 | -0.113 | -0.075 | -0.116 | -0.451** | -0.422** | -0.377* | -0.456** |
| | (-0.66) | (-0.68) | (-0.45) | (-0.70) | (-2.29) | (-1.99) | (-1.87) | (-2.22) |
| | 0.509 | 0.499 | 0.650 | 0.487 | 0.022 | 0.046 | 0.062 | 0.026 |
| Education | -0.226*** | -0.243*** | -0.260*** | | -0.087 | -0.151 | -0.167 | |
| | (-2.63) | (-2.93) | (-3.17) | | (-0.76) | (-1.29) | (-1.44) | |
| | 0.009 | 0.003 | 0.002 | | 0.446 | 0.195 | 0.151 | |
| Household assets (index) | -0.215* | -0.207* | -0.227** | -0.208* | -0.221** | -0.213** | -0.242*** | -0.204** |
| | (-1.90) | (-1.80) | (-2.01) | (-1.79) | (-2.33) | (-2.22) | (-2.59) | (-2.13) |
| | 0.058 | 0.072 | 0.044 | 0.074 | 0.020 | 0.026 | 0.009 | 0.033 |
| Occupation | -0.172 | -0.146 | -0.198 | -0.149 | 0.125 | 0.214 | 0.076 | 0.154 |
| | (-0.68) | (-0.59) | (-0.76) | (-0.59) | (0.65) | (1.11) | (0.38) | (0.80) |
| | 0.497 | 0.558 | 0.445 | 0.555 | 0.513 | 0.268 | 0.704 | 0.426 |
| Age | -0.001 | -0.003 | -0.003 | -0.002 | 0.005 | -0.000 | 0.001 | 0.002 |
| | (-0.12) | (-0.31) | (-0.35) | (-0.27) | (0.63) | (-0.01) | (0.07) | (0.28) |
| | 0.905 | 0.759 | 0.724 | 0.786 | 0.526 | 0.996 | 0.944 | 0.778 |
| Male | -0.239 | -0.214 | -0.181 | -0.238 | -0.286* | -0.204 | -0.158 | -0.243 |
| | (-1.13) | (-1.03) | (-0.86) | (-1.15) | (-1.66) | (-1.17) | (-0.98) | (-1.43) |
| | 0.257 | 0.304 | 0.389 | 0.250 | 0.097 | 0.242 | 0.328 | 0.153 |
| Community resources | -0.739*** | -0.775*** | -0.744*** | -0.754*** | -0.547*** | -0.591*** | -0.549*** | -0.572*** |
| | (-5.15) | (-5.46) | (-5.08) | (-5.40) | (-3.72) | (-4.07) | (-3.71) | (-3.89) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ease of getting job | 0.194* | 0.174 | 0.203* | 0.198* | 0.100 | 0.031 | 0.109 | 0.095 |
| | (1.77) | (1.48) | (1.86) | (1.80) | (0.87) | (0.24) | (0.96) | (0.79) |
| | 0.076 | 0.138 | 0.063 | 0.072 | 0.387 | 0.809 | 0.338 | 0.429 |
| Distance to mangrove (km) | -0.033*** | | | | -0.077*** | | | |
| | (-2.83) | | | | (-5.24) | | | |
| | 0.005 | | | | 0.000 | | | |
| Elevation, union (m) | | -0.251*** | | | | -0.450*** | | |
| | | (-2.60) | | | | (-3.79) | | |
| | | 0.009 | | | | 0.000 | | |
| Elevation, around union (m) | | | -0.367** | | | | -0.836*** | |
| | | | (-2.41) | | | | (-4.62) | |
| | | | 0.016 | | | | 0.000 | |
| No education | | | | 0.838** | | | | 0.661 |
| | | | | (2.46) | | | | (1.59) |
| | | | | 0.014 | | | | 0.112 |
| Primary education | | | | 0.594 | | | | 0.551 |
| | | | | (1.59) | | | | (1.45) |
| | | | | 0.112 | | | | 0.147 |
| Lower secondary education | | | | 0.151 | | | | 0.233 |
| | | | | (0.46) | | | | (0.82) |
| | | | | 0.648 | | | | 0.413 |
| Tertiary education | | | | 0.067 | | | | 0.457 |
| | | | | (0.23) | | | | (1.60) |
| | | | | 0.817 | | | | 0.109 |
| Observations | 620 | 620 | 620 | 620 | 620 | 620 | 620 | 620 |
| Clusters | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| R-squared | 0.18 | 0.17 | 0.17 | 0.18 | 0.19 | 0.15 | 0.16 | 0.17 |

Ordered logit estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

SA Table 3. Attitudes toward internal climate migrants, ordered logit estimations, robustness analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Attitude I | | | | | Attitude II | | | | |
| Distance to exposure (index) | -0.409*** | -0.414*** | -0.333** | -0.390** | -0.413*** | -0.873*** | -0.863*** | -0.897*** | -0.850*** | -0.874*** |
| | (-2.77) | (-2.72) | (-2.20) | (-2.55) | (-2.81) | (-4.71) | (-4.54) | (-4.48) | (-4.62) | (-4.70) |
| | 0.006 | 0.007 | 0.028 | 0.011 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Trust | 0.690*** | 0.685*** | 0.412** | 0.675*** | 0.695*** | 0.731*** | 0.734*** | 0.682*** | 0.708*** | 0.725*** |
| | (3.25) | (3.16) | (2.04) | (3.21) | (3.07) | (4.18) | (4.16) | (3.53) | (3.79) | (3.95) |
| | 0.001 | 0.002 | 0.041 | 0.001 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Repeated bad luck own fault | -0.026 | -0.020 | -0.145* | -0.029 | -0.020 | -0.150* | -0.155* | -0.185* | -0.159* | -0.151 |
| | (-0.28) | (-0.22) | (-1.96) | (-0.32) | (-0.23) | (-1.68) | (-1.73) | (-1.76) | (-1.75) | (-1.62) |
| | 0.779 | 0.829 | 0.050 | 0.750 | 0.822 | 0.094 | 0.084 | 0.078 | 0.080 | 0.106 |
| Religious attitudes | 0.640*** | 0.637*** | 0.532*** | 0.637*** | 0.633*** | 0.437*** | 0.439*** | 0.435*** | 0.435*** | 0.438*** |
| | (5.31) | (5.32) | (4.85) | (5.34) | (5.23) | (4.08) | (4.21) | (3.98) | (4.06) | (3.98) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Accountability | -0.474** | -0.480** | -0.488* | -0.454* | -0.481** | -0.468* | -0.460* | -0.432 | -0.417 | -0.473* |
| | (-2.03) | (-2.06) | (-1.95) | (-1.93) | (-2.04) | (-1.84) | (-1.77) | (-1.55) | (-1.64) | (-1.91) |
| | 0.043 | 0.039 | 0.051 | 0.054 | 0.041 | 0.066 | 0.076 | 0.121 | 0.101 | 0.057 |
| Household migration history | -0.087 | -0.095 | -0.082 | -0.083 | -0.083 | -0.171 | -0.167 | -0.167 | -0.162 | -0.156 |
| | (-0.45) | (-0.47) | (-0.45) | (-0.45) | (-0.42) | (-1.06) | (-1.06) | (-1.11) | (-1.07) | (-1.00) |
| | 0.649 | 0.639 | 0.653 | 0.655 | 0.671 | 0.289 | 0.288 | 0.265 | 0.283 | 0.318 |
| Extended family exposure | -0.109 | -0.118 | -0.061 | -0.077 | -0.095 | -0.440** | -0.423** | -0.464** | -0.394** | -0.435** |
| | (-0.66) | (-0.68) | (-0.33) | (-0.46) | (-0.58) | (-2.15) | (-2.05) | (-2.27) | (-1.99) | (-2.16) |
| | 0.506 | 0.494 | 0.743 | 0.644 | 0.560 | 0.032 | 0.040 | 0.023 | 0.046 | 0.030 |
| Education | -0.236*** | -0.253*** | -0.196** | -0.226*** | -0.234*** | -0.123 | -0.093 | -0.101 | -0.105 | -0.120 |
| | (-2.80) | (-3.14) | (-2.10) | (-2.79) | (-2.65) | (-1.05) | (-0.84) | (-0.79) | (-0.94) | (-1.03) |
| | 0.005 | 0.002 | 0.036 | 0.005 | 0.008 | 0.295 | 0.398 | 0.432 | 0.348 | 0.302 |
| Household assets (index) | -0.215* | -0.215* | -0.261** | -0.203* | -0.210* | -0.217** | -0.213** | -0.183* | -0.198* | -0.216** |
| | (-1.90) | (-1.89) | (-2.11) | (-1.70) | (-1.69) | (-2.30) | (-2.23) | (-1.85) | (-1.89) | (-1.97) |
| | 0.058 | 0.059 | 0.035 | 0.089 | 0.091 | 0.021 | 0.026 | 0.065 | 0.059 | 0.049 |
| Occupation | -0.165 | -0.165 | -0.030 | -0.184 | -0.153 | 0.139 | 0.120 | 0.215 | 0.109 | 0.126 |
| | (-0.65) | (-0.66) | (-0.13) | (-0.71) | (-0.62) | (0.70) | (0.62) | (1.22) | (0.56) | (0.71) |
| | 0.517 | 0.507 | 0.894 | 0.475 | 0.532 | 0.482 | 0.533 | 0.223 | 0.573 | 0.480 |
| Age | -0.002 | -0.002 | -0.002 | -0.002 | -0.020 | 0.003 | 0.003 | 0.006 | 0.003 | -0.018 |
| | (-0.23) | (-0.22) | (-0.23) | (-0.21) | (-0.73) | (0.35) | (0.40) | (0.62) | (0.33) | (-0.60) |
| | 0.816 | 0.828 | 0.821 | 0.831 | 0.467 | 0.723 | 0.692 | 0.534 | 0.742 | 0.551 |
| Male | -0.217 | -0.227 | -0.286 | -0.207 | -0.145 | -0.226 | -0.209 | -0.290* | -0.202 | -0.352 |
| | (-1.03) | (-1.05) | (-1.39) | (-0.96) | (-0.41) | (-1.34) | (-1.20) | (-1.75) | (-1.14) | (-1.12) |
| | 0.301 | 0.295 | 0.165 | 0.336 | 0.685 | 0.181 | 0.230 | 0.080 | 0.256 | 0.262 |
| Community resources | -0.752*** | -0.754*** | -0.852*** | -0.756*** | -0.754*** | -0.566*** | -0.563*** | -0.591*** | -0.577*** | -0.563*** |
| | (-5.29) | (-5.37) | (-5.79) | (-5.22) | (-5.28) | (-3.81) | (-3.84) | (-3.71) | (-3.80) | (-3.76) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ease of getting job | 0.192* | 0.197* | 0.157 | 0.186* | 0.195* | 0.088 | 0.087 | 0.139 | 0.073 | 0.082 |
| | (1.73) | (1.71) | (1.35) | (1.69) | (1.72) | (0.74) | (0.73) | (1.06) | (0.62) | (0.67) |
| | 0.084 | 0.087 | 0.177 | 0.091 | 0.086 | 0.457 | 0.466 | 0.289 | 0.537 | 0.506 |
| Video treatment | -0.105 | | | | | -0.033 | | | | |
| | (-0.71) | | | | | (-0.17) | | | | |
| | 0.481 | | | | | 0.862 | | | | |
| Climate change knowledge | | 0.046 | | | | | -0.076 | | | |
| | | (0.37) | | | | | (-0.71) | | | |
| | | 0.713 | | | | | 0.479 | | | |
| Migrant wealth | | | -0.058 | | | | | 0.080 | | |
| | | | (-0.42) | | | | | (0.50) | | |
| | | | 0.673 | | | | | 0.615 | | |
| Migration size | | | | -0.217 | | | | | -0.373 | |
| | | | | (-0.82) | | | | | (-1.42) | |
| | | | | 0.411 | | | | | 0.155 | |
| Household land owner | | | | | -0.052 | | | | | -0.027 |
| | | | | | (-0.24) | | | | | (-0.10) |
| | | | | | 0.813 | | | | | 0.920 |
| Born in community | | | | | -0.403 | | | | | -0.250 |
| | | | | | (-0.69) | | | | | (-0.37) |
| | | | | | 0.492 | | | | | 0.713 |
| Residency time | | | | | 0.019 | | | | | 0.022 |
| | | | | | (0.72) | | | | | (0.75) |
| | | | | | 0.470 | | | | | 0.454 |
| Household head | | | | | -0.043 | | | | | 0.113 |
| | | | | | (-0.13) | | | | | (0.36) |
| | | | | | 0.896 | | | | | 0.719 |
| Observations | 620 | 620 | 571 | 620 | 619 | 620 | 620 | 571 | 620 | 619 |
| Clusters | 52 | 52 | 51 | 52 | 52 | 52 | 52 | 51 | 52 | 52 |
| R-squared | 0.18 | 0.17 | 0.16 | 0.18 | 0.17 | 0.17 | 0.17 | 0.17 | 0.18 | 0.17 |

Ordered logit estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

SA Table 4. Attitudes toward internal climate migrants, control group

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | | Attitude I | | | Attitude II | |
| Distance to exposure (index) | -0.170* | -0.217*** | -0.180** | -0.399*** | -0.434*** | -0.431*** |
| | (-1.76) | (-2.75) | (-2.15) | (-4.29) | (-4.62) | (-4.44) |
| | 0.085 | 0.008 | 0.036 | 0.000 | 0.000 | 0.000 |
| Trust | 0.378*** | 0.179 | 0.114 | 0.381*** | 0.234** | 0.243** |
| | (3.58) | (1.67) | (1.03) | (3.74) | (2.46) | (2.28) |
| | 0.001 | 0.101 | 0.309 | 0.000 | 0.017 | 0.027 |
| Repeated bad luck own fault | -0.007 | 0.023 | 0.021 | -0.070 | -0.049 | -0.016 |
| | (-0.10) | (0.35) | (0.32) | (-1.00) | (-0.70) | (-0.23) |
| | 0.922 | 0.728 | 0.749 | 0.321 | 0.489 | 0.820 |
| Religious attitudes | 0.273*** | 0.266*** | 0.246*** | 0.187** | 0.182*** | 0.191** |
| | (3.14) | (3.94) | (3.46) | (2.39) | (2.85) | (2.67) |
| | 0.003 | 0.000 | 0.001 | 0.021 | 0.006 | 0.010 |
| Accountability | -0.248 | -0.197 | -0.206 | -0.327* | -0.290* | -0.254 |
| | (-1.55) | (-1.41) | (-1.26) | (-1.89) | (-1.77) | (-1.27) |
| | 0.127 | 0.164 | 0.215 | 0.065 | 0.083 | 0.209 |
| Household migration history | 0.009 | 0.016 | 0.024 | -0.121 | -0.116 | -0.099 |
| | (0.07) | (0.16) | (0.25) | (-1.19) | (-1.42) | (-1.24) |
| | 0.942 | 0.874 | 0.805 | 0.240 | 0.161 | 0.222 |
| Extended family exposure | -0.096 | -0.201 | -0.194 | -0.270** | -0.348** | -0.373** |
| | (-0.60) | (-1.51) | (-1.52) | (-2.09) | (-2.63) | (-2.46) |
| | 0.553 | 0.136 | 0.135 | 0.042 | 0.012 | 0.018 |
| Education | -0.071 | -0.034 | -0.023 | -0.050 | -0.022 | 0.011 |
| | (-0.83) | (-0.53) | (-0.33) | (-0.55) | (-0.28) | (0.13) |
| | 0.411 | 0.598 | 0.744 | 0.582 | 0.778 | 0.895 |
| Household assets (index) | -0.158* | -0.152* | -0.183** | -0.142* | -0.138* | -0.148 |
| | (-1.92) | (-1.96) | (-2.12) | (-1.70) | (-1.69) | (-1.58) |
| | 0.061 | 0.056 | 0.039 | 0.096 | 0.098 | 0.121 |
| Occupation | -0.261 | -0.171 | -0.137 | -0.153 | -0.087 | 0.003 |
| | (-1.48) | (-1.07) | (-0.81) | (-0.85) | (-0.54) | (0.02) |
| | 0.144 | 0.289 | 0.424 | 0.398 | 0.593 | 0.986 |
| Age | 0.004 | 0.007 | 0.005 | 0.005 | 0.007 | 0.008 |
| | (0.82) | (1.19) | (0.87) | (0.97) | (1.32) | (1.42) |
| | 0.417 | 0.240 | 0.391 | 0.335 | 0.193 | 0.162 |
| Male | 0.011 | -0.136 | -0.155 | -0.020 | -0.129 | -0.188 |
| | (0.06) | (-0.86) | (-1.03) | (-0.14) | (-0.96) | (-1.40) |
| | 0.949 | 0.392 | 0.307 | 0.891 | 0.343 | 0.168 |
| Community resources | | -0.406*** | -0.430*** | | -0.299*** | -0.271*** |
| | | (-4.90) | (-4.63) | | (-3.45) | (-2.71) |
| | | 0.000 | 0.000 | | 0.001 | 0.009 |
| Ease of getting job | | 0.180** | 0.190** | | 0.137 | 0.178* |
| | | (2.36) | (2.17) | | (1.62) | (1.84) |
| | | 0.022 | 0.035 | | 0.112 | 0.072 |
| Host community identification | | | -0.027 | | | -0.048 |
| | | | (-0.32) | | | (-0.50) |
| | | | 0.747 | | | 0.620 |
| Observations | 314 | 314 | 281 | 314 | 314 | 281 |
| Clusters | 0.220 | 0.353 | 0.355 | 0.293 | 0.363 | 0.359 |
| R-squared | 50 | 50 | 48 | 50 | 50 | 48 |

OLS estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

SA Table 5. Attitudes toward internal climate migrants, control group, additional analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Attitude I | | | | Attitude II | | | |
| Distance to exposure (index) | | | | -0.217*** | | | | -0.436*** |
| | | | | (-2.80) | | | | (-4.62) |
| | | | | 0.007 | | | | 0.000 |
| Trust | 0.166 | 0.195* | 0.189* | 0.175 | 0.199** | 0.275*** | 0.251** | 0.215** |
| | (1.54) | (1.82) | (1.76) | (1.62) | (2.17) | (2.82) | (2.54) | (2.12) |
| | 0.131 | 0.075 | 0.085 | 0.112 | 0.035 | 0.007 | 0.014 | 0.039 |
| Repeated bad luck own fault | 0.023 | 0.023 | 0.024 | 0.021 | -0.049 | -0.046 | -0.046 | -0.046 |
| | (0.36) | (0.35) | (0.37) | (0.32) | (-0.74) | (-0.64) | (-0.64) | (-0.67) |
| | 0.722 | 0.730 | 0.710 | 0.751 | 0.463 | 0.528 | 0.523 | 0.508 |
| Religious attitudes | 0.270*** | 0.255*** | 0.264*** | 0.268*** | 0.195*** | 0.156** | 0.181** | 0.183*** |
| | (4.00) | (3.78) | (3.84) | (3.96) | (3.20) | (2.44) | (2.67) | (2.96) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.018 | 0.010 | 0.005 |
| Accountability | -0.168 | -0.223 | -0.214 | -0.177 | -0.221 | -0.350** | -0.321* | -0.251 |
| | (-1.19) | (-1.67) | (-1.50) | (-1.25) | (-1.39) | (-2.05) | (-1.90) | (-1.49) |
| | 0.238 | 0.102 | 0.140 | 0.216 | 0.170 | 0.045 | 0.064 | 0.143 |
| Household migration history | 0.021 | 0.009 | 0.011 | 0.021 | -0.102 | -0.135 | -0.124 | -0.113 |
| | (0.21) | (0.08) | (0.11) | (0.21) | (-1.33) | (-1.55) | (-1.49) | (-1.40) |
| | 0.832 | 0.934 | 0.913 | 0.831 | 0.189 | 0.128 | 0.142 | 0.168 |
| Extended family exposure | -0.200 | -0.207 | -0.181 | -0.211 | -0.354*** | -0.347** | -0.310** | -0.370*** |
| | (-1.53) | (-1.55) | (-1.36) | (-1.61) | (-2.74) | (-2.46) | (-2.35) | (-2.73) |
| | 0.133 | 0.127 | 0.181 | 0.115 | 0.009 | 0.017 | 0.023 | 0.009 |
| Education | -0.027 | -0.044 | -0.045 | | 0.000 | -0.050 | -0.040 | |
| | (-0.41) | (-0.69) | (-0.71) | | (0.01) | (-0.64) | (-0.53) | |
| | 0.680 | 0.491 | 0.481 | | 0.995 | 0.524 | 0.596 | |
| Household assets (index) | -0.152* | -0.151* | -0.161** | -0.144* | -0.134 | -0.142* | -0.155* | -0.118 |
| | (-1.97) | (-1.90) | (-2.08) | (-1.78) | (-1.67) | (-1.70) | (-1.90) | (-1.47) |
| | 0.055 | 0.063 | 0.043 | 0.081 | 0.101 | 0.095 | 0.064 | 0.147 |
| Occupation | -0.165 | -0.168 | -0.181 | -0.144 | -0.074 | -0.082 | -0.108 | -0.043 |
| | (-1.04) | (-1.04) | (-1.12) | (-0.89) | (-0.47) | (-0.48) | (-0.66) | (-0.27) |
| | 0.304 | 0.305 | 0.266 | 0.377 | 0.644 | 0.630 | 0.514 | 0.786 |
| Age | 0.007 | 0.006 | 0.006 | 0.006 | 0.008 | 0.006 | 0.006 | 0.006 |
| | (1.25) | (1.11) | (1.09) | (1.17) | (1.59) | (1.03) | (1.15) | (1.20) |
| | 0.218 | 0.272 | 0.281 | 0.248 | 0.117 | 0.306 | 0.257 | 0.234 |
| Male | -0.147 | -0.123 | -0.127 | -0.167 | -0.157 | -0.097 | -0.112 | -0.170 |
| | (-0.93) | (-0.77) | (-0.80) | (-1.01) | (-1.20) | (-0.68) | (-0.87) | (-1.32) |
| | 0.355 | 0.445 | 0.425 | 0.316 | 0.237 | 0.503 | 0.388 | 0.192 |
| Community resources | -0.399*** | -0.417*** | -0.399*** | -0.414*** | -0.286*** | -0.318*** | -0.286*** | -0.314*** |
| | (-4.75) | (-5.02) | (-4.72) | (-4.91) | (-3.34) | (-3.65) | (-3.24) | (-3.64) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.002 | 0.001 |
| Ease of getting job | 0.181** | 0.160** | 0.186** | 0.181** | 0.144* | 0.093 | 0.152* | 0.135 |
| | (2.41) | (2.05) | (2.47) | (2.28) | (1.76) | (1.02) | (1.83) | (1.53) |
| | 0.020 | 0.045 | 0.017 | 0.027 | 0.085 | 0.312 | 0.073 | 0.133 |
| Distance to mangrove (km) | -0.018*** | | | | -0.038*** | | | |
| | (-2.88) | | | | (-5.25) | | | |
| | 0.006 | | | | 0.000 | | | |
| Elevation, union (m) | | -0.134** | | | | -0.237*** | | |
| | | (-2.52) | | | | (-3.64) | | |
| | | 0.015 | | | | 0.001 | | |
| Elevation, around union (m) | | | -0.197** | | | | -0.408*** | |
| | | | (-2.48) | | | | (-4.19) | |
| | | | 0.016 | | | | 0.000 | |
| No education | | | | 0.199 | | | | 0.326 |
| | | | | (0.76) | | | | (1.28) |
| | | | | 0.450 | | | | 0.208 |
| Primary education | | | | 0.136 | | | | 0.249 |
| | | | | (0.50) | | | | (0.95) |
| | | | | 0.619 | | | | 0.345 |
| Lower secondary education | | | | -0.003 | | | | 0.156 |
| | | | | (-0.01) | | | | (0.80) |
| | | | | 0.990 | | | | 0.429 |
| Tertiary education | | | | 0.182 | | | | 0.456** |
| | | | | (0.81) | | | | (2.56) |
| | | | | 0.420 | | | | 0.013 |
| Observations | 314 | 314 | 314 | 314 | 314 | 314 | 314 | 314 |
| Clusters | 0.356 | 0.349 | 0.347 | 0.357 | 0.390 | 0.328 | 0.346 | 0.372 |
| R-squared | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

OLS estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

SA Table 6. Attitudes toward internal climate migrants, control group, robustness analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Attitude I | | | | | Attitude II | | | | |
| Distance to exposure (index) | -0.217*** | -0.224*** | -0.166** | -0.213** | -0.227*** | -0.434*** | -0.440*** | -0.413*** | -0.421*** | -0.434*** |
| | (-2.75) | (-2.83) | (-2.10) | (-2.63) | (-2.81) | (-4.62) | (-4.50) | (-4.26) | (-4.56) | (-4.56) |
| | 0.008 | 0.007 | 0.041 | 0.011 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Trust | 0.179 | 0.178 | 0.105 | 0.174 | 0.178* | 0.234** | 0.232** | 0.225** | 0.220** | 0.211** |
| | (1.67) | (1.66) | (0.97) | (1.65) | (1.69) | (2.46) | (2.48) | (2.18) | (2.31) | (2.26) |
| | 0.101 | 0.104 | 0.335 | 0.105 | 0.098 | 0.017 | 0.017 | 0.034 | 0.025 | 0.028 |
| Repeated bad luck own fault | 0.023 | 0.025 | -0.021 | 0.022 | 0.025 | -0.049 | -0.046 | -0.072 | -0.051 | -0.043 |
| | (0.35) | (0.40) | (-0.32) | (0.34) | (0.37) | (-0.70) | (-0.66) | (-0.94) | (-0.74) | (-0.60) |
| | 0.728 | 0.693 | 0.753 | 0.734 | 0.710 | 0.489 | 0.510 | 0.354 | 0.462 | 0.548 |
| Religious attitudes | 0.266*** | 0.265*** | 0.228*** | 0.267*** | 0.263*** | 0.182*** | 0.182*** | 0.185*** | 0.185*** | 0.186*** |
| | (3.94) | (3.91) | (3.43) | (4.01) | (3.86) | (2.85) | (2.82) | (2.70) | (2.90) | (2.81) |
| | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.006 | 0.007 | 0.009 | 0.006 | 0.007 |
| Accountability | -0.197 | -0.195 | -0.210 | -0.190 | -0.204 | -0.290* | -0.288* | -0.276* | -0.267 | -0.312* |
| | (-1.41) | (-1.41) | (-1.45) | (-1.39) | (-1.49) | (-1.77) | (-1.76) | (-1.69) | (-1.63) | (-1.96) |
| | 0.164 | 0.164 | 0.153 | 0.171 | 0.143 | 0.083 | 0.084 | 0.097 | 0.110 | 0.056 |
| Household migration history | 0.016 | 0.016 | 0.007 | 0.018 | 0.009 | -0.116 | -0.115 | -0.124 | -0.108 | -0.122 |
| | (0.16) | (0.16) | (0.08) | (0.19) | (0.09) | (-1.42) | (-1.38) | (-1.63) | (-1.44) | (-1.44) |
| | 0.874 | 0.875 | 0.940 | 0.852 | 0.930 | 0.161 | 0.173 | 0.110 | 0.156 | 0.155 |
| Extended family exposure | -0.201 | -0.212 | -0.185 | -0.192 | -0.204 | -0.348** | -0.359** | -0.367*** | -0.319** | -0.361** |
| | (-1.51) | (-1.55) | (-1.27) | (-1.44) | (-1.53) | (-2.63) | (-2.68) | (-2.71) | (-2.49) | (-2.66) |
| | 0.136 | 0.128 | 0.212 | 0.157 | 0.133 | 0.012 | 0.010 | 0.009 | 0.016 | 0.010 |
| Education | -0.034 | -0.051 | -0.034 | -0.029 | -0.032 | -0.022 | -0.038 | -0.013 | -0.006 | -0.015 |
| | (-0.53) | (-0.80) | (-0.52) | (-0.49) | (-0.50) | (-0.28) | (-0.51) | (-0.17) | (-0.08) | (-0.20) |
| | 0.598 | 0.425 | 0.608 | 0.624 | 0.622 | 0.778 | 0.610 | 0.869 | 0.937 | 0.845 |
| Household assets (index) | -0.152* | -0.155* | -0.170** | -0.148* | -0.142* | -0.138* | -0.140* | -0.137 | -0.125 | -0.125 |
| | (-1.96) | (-1.99) | (-2.06) | (-1.80) | (-1.75) | (-1.69) | (-1.74) | (-1.60) | (-1.47) | (-1.49) |
| | 0.056 | 0.053 | 0.045 | 0.078 | 0.086 | 0.098 | 0.089 | 0.116 | 0.147 | 0.142 |
| Occupation | -0.171 | -0.164 | -0.157 | -0.178 | -0.197 | -0.087 | -0.080 | -0.086 | -0.109 | -0.143 |
| | (-1.07) | (-1.01) | (-1.02) | (-1.10) | (-1.25) | (-0.54) | (-0.49) | (-0.51) | (-0.67) | (-0.91) |
| | 0.289 | 0.317 | 0.312 | 0.279 | 0.219 | 0.593 | 0.629 | 0.610 | 0.505 | 0.369 |
| Age | 0.007 | 0.006 | 0.005 | 0.006 | 0.002 | 0.007 | 0.007 | 0.007 | 0.007 | -0.001 |
| | (1.19) | (1.17) | (0.80) | (1.15) | (0.10) | (1.32) | (1.29) | (1.04) | (1.24) | (-0.07) |
| | 0.240 | 0.249 | 0.425 | 0.255 | 0.920 | 0.193 | 0.204 | 0.304 | 0.220 | 0.942 |
| Male | -0.136 | -0.144 | -0.122 | -0.126 | -0.204 | -0.129 | -0.137 | -0.103 | -0.098 | -0.300 |
| | (-0.86) | (-0.89) | (-0.80) | (-0.79) | (-1.04) | (-0.96) | (-0.98) | (-0.72) | (-0.72) | (-1.51) |
| | 0.392 | 0.380 | 0.430 | 0.435 | 0.303 | 0.343 | 0.332 | 0.474 | 0.475 | 0.137 |
| Community resources | -0.406*** | -0.410*** | -0.452*** | -0.404*** | -0.413*** | -0.299*** | -0.303*** | -0.296*** | -0.294*** | -0.303*** |
| | (-4.90) | (-4.99) | (-5.30) | (-4.89) | (-4.98) | (-3.45) | (-3.52) | (-3.10) | (-3.47) | (-3.43) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.003 | 0.001 | 0.001 |
| Ease of getting job | 0.180** | 0.178** | 0.176** | 0.176** | 0.188** | 0.137 | 0.135 | 0.160* | 0.126 | 0.138 |
| | (2.36) | (2.33) | (2.17) | (2.32) | (2.36) | (1.62) | (1.57) | (1.77) | (1.50) | (1.53) |
| | 0.022 | 0.024 | 0.035 | 0.025 | 0.022 | 0.112 | 0.123 | 0.082 | 0.141 | 0.132 |
| Climate change knowledge | | 0.041 | | | | | 0.041 | | | |
| | | (0.51) | | | | | (0.52) | | | |
| | | 0.609 | | | | | 0.604 | | | |
| Migrant wealth | | | 0.057 | | | | | 0.092 | | |
| | | | (0.65) | | | | | (0.89) | | |
| | | | 0.517 | | | | | 0.375 | | |
| Migration size | | | | -0.072 | | | | | -0.233* | |
| | | | | (-0.46) | | | | | (-1.91) | |
| | | | | 0.647 | | | | | 0.062 | |
| Household land owner | | | | | -0.102 | | | | | 0.031 |
| | | | | | (-0.75) | | | | | (0.14) |
| | | | | | 0.459 | | | | | 0.886 |
| Born in community | | | | | -0.053 | | | | | -0.099 |
| | | | | | (-0.17) | | | | | (-0.21) |
| | | | | | 0.867 | | | | | 0.834 |
| Residency time | | | | | 0.004 | | | | | 0.006 |
| | | | | | (0.29) | | | | | (0.30) |
| | | | | | 0.775 | | | | | 0.762 |
| Household head | | | | | 0.134 | | | | | 0.313 |
| | | | | | (0.89) | | | | | (1.65) |
| | | | | | 0.376 | | | | | 0.104 |
| Observations | 314 | 314 | 288 | 314 | 313 | 314 | 314 | 288 | 314 | 313 |
| Clusters | 0.353 | 0.354 | 0.331 | 0.354 | 0.354 | 0.363 | 0.364 | 0.343 | 0.373 | 0.369 |
| R-squared | 50 | 50 | 49 | 50 | 50 | 50 | 50 | 49 | 50 | 50 |

OLS estimations with robust t-statistics in parentheses, clustering in enumerator-union
*** p<0.01, ** p<0.05, * p<0.1

**Countries in Latin America, Asia, and Africa** exposed to the environmental consequences of climate change are predicted to see voluntary and forced internal migration on an unprecedented scale in the coming decades. This will likely put a great strain on host communities receiving the internally displaced. In many communities, the long-term residents may be skeptical toward the internal climate migrants, creating grounds for heightened tensions and even violent conflict. To alleviate such tensions, it is important to understand how attitudes toward internal climate migrants among host community members form, an issue that has thus far received little attention in climate research. To promote research on host communities receiving internal climate migrants in developing countries, this article develops a conceptual framework which seeks to map key factors influencing attitudes toward climate migrants. It proposes that distance between migrants and host community members along multiple dimensions is central to understanding how such attitudes form. The framework categorizes the different dimensions of distance into spatial, attitudinal, experiential, and social proximity. The article applies the framework to a survey conducted among over 630 long-term host community residents in the climate exposed Satkhira District of Bangladesh and finds evidence that variables reflecting these categories of proximity shape attitudes toward internal climate migrants.



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# Does changing the narrative improve host community attitudes to climate migrants?

## Experimental evidence from Bangladesh

CMI CHR. MICHELSEN INSTITUTE

# Does changing the narrative improve host community attitudes to climate migrants? Experimental evidence from Bangladesh*

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Arne Wiig******

2 December 2019

**Abstract**
A number of studies suggest that our narratives about the situation of the poor and vulnerable affect how we view them and treat them. Theoretically, a potentially powerful way to make host communities more welcoming of climate migrants is to shift the blame for their situation away from the migrants themselves and onto other forces or agents. We present results from a randomized field experiment conducted among long term residents of host communities in the Satkhira district of Bangladesh. We exposed three treatment groups to narratives that shift the responsibility for climate migration towards natural forces, Westerns countries, and local authorities, respectively. Despite power to detect reasonably small effects, we find no positive effects of the narratives on attitudes to climate migrants. On the contrary, one treatment has a borderline negative effect on attitudes relative to the control group. Our results suggest caution in attempting to influence attitudes through attribution of blame to outside forces or third parties. Such narrative interventions may shift responsibility away from not just the migrants but also from the treated host community residents, and may increase social identification within the host community relative to outsiders.

JEL classification: C93, O15, Q54

Keywords: Climate change, global warming, migration, displacement, field experiment

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## 1. Introduction

Climate change will in coming decades lead to increased frequency and severity of floods, drought and extreme weather events (Intergovernmental Panel on Climate Change, 2018). As the more exposed areas of the world become increasingly inhospitable, this will lead to substantial climate induced displacement of people in developing countries. It is likely that displacement will predominantly be internal to countries, or regional to neighbouring ones, but international migratory pressures will also increase. In terms of numbers, Rigaud et al. (2018) project that by 2050 more than 140 million people could be displaced internally by the slow-onset impacts of climate change in Sub-Saharan Africa, South Asia, and Latin America. For affected countries and communities, such large-scale displacements will create not just technical and economic challenges in accommodating the displaced, but also social and political challenges in avoiding social tension and conflicts that may arise between the displaced and their host communities. It is therefore crucial to understand how attitudes towards migrants form and evolve, and how they can be influenced to ease resettlement processes and avert tension (Burke et al., 2015; Hsiang et al., 2013). For some countries, the stakes are particularly high. Bangladesh is a case in point; a densely populated, low-lying country with substantial exposure to cyclones, floods and drought, and predicted to be affected by increasingly severe climatic conditions in the decades to come (Stocker et al., 2013). The government of Bangladesh expects that "the greatest single impact of climate change might be on human migration/displacement," estimating that "by 2050 one in every 7 people in Bangladesh will be displaced by climate change" (Comprehensive Disaster Management Programme, 2015:4).

This paper presents results from a randomized field experiment designed to test how different *attributions of responsibility* for the situation of the displaced affect views and attitudes towards climate migrants among residents in the receiving communities. The experiment was conducted among 1253 long-term residents in migrant receiving areas of the Satkhira district of Bangladesh, a district selected for its location in the most vulnerable part of the country's coastal zone. Three treatment groups were exposed to narratives suggesting that the responsibility for climate change and displacement lies not with those displaced. Instead, the three narratives shift blame towards i) natural phenomena; ii) industrialized countries; and iii) government inaction, respectively. The narratives were delivered in the form of videos shown to respondents, with a placebo video without attribution of blame shown to the control group. A pre-analysis plan for the experiment was registered in the AEA RCT registry.[1]

Existing experimental evidence suggests that in distributive situations, people will allocate money according to the extent they perceive others as being responsible for their own situation; in other words they will give more aid to a recipient the less they perceive him or her to be responsible for his or her own misfortune (Konow, 2000; List and Cherry, 2008). A main hypothesis that we test is hence that narratives locating the responsibility for displacement elsewhere than on the displaced, will lead to less resistance to accommodating the displaced. The treatments are also motivated by insights from the conflict literature suggesting that attribution of responsibility to a third party can lessen intergroup conflict by emphasizing a shared identity (Gaertner and Dovidio, 2000; Licata et al., 2011), as well as results from the literature on prosocial behaviour suggesting that interventions which generate sympathy or empathy increase people's tendencies to assist others (Eisenberg et al., 2010).

Our results show that the narrative interventions had no significant effect on attitudes to migrants. With randomization at the individual level and in excess of 300 respondents in each treatment arm, the experiment was powered to detect reasonably small effects. If anything, one of our treatments exhibits a marginally significant negative effect on attitudes to migrants in some estimations, contrary to our main

[1] https://www.socialscienceregistry.org/trials/4142

hypothesis. Since not all respondents may have internalized the message of the treatments, we complement our estimates of intention-to-treat effects with estimates of effects of treatment on the treated through an instrumental variable approach, and get similar results. Our analysis of mechanisms suggests that any reduction in the perceived responsibility of migrants for their own situation in treated groups is countered by two effects working in the opposite direction. The first is that blaming outside forces or third parties may also reduce host community perceptions of their *own* responsibility to welcome climate migrants. The second is that blaming a third party may strengthen social identification with the narrow group of one's own host community members, rather than a wider group of fellow nationals which includes migrants.

Empirical evidence on migrant – host community relations is scarce in the context of low levels of development and high susceptibility to future internal displacement. Our experimental data from the Satkhira district are hence quite novel. A number of studies from developed countries, however, suggest that negatively framed political and social narratives on migration adversely affect attitudes towards international migrants, refugees, and victims of disaster (Gale, 2004; Andrighetto et al., 2014; Seate and Mastro, 2016; Utych, 2018; Dempsey and McDowell, 2019; Hoops and Braitman, 2019). To this, we add experimental evidence suggesting that the effects of narratives more sympathetic to the migrant situation are not necessarily straightforward, as they may affect not only attitudes to migrants but also self-perceptions of host community members. This is also an aspect that has met with little consideration in the emerging experimental literature analyzing the effects of providing information about the extent of immigration and the characteristics of immigrants on attitudes to migration (Hainmueller and Hopkins, 2014; Grigorieff et al., 2016).

Our results thus suggest that deliberate attempts to shape or change public discourse on migration are fraught with challenges, and may work in unpredictable ways. While the use of narratives to reduce social tensions and make local adaptation challenges less severe may be a complex (or even counter-productive) endeavour, our results also uncover some potential nuances that should be considered. In explorative analyses not pre-registered, we consider possible heterogeneous effects of our treatments. In line with theories emphasizing labour market competition as a determinant of attitudes to migration, we find that day-labourers are on average more critical to climate migrants than other occupational groups, but also a group where our treatments appear to significantly improve attitudes. Hence, it is possible that for groups for whom the issue matters more on a personal, economic level, changes in the attribution of responsibility may reduce tensions between migrants and host community members. However, the validity of this result needs to be examined in further studies.

In countries vulnerable to the effect of climate change, much of the attention of analysis and policy is devoted to questions of physical infrastructure and economic resources, for good reason. Bangladesh is judged to have advanced further in creating protection from rapid onset events, such as cyclone shelters, than neighbouring countries such as Myanmar, and has also sought to address slow onset phenomena such as increasing soil salinity through new types of crops. Our study is motivated by the importance of the social and political sides of climate change in vulnerable countries, changes in population patterns, social interaction, and distributional conflict over land and jobs and resources that will arise when local adaption measures are no longer adequate to protect people and livelihoods in the most exposed places. Understanding the political economy of climate affected countries is essential to identifying their ability to adapt to climate change without serious increases in social conflict. Our main results offers some important insights to these challenges. In addition, we provide further descriptive results suggesting that in the area studied, there is greater opposition to climate migrants among the more educated and wealthy. While we do not claim that these are causal relations, this is contrary to what has been found

for attitudes to international migration in developed countries, where the educated and well-off tend to be more positive to migrants (Hainmueller and Hopkins, 2014). This has at least two implications. It means that results from studies of attitudes to migration may not travel well from developed to developing country contexts. Moreover, if the educated and wealthy are the most sceptical to migrants in Bangladesh, the relatively greater political power of these groups may pose an impediment to the effective use of migration as an adaptation strategy in the country.

The article is structured as follows. Section 2 presents the details of our randomized field experiment and empirical approach. Section 3 provides a descriptive overview of our data. Our main results are presented in Section 4, with underlying mechanisms and heterogeneous effects analyzed in Section 5. Section 6 concludes.

## 2. Research design

### 2.1 Sampling and experimental design

The field experiment was conducted in the Satkhira district of Bangladesh in March and April 2019, and included 1253 long-term residents as respondents.[2] This district is located in the South-Western region of Bangladesh, which is by far the most vulnerable part of the country's coastal zone.[3] Prior to the experiment, we conducted two rounds of qualitative interviews with migrants, host community members, and local government officials in the district. The interviews indicated that climate related changes had been a relevant factor in mobility decisions of migrants. While our interviews suggested that there had been little conflict with host community members thus far, in part due to the availability of government land on which migrants had been resettled, the interviews suggested that long term residents would be more critical to future, permanent in-migration.

For the experiment, we selected 13 relevant unions from the seven upazilas in the Satkhira district, based on their history of or potential for climate related in-migration, and set the number of respondents in each union according to its share of the total population of the 13 unions. In each union, a team of five to six enumerators set out in pre-defined routes evenly spaced in different directions, starting from the union office, selecting every sixth household along the route and alternating between interviewing an adult female or male in each household. Only long-term residents in the surveyed locations were interviewed, defined as having been born in the community in question or having lived there for at least 20 years, or as having a spouse that was born in the community and having lived there for at least five years.

The instrument and treatment videos were thoroughly piloted before the survey experiment started. Interviews were conducted electronically using tablets running ODK (Open Data Kit), and the videos were also shown to the respondents on the tablets. The questionnaire had the following sections:

1. Respondent selection procedure

[2] The experiment was conducted concurrently with a separate experiment, and while conceptually distinct, the two experiments share the control group. A total of 1568 interviews were conducted for the two experiments, of which 1253 observations comprise the treatment and control groups for the experiment described here. Due to some practical challenges in the field, the number of observations is marginally smaller than that specified in the pre-analysis plan.

[3] Islam and Hasan (2016) estimate that more than 2 million people in the region were displaced as a result of the 2009 cyclone Aila; upazilas in the Satkhira district were among the most heavily affected.

2. Consent
3. Practicalities (location etc.)
4. Covariates
5. Heterogeneous effects variables
6. Video treatment
7. Obfuscation and outcome variables
8. Mechanism variables
9. Additional variables (for descriptive analysis of control group)

In section 6, respondents were randomized into one of the treatments, or to the control group. This was done through lists of random choices prepared in advance and given to each enumerator. The enumerators moved down the list, crossing off the current video shown and moving on to the next one on the list in the next interview. This resulted in between 310 and 318 respondents in each treatment arm. Randomization is hence at the individual level, and not blocked by location.

**2.2 Treatments**

In the treatment section, respondents were randomly assigned to watch one of the treatment videos, or the placebo video if in the control group. The structure of the videos is outlined in Figure A1 in Appendix A. All videos share a first section, which is a general introduction to the phenomenon of climate change and the likely effects on future displacement in Bangladesh. After this first section, the treatment videos include distinct second sections which shift responsibility for climate change and its consequences from migrants towards natural forces (Treatment 1), industrialized countries (Treatment 2), and local authorities (Treatment 3). In this second part, the visual part of the videos froze on a still picture, in order to make the voiceover narratives salient to the treated participants. The placebo video for the control group does not contain a second section, which makes it shorter, but not to an extent where one would expect this to have an independent effect on responses.

All videos also include a third section, designed for obfuscation purposes, where we tell the respondents that we want their feedback on the format of the video to improve it for further audiences. The section of the questionnaire immediately following treatment also starts with four questions on the format of the video. While done to alleviate experimenter demand concerns, the inclusion of this information in the last part of the video is not to be considered deceptive, as reactions to the form of information presented is also of interest to us in discussing policy implications and future directions from the results of the project. The full scripts for the voiceover used in the videos (translated into English) are presented in Appendix A.

**2.3 Empirical strategy**

The variables used in our analysis are presented in Table B1 in Appendix B. Our outcome variable is Attitude to migrants, reflecting responses to the survey question "To what extent do you agree with the following statement: 'It is a good thing that new migrants settle permanently in my home community.'" Responses were given on a five point scale: 5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly. Our main hypothesis is that by locating the responsibility for displacement elsewhere than on the displaced, the treatments will improve respondent attitudes to migrants. We test this hypothesis using OLS estimation (with robust standard errors) of the following equation:

$$y_i = \alpha + \beta_{T1} T1_i + \beta_{T2} T2_i + \beta_{T3} T3_i + \varepsilon_i \quad (1)$$

where $y_i$ is the outcome for individual *i*, and $Tt_i$ are indicator variables taking the value one if individual *i* is in treatment group *t*, and zero otherwise. We also estimate an equation which includes the covariates specified in the pre-analysis plan and detailed in Table B1 in Appendix B (including union fixed effects), captured by the vector $X_i$:

$$y_i = \alpha + \beta_{T1} T1_i + \beta_{T2} T2_i + \beta_{T3} T3_i + \boldsymbol{X_i}\gamma + \varepsilon_i \quad (2)$$

We also test for differences in effects between the treatments using two-sided t-tests. While our outcome variable is strictly speaking an ordinal variable, we treat it as a continuous variable in our main analysis, but show that results are robust to using ordered probit and ordered logit estimation. With this specification, and based on means and standard deviations from our pilot data, the minimum detectable effect at 80% power and .05 significance is .208, or .224 of a standard deviation.[4]

In the case of less than perfect take-up of our treatments, the above estimated parameters can be interpreted as intention-to-treat effects. To measure take-up, we asked respondents what or who was identified by the video they had seen as responsible for climate migration. We define three treatment take-up dummies which equal one if a respondent is in treatment group $j \in \{1,2,3\}$ and their response corresponds to the message of the video of treatment *j*, and zero otherwise. We estimate effects of treatment on the treated, through instrumental variable estimation where the treatment dummies are used as instruments for the take-up variables.

While our survey instrument was designed to also analyze heterogeneities in effects across groups, and mechanisms behind our results, we did not pre-specify these analyses, noting the trade-off between the credibility that pre-specification generates and the potential costs in terms of developing highly complex pre-specification with limits on potential learning from the data (Olken, 2015).

**3. Data**

Summary statistics for our sample are presented in Table B2 in Appendix B. Our sample consists of 1253 individuals aged 18 and above. On attitude to migrants, the mean response falls in the middle of our scale, which is neither disagreeing nor agreeing with the statement 'It is a good thing that new migrants settle permanently in my home community.' The mean respondent is 41 years old, about half of the respondents are male, a little less than half household heads, and the mode in terms of education is to have completed primary education (the omitted category is no completed education). The most common occupations are housewife, self-employment (with or without non-family employees), day labourer, and farmer (the omitted category is other occupations than the ones listed). Our household asset index is based on factor analysis of the following asset variables: ownership of house, bicycle, radio, TV, motor vehicle or motorcycle, mobile phone, computer, and number of rooms the household occupies.[5] More than three quarters of respondents live in households that own land, and the mean household size is five members. Almost 60 per cent of respondents were born in the host community in question, and the number of years they have lived in the community is a minimum of 5 (since this was our cutoff for inclusion in the sample)

[4] In the pre-analysis plan, we specified one-sided tests for the three coefficients, which would make the minimum detectable effect even smaller. Limited compliance, on the other hand, pulls in the opposite direction.

[5] The asset index was computed for the sample of household that also included the treatment group from our concurrent experiment to be analyzed separately, which is why its mean deviates slightly from zero and its standard deviation is different from one.

and an average of 33 years. The median household has never moved between unions, the largest number of such moves is 10.

Table B3 in Appendix B presents the number of respondents randomized into each of our three treatments, which is 310 (nature treatment), 313 (industrialized treatment), 312 (government treatment); there are 318 respondents in the control group. Almost all our respondents reported finding the videos easy to understand (99 per cent) and of an appropriate length (85 percent).[6] Most respondents (72 per cent) answered that the video told them something they did not already know. Nevertheless, while take-up is high in the nature treatment, with almost three quarters of respondents being able to identify the message of the treatment in the follow up question, this proportion falls to less than 40 per cent for respondents in the industrialized treatment, and to just over 20 per cent in the government treatment.

It is hard to say whether the limited take-up is due to images of natural phenomena being prevalent in all parts of the videos, or an order effect where the first response category is more readily chosen.[7] Since it is difficult to design videos of climate migration without including images of natural forces, our take-up variables may not perfectly track compliance. In principle, it is possible that respondents in other treatment groups who identify natural forces as the main force behind climate displacement may still have internalized the shift in responsibility away from migrants towards industrialized countries or local authorities, and our take-up variables may hence underestimate compliance. Given imperfect compliance, we compute both intention to treat effects and effects of treatment on the treated; the results are not qualitatively different. It is not obvious which of the two would be more relevant; we piloted our videos for high impact, but there are limits to what any message can achieve in terms of being received and internalized among respondents.

Tests for balance on our covariates across treatment arms are presented in Table B4 of Appendix B. There are few significant differences between groups, and no more than one would expect by chance. The final column of Table B4 contains the p-value of an F-test of the null hypothesis that the treatment arms do not predict the means on each balancing variable. There is balance on all variables except age, which again is no more than one would expect by chance. Randomization appears to have worked well in taking out differences between treatment groups.

**4. Main results**

Our main results are presented in Table 1. Column one shows the results from estimating equation (1), i.e. regressing our outcome variable on the treatment variables only. The treatments shifting blame for climate related migration towards natural forces and onto the government display negative coefficients, the treatment shifting blame towards industrialized countries a positive coefficient, but none of these estimates are statistically significant. Adding covariates in column two increases precision slightly, with the result that the treatment highlighting the role of the government has a statistically significant negative effect on attitudes to migrants, while the other two treatments have no effect. In general, we find no evidence of a positive effect of shifting the responsibility for their situation off the migrants themselves, on attitudes of long term residents in receiving communities towards migrants. The government treatment may even have a negative effect, and certainly has a significantly worse effect on attitudes than

[6] These proportions are not reported in the Appendix B tables.

[7] Our treated groups were all able to identify the correct answer to this question at a higher rate than respondents in the control group who were also asked this question following the placebo video. The most common response in the control group was also to identify the role of natural forces as the message of the video.

the industrialized countries treatment (p=.012). Qualitatively, we get the same results if we estimate effects of the treatments on the treated through the instrumental variable approach, as displayed in columns three and four of Table 1. While the estimated coefficients increase in absolute size, so does the imprecision of the estimates. As shown in Table C1 in Appendix C, ordered probit and ordered logit estimation produce the same qualitative results, except for the effect of the government treatment which is not significant, even with covariates included.

The estimated coefficients for our covariates add some interesting information on the correlates of attitudes to climate migrants. Education and wealth seem to be the variables most consistently associated with attitudes to migrants. In contrast to studies from developed countries focusing on international migration, however, in our case the more educated and more wealthy are significantly more critical to new migrants settling in their communities. In some estimations, household heads are more positive to migrants, which could relate to greater decision making power, a more secure personal position that follows from diversification of the activities of other household members, or a history of making decisions to have other household members migrate. The significance of the household head coefficient is, however, not robust to changes in the estimation method (cf. Table C1 in Appendix C). For our other covariates, there are few robust associations. We do, however, find some heterogeneous effects of our treatments, which we present in the following section after looking at possible mechanisms.

*Table 1. Main results*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *Dependent variable* | *Attitude to migrants* | *Attitude to migrants* | *Attitude to migrants* | *Attitude to migrants* |
| *Effect* | *Intention to treat* | *Intention to treat* | *Treatment on treated* | *Treatment on treated* |
| Treatment nature | -0.111 | -0.077 | | |
| | (0.10) | (0.09) | | |
| Treatment industrialized | 0.048 | 0.071 | | |
| | (0.10) | (0.09) | | |
| Treatment government | -0.131 | -0.149* | | |
| | (0.10) | (0.09) | | |
| Take-up nature (predicted) | | | -0.154 | -0.103 |
| | | | (0.14) | (0.12) |
| Take-up industrialized (predicted) | | | 0.125 | 0.196 |
| | | | (0.25) | (0.22) |
| Take-up government (predicted) | | | -0.639 | -0.718* |
| | | | (0.47) | (0.43) |
| Age | | 0.008 | | 0.007 |
| | | (0.01) | | (0.01) |
| Male | | -0.007 | | 0.011 |
| | | (0.14) | | (0.14) |
| Head of household | | 0.191* | | 0.195* |
| | | (0.11) | | (0.11) |
| Education primary | | -0.183** | | -0.196** |
| | | (0.09) | | (0.09) |
| Education secondary | | -0.354*** | | -0.390*** |
| | | (0.10) | | (0.10) |
| Education higher secondary | | -0.396*** | | -0.417*** |
| | | (0.13) | | (0.13) |
| Education tertiary | | -0.563*** | | -0.593*** |
| | | (0.14) | | (0.14) |
| Occupation farmer | | -0.076 | | -0.116 |
| | | (0.18) | | (0.18) |
| Occupation farm labourer | | -0.272 | | -0.303 |
| | | (0.27) | | (0.27) |
| Occupation gatherer | | 0.089 | | 0.217 |
| | | (0.45) | | (0.49) |
| Occupation self-employed | | -0.056 | | -0.064 |
| | | (0.16) | | (0.15) |
| Occupation employer | | -0.070 | | -0.068 |
| | | (0.20) | | (0.20) |
| Occupation day labourer | | -0.012 | | -0.006 |
| | | (0.18) | | (0.17) |
| Occupation high skilled employee | | 0.148 | | 0.146 |
| | | (0.22) | | (0.22) |
| Occupation low skilled employee | | 0.051 | | 0.040 |
| | | (0.21) | | (0.21) |
| Occupation housewife | | 0.261 | | 0.268 |
| | | (0.18) | | (0.18) |
| Occupation student | | 0.064 | | 0.055 |
| | | (0.21) | | (0.21) |
| Asset index | | -0.111*** | | -0.106*** |
| | | (0.04) | | (0.04) |
| Land owner | | -0.087 | | -0.079 |
| | | (0.09) | | (0.09) |
| Household size | | 0.030* | | 0.028 |
| | | (0.02) | | (0.02) |
| Born in host community | | 0.274* | | 0.262 |
| | | (0.16) | | (0.16) |
| Years lived in host community | | -0.013* | | -0.012 |
| | | (0.01) | | (0.01) |
| Migration history | | -0.001 | | -0.002 |
| | | (0.05) | | (0.05) |
| Constant | 3.182*** | 3.413*** | 3.182*** | 2.622*** |
| | (0.07) | (0.34) | (0.07) | (0.31) |
| Union fixed effects | No | Yes | No | Yes |
| r2 | 0.004 | 0.230 | -0.001 | 0.216 |
| N | 1253 | 1250 | 1253 | 1250 |

*Note: Results from OLS regressions in columns 1 and 2, and instrumental variable regressions in columns 3 and 4. Robust standard errors in parentheses. Variables as defined in Table B1 in Appendix B, with the take-up variables predicted from the first stage of the instrumental variable regressions using the treatment variables as instruments. *** indicates significance at the 1% level, ** at 5%, * at 10%.*

**5. Mechanisms and heterogeneous effects**

As noted in Section 2.1, our survey instrument includes a number of questions designed to look into mechanisms behind our experimental results. For flexibility, the analysis of these variables was not specified in the pre-analysis plan. The results from our analyses of mechanisms are summarized in Table 2. Each column in the table shows results from an OLS regression using the mechanism variable specified at the top of the column as the dependent variable, with the mechanism variables defined in detail in Table B5 in Appendix B. All regressions in Table 2 include covariates; results are qualitatively the same without covariates, and if using an instrumental variable approach to identify effects of treatments on the treated.[8]

Our main hypothesis of a positive effect of the video interventions on attitudes to migrants was based on the idea that the treatments would reduce the perceived responsibility of migrants for their own situation. In column one in Table 2 we present results of a regression using Migrant responsibility as the dependent variable. This variable is defined through respondent's agreement with the statement "If people have to move due to climate change, that is their own fault", with responses given on the same five-point scale as our main outcome variable (from 5 – Agree very strongly, to 1 – Disagree very strongly). The treatment coefficients are all negative, in line with the theory behind our main hypothesis, but are too small to be statistically significant.

By contrast, the second column of Table 2 has respondents' perceptions of their own Host community responsibility for helping migrants as the dependent variable. Results for the nature and industrialized treatments suggest that they significantly *reduced* the obligations long term residents in host communities believe they have for aiding climate migrants. Moreover, in column three of Table 2 the dependent variable reflects respondent agreement with the statement "I have more in common with the members of my community than with migrants that arrive here." The results suggest that our third treatment, stressing the responsibility of the government, solidified narrow identification with respondents' own host community relative to wider identification with migrants. Attributing blame to a third party (the government) in this case seems to have reinforced a narrower form of social identity than anticipated.

In sum, the results of the first three columns of Table 2 provide a set of explanations for our main result of no (or a marginal negative) impact of our interventions on attitudes to migrants. Any reduction in the perceived responsibility of migrants for their own situation that our videos created, is (more than) offset by a reduction in perceived obligations of host communities for helping migrants, or tighter social identification with one's own host community members relative to outsiders such as migrants. Shifting blame for the consequences of climate change towards other forces or third parties hence seems a risky thing; it shifts blame not only from the vulnerable but also from locals upon whom they will come to rely, or may create a narrow sort of solidarity within local host communities rather than the wider kind needed to welcome vulnerable outsiders displaced by climate change.

[8] Results available on request.

*Table 2. Mechanism results*

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| *Dependent variable* | *Migrant responsibility* | *Host community responsibility* | *Host community identity* | *Perceived migrant wealth* | *Perceived scale of migration* |
| Treatment nature | -0.049 | -0.114* | 0.104 | -0.048 | 0.061 |
| | (0.08) | (0.07) | (0.07) | (0.06) | (0.05) |
| Treatment industrialized | -0.004 | -0.115* | 0.035 | -0.163** | 0.079* |
| | (0.08) | (0.07) | (0.07) | (0.06) | (0.05) |
| Treatment government | -0.012 | -0.050 | 0.160** | -0.044 | 0.063 |
| | (0.08) | (0.07) | (0.07) | (0.06) | (0.05) |
| Constant | 1.564*** | 3.291*** | 4.028*** | 1.827*** | 4.458*** |
| | (0.24) | (0.31) | (0.27) | (0.25) | (0.18) |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| r2 | 0.047 | 0.057 | 0.150 | 0.126 | 0.056 |
| N | 1248 | 1229 | 1104 | 1116 | 1233 |

*Note: Results from OLS regressions. Robust standard errors in parentheses. Variables as defined in Tables B1 and B5 in Appendix B. *** indicates significance at the 1% level, ** at 5%, * at 10%.*

The final two columns in Table 2 present results that shed light on possible reasons why the treatment that emphasizes the responsibility of industrialized countries has less of a negative effect on attitudes to migrants than the other two treatments. The dependent variable in column four captures responses to the question "The typical migrant to my community is likely to be _____", with the options given on the five point scale 5 - Extremely rich, 4 - Rich, 3 - Neither poor nor rich, 2 - Poor, 1 - Extremely poor. The industrialized treatment appears to trigger an implicit comparison of migrants to the populations of the Western industrialized countries mentioned in the video, leading to lower assessments of the wealth of climate migrants than in the control group and the other two treatments (the differences to the nature and government coefficients are significant at p=.078 and p=.073, respectively).

Moreover, the dependent variable in column five of Table 2 reflects respondent agreement with the statement “After seeing the video, I believe that climate change will lead to substantial migration of people in Bangladesh”, again measured on a five point scale. The results suggest that the industrialized treatment leads respondents to perceive the scale of climate migration to be greater than respondents in the control group, perhaps by introducing a global frame of reference, though the precise reason is hard to assess. However, the difference to the perceptions of the other treatment groups is not statistically significant.

Potential explanations for the less negative effect of the treatment stressing the responsibility of industrialized countries are hence cues that emphasize poverty among migrants, and (possibly) induced perceptions of greater climate migration challenges. Though the industrialized country treatment has less negative effects on attitudes towards migrants, a possibility is that it also contributes to political radicalization by stressing the role of Western countries in climate change. We tested this through an additional survey question on whether the West generally respects religious freedom everywhere, and found no evidence that the treatment induces radicalization.[9]

Some of our respondents are in occupations where they are likely to be in direct competition with climate migrants from poor and vulnerable areas. In particular, this would seem to be the case for respondents relying on gathering/foraging/hunting, and day labourers. Any more critical attitudes to migrants from these occupational group are not immediately apparent from the covariate results in Table 1. However, a regression of attitudes to migrants on covariates for the control group only reveals a different pattern.[10]

[9] Results available on request.

[10] Results available on request.

Those with occupations in gathering and day labourers have the most negative mean scores on the attitude to migrants question, and these are the only two occupation categories with significantly lower scores than the excluded category (other occupations). We take this as a possible sign of heterogeneous effects of our treatments in these occupational categories, while also noting that any analysis of this has not been pre-registered and remains explorative.

The gatherers in our sample only count five respondents, so we cannot meaningfully test for heterogeneous effects for this group. The number of day labourers in our sample is 90, and Table 3 presents results of tests of heterogeneous treatment effects for this group. We include interaction terms for all three treatment variables with the occupation day labourer dummy (as well as the day labourer dummy itself and all other covariates which for brevity are suppressed in the output). Results for the interaction terms suggest that the effects of the nature treatment and the industrialized treatment are significantly more positive for day labourers than for other groups. The three bottom rows of Table 3 report the p-values of tests that the treatment effects for day labourers are zero, which is rejected in the cases of the nature and industrialized treatments, but not in the government treatment. If shifting the blame from migrants for their own situation works for any group, our results hence suggest beneficial effects on attitudes to migrants in occupations in direct competition with them, and these are also occupations whose members tend to be more critical to migrants to begin with. Since our analysis of heterogeneous effects in our experiment is explorative, we consider this a hypothesis to be more carefully tested in future work.

*Table 3. Heterogeneous effects*

| | **(1)** |
|---|---|
| *Dependent variable* | *Attitude to migrants* |
| Treatment nature | -0.123 |
| | (0.09) |
| Treatment industrialized | 0.000 |
| | (0.09) |
| Treatment government | -0.164* |
| | (0.09) |
| Treatment nature*Occupation day labourer | 0.617** |
| | (0.29) |
| Treatment industrialized*Occupation day labourer | 0.914*** |
| | (0.30) |
| Treatment government*Occupation day labourer | 0.139 |
| | (0.35) |
| Occupation day labourer | -0.457* |
| | (0.26) |
| Constant | 3.433*** |
| | (0.34) |
| Covariates | All |
| r2 | 0.236 |
| N | 1250 |
| p-value (Treatment nature + Treatment nature*Occupation day labourer = 0) | 0.075 |
| p-value (Treatment industrialized + Treatment industrialized*Occupation day labourer = 0) | 0.002 |
| p-value (Treatment government + Treatment government*Occupation day labourer = 0) | 0.941 |

*Note: Results from OLS regression, results for other covariates than Occupation day labourer suppressed in output. Robust standard errors in parentheses. Variables as defined in Table B1 in Appendix B. *** indicates significance at the 1% level, ** at 5%, * at 10%.*

## 6. Concluding remarks

Narratives can be powerful in framing public discourse on migration, as seen in the use of the term "economic migrant" in immigration debates. Shaping or changing the narrative can, however, be a difficult

endeavour with unpredictable consequences, as our analysis shows. Our experimental results among long term host community residents in Bangladesh show that shifting the blame for climate migration from the migrants onto outside forces or third parties might do more to relieve host communities of perceived obligations to migrants than to increase identification with their plight and willingness to receive them. In light of the limited impact of the narratives on overall attitudes to migrants, it is also possible that our respondents had relatively strong prior views on climate migration, which would be hard to shift through narrative interventions. Consistent with this, responses to questions on knowledge of climate change asked prior to our interventions suggest that our respondents were at least somewhat knowledgeable about the cause and/or symptoms of climate change.

Our data also reveals a puzzle of worse average attitudes to climate migrants among the well off and educated, in contrast to results from other countries (Hainmueller and Hopkins, 2014). While this suggests that there may be socio-economic fault lines in handling future migration challenges in Bangladesh, more work is needed to understand the robustness of these results, and the underlying mechanisms. One possibility is that the views are shaped by social distance to the migrants, another that the more wealthy and educated expect to shoulder more of the economic implications of future migration, for instance through increases in taxes. Though our results suggest caution in approaching the issue of migration as climate adaptation, and social conflicts that may arise, through narrative interventions, we do also provide some ways forward that should be pursued. The hypothesis that narratives can be effective in improving attitudes to migrants in groups for whom the issue matters most - those in direct labour market competition with climate migrants - is one explorative finding from the experiment that deserves to be followed up on in future studies.

**References**

Andrighetto, L., Baldissarri, C., Lattanzio, S., Loughnan, S., and Volpato, C. (2014). Human-itarian aid? Two forms of dehumanization and willingness to help after natural disasters. British Journal of Social Psychology, 53, 573–584.

Burke, M., Hsiang S. M., and Miguel E., (2015). Climate and Conflict. Annual Review of Economics, 7: 577–617.

Comprehensive Disaster Management Programme (2015). National Strategy on the Management of Disaster and Climate Induced Internal Displacement, Dhaka: Ministry of Disaster Management and Relief.

Dempsey, K. E., and McDowell, S. (2019). Disaster depictions and geopolitical representations in Europe's migration 'Crisis'. Geoforum, 98, 153–160.

Eisenberg, N., Eggum, N. D. and Di Giunta, L. (2010). Empathy-Related Responding: Associations with Prosocial Behavior, Aggression, and Intergroup Relations. Social Issues and Policy Review, 4, 1, 143–180.

Gaertner, S. L., & Dovidio, J. F. (2000). Reducing intergroup bias: The common ingroup identity model. Philadelphia, PA: Psychology Press.

Gale, P. (2004), The refugee crisis and fear – Populist politics and media discourse, Journal of Sociology, 40, 4, 321-340.

Grigorieff, A., Roth, C. and Ubfal, D. (2016), Does information change attitudes towards immigrants? Evidence from survey experiments, Available at SSRN: http://ssrn.com/abstract=2768187.

Hainmueller, J. and Hopkins, D. J. (2014), Public attitudes toward immigration, Annual Review of Political Science, 17, 225-249.

Hoops, J. F., and Braitman, K., (2019). The influence of immigration terminology on attribution and empathy. Critical Discourse Studies, 16,2, 149–161. https://doi.org/10.1080/17405904.2018.1535989.

Hsiang, S. M., M. Burke, and E. Miguel. (2013). Quantifying the influence of climate on human conflict. Science 341 (6151):1212-+.

Intergovernmental Panel on Climate Change (2018), Global Warming of 1.5°C, Geneva: Intergovernmental Panel on Climate Change.

Islam, M. R., and. Hasan H. (2016). Climate-induced human displacement: a case study of Cyclone Aila in the south-west coastal region of Bangladesh. Natural Hazards, 81, 2, 1051-1071.

Konow, J. (2000), Fair shares: Accountability and cognitive dissonance in allocation decisions, American Economic Review, 90, 4, 1072-1091.

Licata, L., Klein, O., Saade, W., Azzi, A E. and Branscombe, N. R. (2011), Perceived Out-Group (Dis)Continuity and Attribution of Responsibility for the Lebanese Civil War Mediate Effects of National and Religious Subgroup Identification on Intergroup Attitudes, Group Processes & Intergroup Relations, 15, 2, 179-192.

List, J. A. and Cherry, T. L. (2008), Examining the role of fairness in high stakes allocation decisions, Journal of Economic Behavior & Organization, 65, 1-8.

Olken, B. A. (2015), Promises and perils of pre-analysis plans, Journal of Economic Perspectives, 29, 3, 61-80.

Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., and Midgley, A. (2018), Groundswell – Preparing for Internal Climate Migration, Washington D.C.: The World Bank.

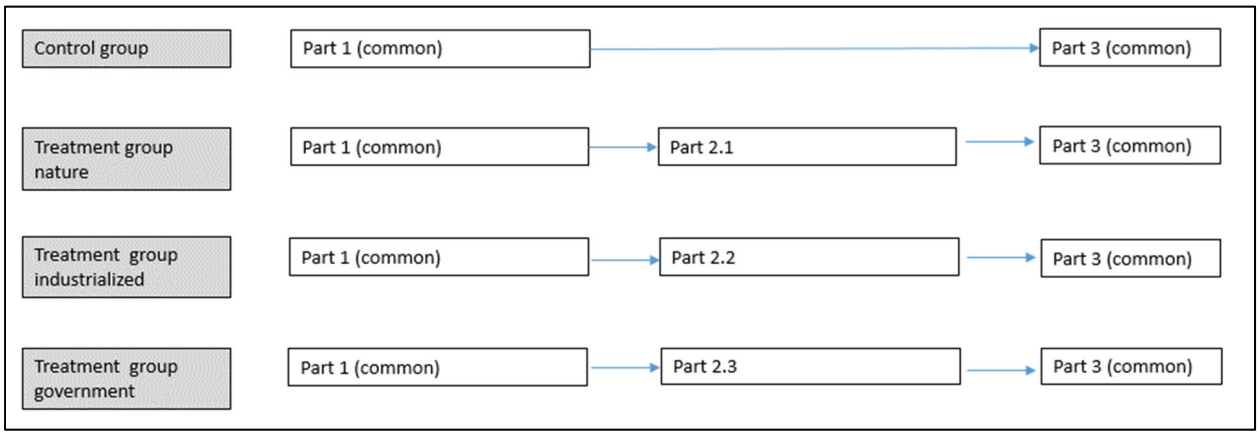
Seate, A. A., and Mastro, D. (2016). Media's influence on immigration attitudes: An intergroup threat theory approach. Communication Monographs, 83, 2, 194–213.

Stocker, T. F., Qin, D., Plattner, G. K., Tignor, M. M. B., Allen, S. K., Boschung, J., … Midgley, P. M. (eds.) (2013), Climate Change 2013 - The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge: Cambridge University Press.

Utych S. M. (2018). How Dehumanization Influences Attitudes toward Immigrants. Political Research Quarterly, 71, 2, 440–452.

## Appendix A. Manuscripts for treatment videos

*Figure A 1. Structure of video interventions*




**Voiceover part 1 (all groups):**

"A lot of people migrate from one place to another in Bangladesh.
Some of them for shorter periods, others for longer, and some migrate permanently.
Some households send a member to another village or city, in other cases the whole household may move.
People migrate for many different reasons, and to different places.
You probably have some migrants in your neighbourhood, village or town?"

"One reason people are moving in Bangladesh is that the climate is changing.
This leads to more extreme weather events and worse living conditions in areas where people live.
You probably remember the cyclone Ayla, which brought devastation to many communities.
And you may have noticed or have heard that rising sea levels and increased salinity are making land less useful for growing food.
And finding drinking water more difficult.
Many families have also lost their homes or land through river erosion and flooding.
Some say that the mangrove forest is dying."

"The problems created by a changing climate are likely to get worse.
More people will have to move as a result.
Perhaps to the place where you live?
Some of these people will not have a job or a place to live waiting for them in the new location.
The poor and landless will also be forced to move.
Where will they all go?
Where will they live?
What will they do for work?"

**Voiceover part 2.1 (treatment nature)**
"The climate is changing due to a build up of certain gases in the air around us.
This is a powerful natural phenomenon.
And these natural forces do not discriminate, but affect everyone.
There is little you can do if these powerful forces come your way.

Sometimes things happen to us that are not our own fault.
There is little people in affected areas of Bangladesh can do about the natural forces that bring extreme weather and damage to homes and land.
But their lives and livelihoods are affected by them.
And they may have no other choice than to move."

**Voiceover part 2.2 (treatment industrialized)**
"The climate is changing due to a build up of certain gases in the air around us.
Gas emissions from rich, Western countries are a major factor in causing climate change.
People in rich, Western countries enjoy a high standard of living, and their lifestyle and consumption result in large emissions of damaging gases.
While people in poorer countries like Bangladesh suffer the negative consequences of rich countries' gas emissions.

Sometimes things happen to us that are not our own fault.
People living in affected areas of Bangladesh have not contributed much to the climate problems bringing extreme weather and damage to homes and land.
But their lives and livelihoods are affected by them.
And they may have no other choice than to move."

**Voiceover part 2.3 (treatment government)**
"The climate is changing due to a build up of certain gases in the air around us.
To cope with the problems created by climate change, the authorities have to play an active role.
The authorities need to protect and assist people so they can stay in their homes.
The authorities must assist in finding housing and livelihood opportunities for those who need to move.
If the living and housing situation turns out to be really bad, this may be because the authorities have not done enough.

Sometimes things happen to us that are not our own fault.
People living in affected areas can only do so much to protect themselves from extreme weather and damage to homes and land.
But their lives and livelihoods are affected by them.
And they may have no other choice than to move."

**Voiceover part 3 (all groups)**

"It is important that you are well informed about future events that may affect your life.
The people of Bangladesh deserve good and useful information.
We have attempted to make the message of this video as clear and relevant to you as we can.
We hope we have succeeded in this."

"And we are also interested in how we can provide the information in even better ways.
How this video can be improved.
You probably have some ideas on how this can be done.
What do you think?
How can the video be made more informative, clear, and interesting?
Your view matters.
Thank you for your attention."

## Appendix B. Variable definitions and summary statistics

*Table B 1. Main variables.*

| Variable | Explanation |
|---|---|
| *Dependent variable* | |
| Attitude to migrants | Respondent attitudes to migrants based on response to question "To what extent do you agree with the following statement: 'It is a good thing that new migrants settle permanently in my home community.'" (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |
| *Treatment variables* | |
| Treatment nature | Dummy variable of whether respondent watched video shifting blame for for climate change and its consequences from migrants towards natural forces (1 – Yes, 0 – No) |
| Treatment industrialized | Dummy variable of whether respondent watched video shifting blame for for climate change and its consequences from migrants towards industrialized countries (1 – Yes, 0 – No) |
| Treatment government | Dummy variable of whether respondent watched video shifting blame for for climate change and its consequences from migrants towards local authorities (1 – Yes, 0 – No) |
| *Treatment take-up variables* | |
| Take-up nature | Takeup nature treatment (dummy variable, 1 – if respondent is in nature treatment group and responds "Natural forces" to the question "According to the video, if people in Bangladesh need to move due to climate change, who bears the main responsibility for this? Please note that we want you to say who the video said is responsible, not who you think is to blame." , 0 – otherwise) |
| Take-up industrialized | Takeup industrialized treatment (dummy variable, 1 – if respondent is in the industrialized treatment group and responds "Western countries" to the question "According to the video, if people in Bangladesh need to move due to climate change, who bears the main responsibility for this? Please note that we want you to say who the video said is responsible, not who you think is to blame." , 0 – otherwise) |
| Take-up government | Takeup government treatment (dummy variable, 1 – if respondent is in the government treatment group and responds "Bangladeshi authorities" to the question "According to the video, if people in Bangladesh need to move due to climate change, who bears the main responsibility for this? Please note that we want you to say who the video said is responsible, not who you think is to blame." , 0 – otherwise) |
| *Covariates* | |
| Age | Age of respondent (number of years) |
| Male | Gender of respondent (dummy variable, 1 – male, 0 – female) |
| Head of household | Respondent is head of household (dummy variable, 1 – Yes, 0 – No) |
| Education primary | Respondent has completed primary school (dummy variable, 1 – Yes, 0 – No) |
| Education secondary | Respondent has completed secondary school (dummy variable, 1 – Yes, 0 – No) |
| Education higher secondary | Respondent has completed higher secondary school (dummy variable, 1 – Yes, 0 – No) |
| Education tertiary | Respondent has completed tertiary school (dummy variable, 1 – Yes, 0 – No) |
| Occupation farmer | Occupation farming, fish/shrimp production, on own land (dummy variable, 1 – Yes, 0 – No) |
| Occupation farm labourer | Occupation farm or fish/shrimp production labourer or day labourer (dummy variable, 1 – Yes, 0 – No) |
| Occupation gatherer | Occupation gathering/foraging/hunting (dummy variable, 1 – Yes, 0 – No) |
| Occupation self-employed | Occupation self-employed (owns business with no non-family employees) (dummy variable, 1 – Yes, 0 – No) |
| Occupation employer | Occupation self-employed (owns business with at least one non-family employee) (dummy variable, 1 – Yes, 0 – No) |
| Occupation day labourer | Occupation day labourer (dummy variable, 1 – Yes, 0 – No) |
| Occupation high skilled employee | Occupation employee (high skilled) (dummy variable, 1 – Yes, 0 – No) |
| Occupation low skilled employee | Occupation employee (low skilled) (dummy variable, 1 – Yes, 0 – No) |
| Occupation housewife | Occupation housewife (dummy variable, 1 – Yes, 0 – No) |
| Occupation student | Occupation student (dummy variable, 1 – Yes, 0 – No) |
| Asset index | Household asset index based on factor analysis of the following asset variables: ownership of house, bicycle, radio, TV, motor vehicle or motorcycle, mobile phone, computer, number of rooms the household occupies |
| Land owner | Land owner (dummy variable, 1 – household owns land, 0 – otherwise) |
| Household size | Total number of household members |
| Born in host community | Respondent born in host community (Dummy variable, 1- born in community, 0-otherwise) |
| Years lived in host community | Number of years respondent has resided in community |
| Migration history | Migration history of household (how many times has the household relocated from one union to another) |
| Union fixed effects | Dummy variables for each of the 13 unions |

*Table B 2: Descriptive statistics*

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Attitude to migrants | 1253 | 3.134 | 1.217 | 1 | 5 |
| Age | 1253 | 41.449 | 13.851 | 18 | 89 |
| Male | 1253 | 0.504 | 0.500 | 0 | 1 |
| Head of household | 1253 | 0.454 | 0.498 | 0 | 1 |
| Education primary | 1253 | 0.297 | 0.457 | 0 | 1 |
| Education secondary | 1253 | 0.237 | 0.425 | 0 | 1 |
| Education higher secondary | 1253 | 0.116 | 0.320 | 0 | 1 |
| Education tertiary | 1253 | 0.121 | 0.326 | 0 | 1 |
| Occupation farmer | 1253 | 0.069 | 0.254 | 0 | 1 |
| Occupation farm labourer | 1253 | 0.019 | 0.137 | 0 | 1 |
| Occupation gatherer | 1253 | 0.004 | 0.063 | 0 | 1 |
| Occupation self-employed | 1253 | 0.151 | 0.358 | 0 | 1 |
| Occupation employer | 1253 | 0.045 | 0.207 | 0 | 1 |
| Occupation day labourer | 1253 | 0.072 | 0.258 | 0 | 1 |
| Occupation high skilled employee | 1253 | 0.034 | 0.180 | 0 | 1 |
| Occupation low skilled employee | 1253 | 0.042 | 0.200 | 0 | 1 |
| Occupation housewife | 1253 | 0.421 | 0.494 | 0 | 1 |
| Occupation student | 1253 | 0.063 | 0.243 | 0 | 1 |
| Asset index | 1252 | 0.024 | 1.025 | -1.841 | 6.611 |
| Land owner | 1252 | 0.764 | 0.425 | 0 | 1 |
| Household size | 1253 | 4.939 | 2.007 | 1 | 21 |
| Born in host community | 1253 | 0.591 | 0.492 | 0 | 1 |
| Years lived in host community | 1253 | 33.698 | 16.133 | 5 | 89 |
| Migration history | 1253 | 0.253 | 0.800 | 0 | 10 |

*Table B 3. Treatment take-up.*

| | Number of respondents | Take-up number | Take-up proportion |
|---|---|---|---|
| Treatment nature | 310 | 224 | 0.72 |
| Treatment industrialized | 313 | 119 | 0.38 |
| Treatment government | 312 | 64 | 0.21 |

*Table B 4. Balance across treatment arms*

| | Control | Treatment nature | Treatment industrialized | Treatment government | p-value (control vs nature) | p-value (control vs industrialized) | p-value (control vs government) | p-value (nature vs industrialized) | p-value (nature vs government) | p-value (industrialized vs government) | Orthogonality test |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 41.915 | 43.206 | 39.981 | 40.699 | 0.271 | 0.077 | 0.267 | 0.004 | 0.025 | 0.487 | 0.022 |
| | 0.816 | 0.840 | 0.728 | 0.731 | | | | | | | |
| Male | 0.500 | 0.529 | 0.466 | 0.519 | 0.468 | 0.400 | 0.630 | 0.119 | 0.807 | 0.188 | 0.415 |
| | 0.028 | 0.028 | 0.028 | 0.028 | | | | | | | |
| Head of household | 0.459 | 0.484 | 0.406 | 0.468 | 0.535 | 0.177 | 0.825 | 0.050 | 0.692 | 0.117 | 0.223 |
| | 0.028 | 0.028 | 0.028 | 0.028 | | | | | | | |
| Education primary | 0.274 | 0.287 | 0.291 | 0.337 | 0.707 | 0.633 | 0.087 | 0.920 | 0.184 | 0.218 | 0.355 |
| | 0.025 | 0.026 | 0.026 | 0.027 | | | | | | | |
| Education secondary | 0.236 | 0.235 | 0.252 | 0.224 | 0.991 | 0.629 | 0.732 | 0.624 | 0.742 | 0.412 | 0.877 |
| | 0.024 | 0.024 | 0.025 | 0.024 | | | | | | | |
| Education higher secondary | 0.138 | 0.087 | 0.125 | 0.112 | 0.042 | 0.610 | 0.321 | 0.128 | 0.297 | 0.631 | 0.195 |
| | 0.019 | 0.016 | 0.019 | 0.018 | | | | | | | |
| Education tertiary | 0.101 | 0.152 | 0.118 | 0.112 | 0.055 | 0.480 | 0.639 | 0.223 | 0.147 | 0.814 | 0.276 |
| | 0.017 | 0.020 | 0.018 | 0.018 | | | | | | | |
| Occupation farmer | 0.085 | 0.065 | 0.070 | 0.058 | 0.332 | 0.493 | 0.185 | 0.774 | 0.723 | 0.521 | 0.602 |
| | 0.016 | 0.014 | 0.014 | 0.013 | | | | | | | |
| Occupation farm labourer | 0.009 | 0.029 | 0.022 | 0.016 | 0.075 | 0.195 | 0.462 | 0.600 | 0.275 | 0.564 | 0.273 |
| | 0.005 | 0.010 | 0.008 | 0.007 | | | | | | | |
| Occupation gatherer | 0.009 | 0.003 | 0.000 | 0.003 | 0.326 | 0.083 | 0.324 | 0.318 | 0.996 | 0.318 | 0.171 |
| | 0.005 | 0.003 | 0.000 | 0.003 | | | | | | | |
| Occupation self-employed | 0.148 | 0.158 | 0.125 | 0.173 | 0.721 | 0.396 | 0.388 | 0.231 | 0.615 | 0.089 | 0.368 |
| | 0.020 | 0.021 | 0.019 | 0.021 | | | | | | | |
| Occupation employer | 0.031 | 0.045 | 0.045 | 0.058 | 0.372 | 0.385 | 0.111 | 0.979 | 0.480 | 0.463 | 0.444 |
| | 0.010 | 0.012 | 0.012 | 0.013 | | | | | | | |
| Occupation day labourer | 0.069 | 0.077 | 0.080 | 0.061 | 0.693 | 0.610 | 0.674 | 0.910 | 0.418 | 0.355 | 0.781 |
| | 0.014 | 0.015 | 0.015 | 0.014 | | | | | | | |
| Occupation high skilled employee | 0.028 | 0.032 | 0.038 | 0.035 | 0.773 | 0.483 | 0.620 | 0.681 | 0.836 | 0.838 | 0.908 |
| | 0.009 | 0.010 | 0.011 | 0.010 | | | | | | | |
| Occupation low skilled employee | 0.047 | 0.029 | 0.038 | 0.051 | 0.235 | 0.584 | 0.812 | 0.520 | 0.158 | 0.435 | 0.473 |
| | 0.012 | 0.010 | 0.011 | 0.013 | | | | | | | |
| Occupation housewife | 0.425 | 0.400 | 0.454 | 0.407 | 0.533 | 0.462 | 0.657 | 0.176 | 0.858 | 0.240 | 0.536 |
| | 0.028 | 0.028 | 0.028 | 0.028 | | | | | | | |
| Occupation student | 0.063 | 0.058 | 0.073 | 0.058 | 0.800 | 0.599 | 0.784 | 0.438 | 0.984 | 0.426 | 0.850 |
| | 0.014 | 0.013 | 0.015 | 0.013 | | | | | | | |
| Asset index | 0.038 | 0.081 | -0.013 | -0.009 | 0.606 | 0.512 | 0.567 | 0.258 | 0.301 | 0.956 | 0.648 |
| | 0.055 | 0.061 | 0.055 | 0.060 | | | | | | | |
| Land owner | 0.751 | 0.742 | 0.776 | 0.788 | 0.799 | 0.451 | 0.263 | 0.316 | 0.172 | 0.714 | 0.483 |
| | 0.024 | 0.025 | 0.024 | 0.023 | | | | | | | |
| Household size | 4.814 | 5.048 | 4.859 | 5.038 | 0.165 | 0.745 | 0.145 | 0.260 | 0.956 | 0.241 | 0.331 |
| | 0.098 | 0.137 | 0.097 | 0.118 | | | | | | | |
| Born in host community | 0.594 | 0.561 | 0.588 | 0.622 | 0.403 | 0.869 | 0.481 | 0.503 | 0.125 | 0.386 | 0.496 |
| | 0.028 | 0.028 | 0.028 | 0.027 | | | | | | | |
| Years lived in host community | 34.472 | 34.361 | 32.476 | 33.478 | 0.934 | 0.124 | 0.450 | 0.135 | 0.490 | 0.420 | 0.361 |
| | 0.966 | 0.918 | 0.864 | 0.892 | | | | | | | |
| Migration history | 0.233 | 0.261 | 0.275 | 0.244 | 0.678 | 0.493 | 0.874 | 0.820 | 0.790 | 0.595 | 0.901 |
| | 0.050 | 0.047 | 0.035 | 0.047 | | | | | | | |
| N | 318 | 310 | 313 | 312 | | | | | | | |

*Table B 5. Mechanism variables*

| Variable | Explanation |
|---|---|
| *Mechanism variables* | |
| Migrant responsibility | Respondent perception of climate migrant responsibility for their own situation, based on agreement with the following statement: "If people have to move due to climate change, that is their own fault" (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |
| Host community responsibility | Respondent perception of host communities obligation to help climate migrants, based on inverted values for stated agreement with the following statement: "Our community has no responsibility for helping climate migrants." (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |
| Host community identity | Respondent identification with fellow host community members over outsiders/migrants, based on agreement with the following statement: "I have more in common with the members of my community than with migrants that arrive here." (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |
| Perceived migrant wealth | Respondent perception of the wealth of migrants, based on responses to the question "The typical migrant to my community is likely to be _____" (5 -Extremely rich, 4 - Rich, 3 - Neither poor nor rich, 2 - Poor, 1 - Extremely poor, missing - Don't know) |
| Perceived scale of migration | Respondent perception of the scale of future migration in Bangladesh, based on agreement with the following statement: "After seeing the video, I believe that climate change will lead to substantial migration of people in Bangladesh" (5 – Agree very strongly, 4 – Agree, 3 – Neither agree nor disagree, 2 – Disagree, 1 – Disagree very strongly, missing – Don't know) |

## Appendix C. Additional results

*Table C 1. Ordered probit and ordered logit results*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *Dependent variable* | *Attitude to migrants* | *Attitude to migrants* | *Attitude to migrants* | *Attitude to migrants* |
| *Estimation method* | *Ordered probit* | *Ordered probit* | *Ordered logit* | *Ordered logit* |
| Treatment nature | -0.099 | -0.077 | -0.172 | -0.149 |
| | (0.09) | (0.09) | (0.15) | (0.16) |
| Treatment industrialized | 0.046 | 0.079 | 0.072 | 0.129 |
| | (0.08) | (0.09) | (0.15) | (0.16) |
| Treatment government | -0.111 | -0.148 | -0.195 | -0.261 |
| | (0.09) | (0.09) | (0.15) | (0.16) |
| Age | | 0.004 | | 0.011 |
| | | (0.01) | | (0.01) |
| Male | | 0.063 | | 0.066 |
| | | (0.14) | | (0.26) |
| Head of household | | 0.180 | | 0.294 |
| | | (0.12) | | (0.20) |
| Education primary | | -0.209** | | -0.344** |
| | | (0.10) | | (0.17) |
| Education secondary | | -0.428*** | | -0.781*** |
| | | (0.10) | | (0.18) |
| Education higher secondary | | -0.494*** | | -0.887*** |
| | | (0.13) | | (0.24) |
| Education tertiary | | -0.679*** | | -1.220*** |
| | | (0.14) | | (0.25) |
| Occupation farmer | | -0.068 | | -0.092 |
| | | (0.18) | | (0.33) |
| Occupation farm labourer | | -0.325 | | -0.464 |
| | | (0.26) | | (0.47) |
| Occupation gatherer | | -0.058 | | -0.097 |
| | | (0.41) | | (0.79) |
| Occupation self-employed | | -0.124 | | -0.179 |
| | | (0.16) | | (0.29) |
| Occupation employer | | -0.104 | | -0.128 |
| | | (0.21) | | (0.37) |
| Occupation day labourer | | -0.146 | | -0.223 |
| | | (0.18) | | (0.33) |
| Occupation high skilled employee | | 0.171 | | 0.335 |
| | | (0.21) | | (0.37) |
| Occupation low skilled employee | | -0.006 | | 0.048 |
| | | (0.21) | | (0.38) |
| Occupation housewife | | 0.237 | | 0.377 |
| | | (0.18) | | (0.32) |
| Occupation student | | 0.069 | | 0.163 |
| | | (0.20) | | (0.37) |
| Asset index | | -0.113*** | | -0.194*** |
| | | (0.04) | | (0.07) |
| Land owner | | -0.061 | | -0.085 |
| | | (0.09) | | (0.16) |
| Household size | | 0.031* | | 0.052* |
| | | (0.02) | | (0.03) |
| Born in host community | | 0.188 | | 0.346 |
| | | (0.17) | | (0.30) |
| Years lived in host community | | -0.010 | | -0.020 |
| | | (0.01) | | (0.01) |
| Migration history | | -0.017 | | -0.007 |
| | | (0.05) | | (0.09) |
| Union fixed effects | No | Yes | No | Yes |
| Pseudo r2 | 0.001 | 0.106 | 0.001 | 0.104 |
| N | 1253 | 1250 | 1253 | 1250 |

*Note: Results from ordered probit regressions in columns 1 and 2, and ordered logit regressions in columns 3 and 4. Robust standard errors in parentheses. Variables as defined in Table B1 in Appendix B. *** indicates significance at the 1% level, ** at 5%, * at 10%.*

A number of studies suggest that our narratives about the situation of the poor and vulnerable affect how we view them and treat them. Theoretically, a potentially powerful way to make host communities more welcoming of climate migrants is to shift the blame for their situation away from the migrants themselves and onto other forces or agents. We present results from a randomized field experiment conducted among long term residents of host communities in the Satkhira district of Bangladesh. We exposed three treatment groups to narratives that shift the responsibility for climate migration towards natural forces, Westerns countries, and local authorities, respectively. Despite power to detect reasonably small effects, we find no positive effects of the narratives on attitudes to climate migrants. On the contrary, one treatment has a borderline negative effect on attitudes relative to the control group. Our results suggest caution in attempting to influence attitudes through attribution of blame to outside forces or third parties. Such narrative interventions may shift responsibility away from not just the migrants but also from the treated host community residents, and may increase social identification within the host community relative to outsiders.



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