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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.

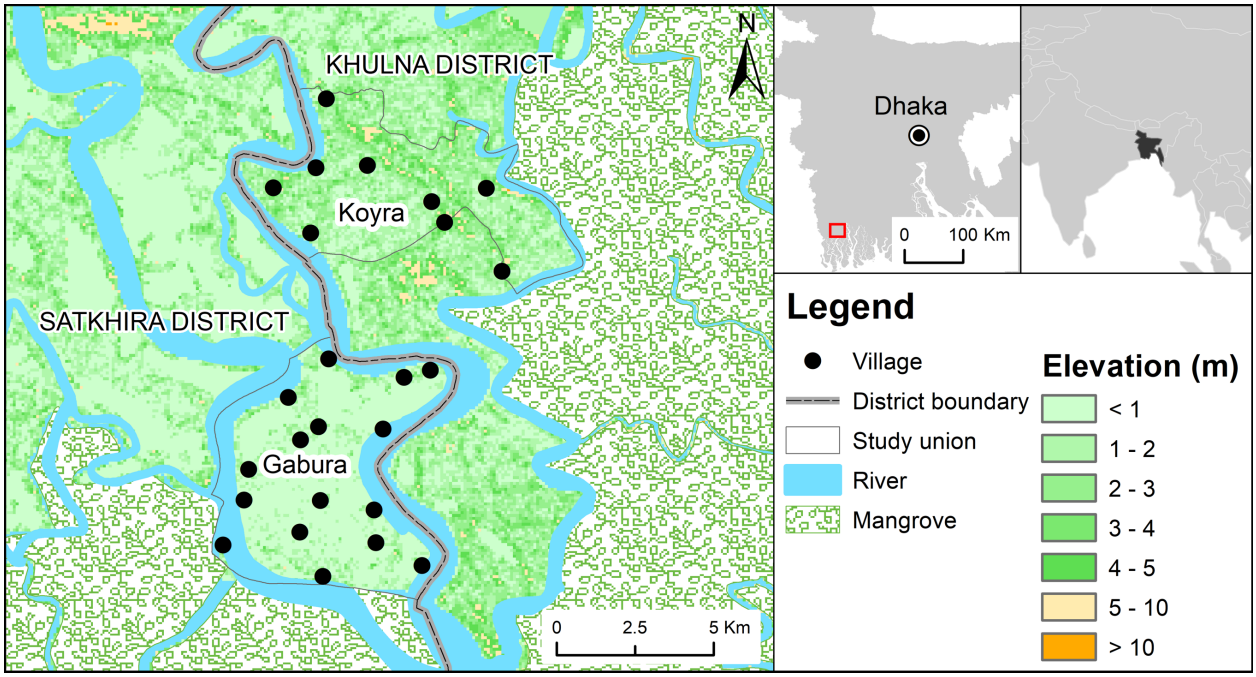

Figure 1 Study Areas

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 α_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) For every 100 Taka you earn today, you only earn 80 Taka (.8) For every 100 Taka you earn today, you only earn 50 Taka (.5)	Continuous
House	State of your house	Intact Damaged, in need of considerable and costly repair Destroyed, needs to be completely rebuilt	Ordinal
Agricultural productivity	Agricultural production in your village	Same as today (1) For every 10 kg produced today, only able to produce 8 kg (.8) 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) For every 10 kg hunted/fished/gathered today, only able to hunt/fish/gather 8 kg (.8) Able to hunt/fish/gather half the quantities compared to today (.5)	Continuous
Water	Access to clean drinking water	As today 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 Much worse than today	Dummy
Protection	Protection provided by, for example, shelters and dykes	As today 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.

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

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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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