# Decision to stay in climate-risk areas: Cognitive biases and preferences in Coastal Bangladesh

Björn Vollan[1,*], Ivo Steimanis[1], Maximilian Nicolaus Burger[1], and Andreas Neef[2]

[1] Department of Economics, Philipps University Marburg, 35032 Marburg, Germany

[2] Arts, Education and Law Group, Griffith University, Australia

*Corresponding author: Björn Vollan, **Email**: bjoern.vollan@wiwi.uni-marburg.de

**Abstract:** Why do many individuals remain in climate-vulnerable areas despite escalating environmental hazards and, for some households, financially feasible relocation options? This study examines mobility decision-making among residents of two climate-risk-prone areas in Bangladesh. It develops a three-stage framework - appraisal & awareness, aspiration & intention, and action - to examine how cognitive and emotional considerations relate to im(mobility) preferences. The paper contributes to behavioral climate science by examining whether mechanisms usually studied in lower-stakes settings - selective information avoidance, sunk-cost sensitivity, time preferences, risk tolerance, and self-efficacy - are observable in consequential mobility decisions under climate risk. It also qualifies place-attachment accounts of immobility by asking whether attachment to place is linked not only to valued relationships and identities, but also to how people process uncomfortable risk information and evaluate prior investments. Study 1 (N=247) used conflicting but factually correct satellite-based information: one video highlighted sea-level-rise risks such as erosion and migration pressure, while another highlighted geomorphic resilience such as land accretion and in-situ adaptation potential. Approximately 40% of respondents recommended ignoring one of the two evidence-based messages, consistent with selective information avoidance. In Study 2 (N=385), about one-third referred to past investments in homes and land when evaluating relocation, consistent with sensitivity to sunk costs. Both tendencies appear more pronounced among individuals with strong emotional attachment to place. Across studies, stronger place attachment is associated with shorter time horizons and lower confidence in being able to adapt locally. Groups with different stay-or-move profiles also differ in willingness to take risks, including among households that appear able to afford relocation. The evidence is correlational, but it suggests that immobility cannot be understood through financial constraints, information deficits, or place attachment alone. Place-based ties may interact with behavioral frictions that shape risk appraisal, perceived feasibility, and the translation of intentions into action. Long-term adaptation support may therefore need to address not only resources and information, but also the cognitive and emotional processes through which people evaluate staying, moving, and adapting.

**Key Policy Insights**

- Risk communication should not rely on information provision alone; messages may need trusted local channels, concrete action pathways, and designs that reduce defensive disengagement.
- Adaptation and mobility support should account for place-based identities, social ties, and perceived losses from past home and land investments.
- Financial assistance is unlikely to be sufficient unless paired with practical implementation support that makes adaptation or relocation feel feasible.
- Participatory and deliberative formats may help communities engage with uncomfortable risk evidence while co-producing staged, locally credible adaptation pathways.

**Keywords:** Climate Adaptation; Cognitive Biases; Sunk-Cost Sensitivity; Information Avoidance; Self-efficacy; Endogenous Preferences; Climate Risk Perception; Bangladesh

**Acknowledgments:** The authors are thankful for the valuable contributions to the fieldwork by Abu Siddique and Jasia Tahzeeda, as well as support by the Bangladesh Rural Advancement Committee.

**Funding:** The research was supported by the Robert Bosch Foundation (grant number: 32.5.F082.0001.0) and the German federal ministry of education and research (grant number: 01DR20003) as well as the Royal Society Te Aparangi (FRG-UOA1901). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Data can be accessed** via https://github.com/IvoSteimanis/barriers_adaptation

## 1 Introduction

Sea-level rise (SLR) is reshaping coastal livelihoods worldwide, yet many exposed residents choose to remain (Seneviratne et al., 2021; Storlazzi et al., 2018; Vitousek et al., 2017). Decisions by residents of coastal communities to adapt or migrate shape local resilience and carry broader implications for regional stability and migration flows. Countries particularly susceptible to SLR, such as Bangladesh, face significant displacement risks (Hauer et al., 2020). While slow-onset climatic events can increase out-migration from rural areas (Šedová et al., 2021), climate-affected populations also voluntarily remain despite the risks (Ahsan et al., 2021; Balgah & Kimengsi, 2022), often preferring in-situ adaptation or temporary migration to resettlement in less exposed places (Barnett & McMichael, 2018; Hutton & Haque, 2003; Kelman et al., 2019; Mortreux & Barnett, 2009; Nichols, 2019;

Oakes, 2019; Shen & Gemenne, 2011; Zickgraf, 2019). Understanding this paradox requires attention to both structural constraints and the cognitive processes that shape how risks and options are perceived. This paper contributes to climate policy debates on in-situ adaptation and planned relocation by "opening the black box" of aspiration formation and implementation under climate risk. Rather than treating information deficits or financial constraints as the primary bottlenecks, the analysis focuses on three behavioral mechanisms that map onto the stages of the framework: (i) selective dismissal of credible but uncomfortable risk-relevant narratives, (ii) investment-framed rationales for staying that resemble sunk-cost reasoning, and (iii) lower perceived capacity to adapt or move. These patterns suggest that policies expanding options (e.g., grants, relocation packages) may still underperform unless they also address how people process risk information, weigh prior investments, and perceive feasibility. Building on behavioral work largely developed in laboratory settings in high-income countries (Henrich et al., 2010), this high-stakes field setting in Bangladesh tests whether such mechanisms are associated with risk appraisal and mobility choices under SLR.

Existing explanations can be grouped into two broad strands. First, decisions to remain in climate-affected regions reflect cultural identities, place attachments, and relational values beyond capacity (Ayeb-Karlsson et al., 2018; Black, Adger, et al., 2011; Rigaud et al., 2018) and political constraints (Esteban et al., 2019; Hauer et al., 2020; Jamero et al., 2017; Lindegaard, 2018; Swapan & Sadeque, 2021; Yates et al., 2022; Zickgraf, 2019). These choices are further reinforced by strong social ties, emotional connections to home (Adams, 2016; Adger et al., 2013; Manchin & Orazbayev, 2018), and practical considerations such as uncertainties about livelihoods due to climate hazards, the transitional costs of relocation, as well as the challenges of processing overwhelming information (Czaika, 2015; Czaika & Reinprecht, 2022; Magnan et al., 2016; Schipper, 2020). Second, a complementary behavioral-economic strand emphasizes that preferences can be endogenous, i.e., shaped by the institutions and environments in which people live (Bowles & Hwang, 2008; Mattauch et al., 2022; Mattauch & Hepburn, 2016; Nyborg et al., 2016; Steimanis et al., 2021). In this view, repeated exposure to hazards may reshape aspirations, perceived feasibility, and how

individuals trade off present needs against future security, without implying that such adjustments reflect inferior knowledge or irrationality.

A third, complementary strand emphasizes cognitive processing frictions: mobility decisions can be influenced by systematic biases that affect how risks and options are perceived and how decision-relevant evidence is processed. Such biases have been shown to contribute to choices that may be inconsistent with long-run risk reduction, including underweighting future harms, delaying protective actions, or favoring short-run coping over more comprehensive adaptations (Gifford, 2011; Grothmann & Patt, 2005). Since such biases are widespread in the general population (Tversky & Kahneman, 1974), they plausibly also arise in climate-affected communities, potentially complicating efforts to translate risk information into adaptive behavior. Drawing on the concept of autonomy as self-constitution (Colin-Jaeger & Dold, 2025), this paper asks whether immobility reflects a stable, reflective commitment to staying, or whether it is sometimes shaped by the interaction of hazard-adapted preferences and biased processing of decision-relevant information. This perspective does not discount local values or lived experience; rather, it examines whether psychological mechanisms may weaken the translation of those values into long-term adaptive action. If so, this has direct policy relevance: risk communication may need to reduce defensive disengagement and provide feasible action pathways, and relocation support may need to account for investment- and loss-based reasoning that makes moving feel more costly than financial constraints alone.

Two surveys in Bangladesh's climate-vulnerable areas examine information avoidance – operationalized as selective dismissal of available, evidence-based messages about coastal change – and its association with climate risk awareness (Study 1, N=247), and sunk-cost sensitivity in relocation decisions (Study 2, N=385). Across both studies, we additionally examine heterogeneity in key behavioral parameters such as impatience, risk aversion, and perceived self-efficacy that may reinforce barriers to mobility. The aim is not to establish causal effects of specific cognitive biases, but to document their prevalence and correlates across socio-economic groups in climate-risk–affected areas. For example, the information-avoidance measure is associated with a lower share of climate-risk-aware individuals. These patterns point to underexplored dynamics that may contribute to climate-related immobility.

The remainder of the paper proceeds as follows. Section 2 develops the conceptual framework linking awareness and appraisal, aspirations and intentions, and action within an adaptation space. Section 3 describes the Bangladesh study sites, measures, and empirical strategy. Section 4 presents the results for information avoidance, sunk-cost-framed staying, behavioral preferences, self-efficacy, and mobility profiles. Section 5 discusses implications for risk communication, adaptation support, and relocation policy, while noting the descriptive limits of the evidence.

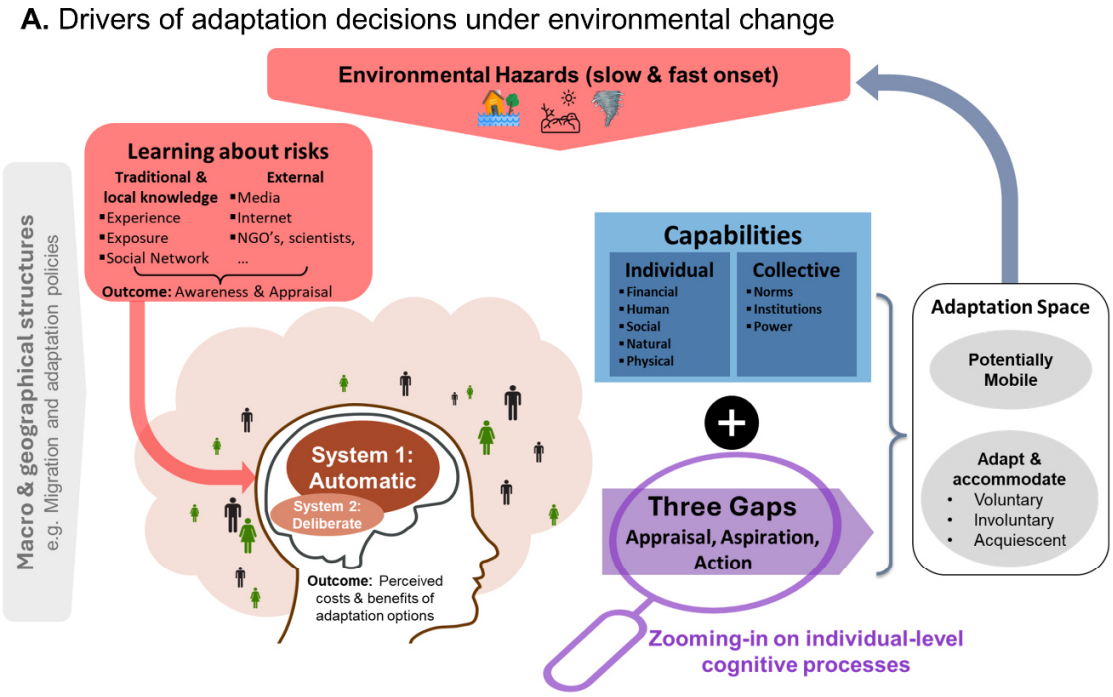
## 2 Conceptual framework: Cognitive drivers of mobility decision-making

We build on the aspiration-capability framework proposed by Carling (Carling, 2002), a widely adopted and expanded conceptual model (Carling & Schewel, 2018; Haas, 2021; Schewel, 2020) that disentangles the decision to migrate into two distinct components: the desire to move (aspirations) and the capability to do so. In this framework, aspirations are viewed as the necessary precondition for migration, which are then filtered by micro-, meso-, and macro-level constraints (i.e. individual resources, social norms, or political barriers) to determine whether movement actually occurs. However, while traditional applications of this framework effectively map these external constraints (the capability side), they often treat the formation of the aspirations themselves as a 'black box' (see Figure 1, Panel A). In addition, the relationship between aspirations and capability to move can often run both ways. While aspirations typically drive the acquisition of capability to act on them, limited capability can also suppress aspirations (Amartya Sen, 1999). Individuals perceiving a lack of capability to move may unconsciously downgrade their aspirations to align with reality and reduce the discomfort of wanting something that feels infeasible. This feedback loop mirrors Schewel's (Schewel, 2020) concept of acquiescent immobility where individuals neither aspire to move nor possess the capability to do so. For many in this group, the lack of aspiration is conditioned by their lack of capability and represents a resigned adaptation to constraints rather than a genuine preference for staying. While the framework is used here to explore the links between behavioral factors and mobility decisions, it is more broadly applicable to adaptation in general. This includes in-situ

strategies such as waterproofing homes, buying insurance, shifting livelihoods, or signing up for early warning systems, where decisions similarly depend on how individuals interpret risks, weigh alternatives, and form intentions over time.

The framework extends this model through a three-gap approach: awareness & appraisal, intention & aspiration, and action within an adaptation space. To explain how individuals move through these stages, the framework draws on dual-process theory (Kahneman, 2011; Tversky & Kahneman, 1974) and the theory of planned behavior (Ajzen, 1991). Compared to the Private Proactive Adaptation model (Dang et al., 2012; Grothmann & Patt, 2005), which is typically applied as a rational or static snapshot of decision-making, this perspective differs in two ways. First, appraisal is allowed to be shaped by biased information processing, including information avoidance: after repeated floods, a household may be highly aware of immediate risks yet downplay longer-run sea-level rise information that implies relocation. Second, the framework incorporates endogenous preference formation, so that exposure to climate hazards can reshape aspirations, perceived feasibility, and fundamental economic preferences over time. After years of recurrent flooding, households may become more present-oriented and more willing to accept uncertainty, while adjusting aspirations downward if moving repeatedly proves unattainable. Stated preferences and feasibility perceptions thus evolve with experience rather than remaining fixed.

**Figure 1. Mobility decision-making at the individual level under climate risks**




Notes: This figure presents a conceptual framework for understanding how individuals make mobility decisions in response to environmental hazards, ranging from slow-onset events (e.g., sea-level rise) to sudden disasters (e.g., floods, earthquakes). Panel A illustrates the macro-micro context. It distinguishes between individual and collective capabilities and the cognitive processes that filter them. The central profile depicts the interplay between System 1 (Automatic) and System 2 (Deliberate) processing, surrounded by social influences that shape risk appraisal and adaptation options. Panel B zooms in on the individual decision-making process, detailing three stages: awareness & appraisal, intentions & aspirations, and actions. The "rope bridge" metaphor illustrates how cognitive biases and endogenous preferences may affect these stages, potentially creating behavioral and cognitive barriers to mobility or more generally adaptation actions. Empirically tested factors in this paper are highlighted in bold in the purple boxes.

Dual-process theory is drawn on to organize these micro-level mechanisms (Kahneman, 2011). Responses to climate hazards are conceptualized as arising from intuitive, heuristic-

based processing (System 1: automatic) or more reflective reasoning (System 2: deliberate). System 1 facilitates fast decision-making under uncertainty (Gigerenzer & Brighton, 2009), but reliance on past experiences and heuristics can bias what evidence is noticed and how it is interpreted. The analysis does not directly measure System 1 versus System 2 activation; rather the distinction provides a lens for interpreting patterns that may arise under common conditions in climate-vulnerable environments, such as cognitive load, uncertainty, or time pressure. These conditions can reduce System 2 engagement (Haushofer & Fehr, 2014; Mani et al., 2013; Shah et al., 2012), and increase the role of heuristic processing, which may tilt decisions toward short-term coping and away from longer-run risk reduction.

Environmental hazards differ in temporal structure, which may shape how individuals move through the stages of awareness, aspiration, and action. Fast-onset shocks (e.g., cyclones, storm surges) are vivid and affect-laden, often heightening short-run risk perception through experiential and availability-based processing, though such updating may fade over time (Loewenstein et al., 2001; Weber, 2006). Slow-onset processes (e.g., sea-level rise, erosion, salinization) unfold gradually and ambiguously, increasing psychological distance and leaving greater scope for delayed updating, competing interpretations, or selective information avoidance (Golman et al., 2017; Spence et al., 2012). At the intention stage, acute shocks may trigger temporary coping or migration considerations, whereas gradual change more strongly interacts with place attachment, cumulative investments, and evolving aspirations (Adger et al., 2011; Steimanis et al., 2021). Because slow-onset hazards require intertemporal trade-offs, they may also make patience, risk attitudes, and perceived self-efficacy particularly relevant for translating intentions into action. Our design does not identify distinct causal pathways; we introduce this distinction to clarify the mechanisms embedded in the three-gap framework.

Finally, the framework integrates emerging evidence that fundamental economic preferences (risk, time, and social preferences) are not fixed traits, but dynamically shaped by environmental shocks, cultural norms, and institutional contexts (Becchetti et al., 2017; Bénabou & Tirole, 2016, p. 20; Bowles, 2008; Cassar et al., 2017; Di Falco & Vieider, 2022; Prediger et al., 2014; Steimanis & Vollan, 2022). Such shifts can influence how people weigh uncertainty and trade off present needs against future security. In climate-affected

settings, repeated hazard exposure has been linked to differences in risk attitudes and related social responses (Becchetti et al., 2017; Cassar et al., 2017; Steimanis et al., 2021; Steimanis & Vollan, 2022). This implies that persistent immobility is not necessarily a matter of missing information: people may evaluate risks and relocation under preference profiles and perceived feasibility shaped by past exposure, potentially reinforcing staying even when risks are recognized.

### 2.1 Stages of decision-making

**Awareness & Appraisal:** Individuals develop awareness of climate risks through multiple knowledge sources, including personal and intergenerational experience (e.g., damage to homes from heavy rains, agricultural land erosion, loss of work materials) and external intermediaries such as NGOs, social networks, and media (Gould et al., 2024; Minor et al., 2023; Ricart et al., 2023; Rosenthal, 2022). This information can prompt updates to beliefs about the costs and benefits of different mobility options (Drees & Liehr, 2015; Kennan & Walker, 2011).

However, cognitive barriers can obstruct information processing regardless of the source. We therefore focus on information avoidance, defined as behavior aimed at preventing, delaying, or disengaging from available but potentially uncomfortable decision-relevant information (Golman et al., 2017; Hart et al., 2009; Sweeny et al., 2010) . Integrative reviews emphasize that avoidance often arises when information is anticipated to be psychologically costly to process, for example because it increases worry, threatens identity, or creates dissonance, and that it can be captured as observable disengagement rather than as belief-consistent evaluation relative to pre-measured priors (Foust & Taber, 2025; Golman et al., 2017). In our context, strong place attachment may make some evidence psychologically difficult to engage with, leading individuals to dismiss or ignore messages about escalating risks such as flooding or sea-level rise (Javeline et al., 2019; Mildenberger et al., 2019, 2024). More generally, selective dismissal can reduce the extent to which new information, scientific or experiential, enters appraisal processes, thereby limiting the awareness needed for subsequent intention formation and adaptive action (Adger et al., 2021; Bekaert et al., 2021; Zander et al., 2019).

**Intention & Aspiration:** While awareness and appraisal are prerequisites for forming intentions and aspirations, they do not automatically lead to action (Ajzen, 1991). Risk awareness can motivate aspirations to move, yet competing motivations and perceived barriers may dampen them. Place attachment may reduce mobility aspirations when emotional and relational ties to home outweigh perceived benefits of moving. Second, decisions may be influenced by sensitivity to past investments and commitments (sunk-cost considerations), which can make relocation appear psychologically more costly even when safer alternatives exist (Arkes & Blumer, 1985; Roth et al., 2015). Third, low perceived self-efficacy may inhibit intention formation when individuals doubt their capacity to manage difficult changes (Burnham & Ma, 2017; Valkengoed & Steg, 2019; van Valkengoed et al., 2024). Finally, heterogeneity in risk and time preferences may condition aspirations: individuals who weigh immediate needs more heavily or perceive relocation outcomes as highly uncertain may be less likely to form mobility intentions, whereas others may be more willing to consider moving despite uncertainty (Goldbach & Schlüter, 2018; Steimanis et al., 2021).

**Action within the adaptation space:** Even strong intentions may fail to translate into action due to limited willpower and resources or uncertainty about outcomes. In our framework, mobility outcomes within the adaptation space are shaped by a combination of constraints and behavioral factors, including patience (time preference), risk attitudes, and self-efficacy (Goldbach & Schlüter, 2018; Jaeger et al., 2010; van Valkengoed et al., 2024). Because migration and many in-situ adaptations involve intertemporal trade-offs (incurring immediate costs to reduce future risk), lower patience may widen the intention–action gap when near-term costs loom larger than delayed safety benefits. Risk aversion may increase the weight placed on uncertainties associated with resettling (e.g., livelihood instability or social disruption), favoring familiar coping strategies in place. Low self-efficacy may further hinder implementation when individuals feel unable to act (van Valkengoed et al., 2024) or anticipate the emotional consequences of potential failure (Conner & Armitage, 1998; Heslin & Klehe, 2006). Additional mechanisms are discussed in SI Section S2.

# 3 Materials and Methods

## 3.1 Study sites & sample

Bangladesh's Ganges Delta is highly vulnerable to sea-level rise (SLR), with frequent cyclones (Bhuiyan et al., 2012), flooding (Li et al., 2018), erosion, and salinization (Auerbach et al., 2015; Nicholls et al., 2020). Study sites were selected in collaboration with the BRAC Institute of Governance and Development (BIGD). Using administrative data on climate vulnerability, we preselected affected unions and randomly sampled villages within these units. Environmental exposure was high in both studies: 50% of respondents experienced cyclones, 25% erosion, and 25% flooding in the past five years; with individuals in Study 1 reporting an average of 2.2 hazards and those in Study 2 an average of 7.6. Study 1 (2018, N=247) targeted rural communities in the Barisal Division located 7–39 km from the nearest urban center, where livelihoods depend primarily on agriculture, aquaculture, and fisheries. Within villages, respondents were selected via a standard random walk procedure (Bauer, 2016), interviewing one adult from every third household. On average, they were 35 years old, with equal gender representation, 7.5 years of schooling, and a monthly household income of $122 (monthly income, purchasing power parity adjusted (PPP)).

Study 2 (2021, N=385) targeted household heads in the Satkhira district, where within each selected household via the random walk procedure, the interview was conducted with the adult household decision-maker (or household head), defined as the person primarily responsible for major household decisions; if this person was unavailable, enumerators scheduled a callback. This strategy was chosen to examine sunk-cost sensitivity regarding major asset and relocation decisions which are primarily managed by household heads in this context. Consequently, this sample is mostly male (86%), less educated (6.3 years of schooling), less wealthy ($73 monthly income, PPP), and older with 43 years on average (consistent with targeting senior household heads). Because gender-specific analyses pool respondents across both studies to maintain statistical power, the predominantly male composition of Study 2 should be kept in mind when interpreting gender differences. Despite demographic and economic differences, place attachment was equally strong in

both samples (mean: 4.2/5).[1] For additional details, see SI Figure S1 and Table S4 to Table S5.

### 3.2 Key measures

To align our measures with the three-stage framework (Section 2.1; Fig. 1), we map them as follows. Stage 1 (awareness & appraisal) is captured by perceived past and future SLR intensity and perceived livelihood threat, as well as our choice-based measure of selective information dismissal / information avoidance (Study 1). Stage 2 (aspirations & intentions) is captured by stated mobility aspirations (preference to stay versus relocate) and, among stayers, stated reasons including the sunk-cost–framed rationale (Study 2). Stage 3 (implementation) is examined through patience, risk attitudes, and self-efficacy, and through differences in these factors across mobility types (aspirations × financial feasibility); we do not observe realized actions. All continuous behavioral measures are normalized to 0–100 scales for comparability; missing items for risk and patience composites are imputed using predictive mean matching (Azur et al., 2011). Details on standardization, composite construction, and imputation procedures are provided in Supplementary Information (SI) Section 1.2.

#### 3.2.1 Study-specific experimental measures

**Information Avoidance (Study 1):** Respondents viewed two videos displaying contrasting but evidence-based information about SLR-related coastal change in their delta region utilizing time-lapse satellite imagery to show shoreline changes. One video highlighted risks such as coastal erosion and salinization leading to land loss, framing migration as a necessary adaptation strategy (Ashraful Islam et al., 2016). The second video showed net land increases due to sedimentation, potentially enabling in-situ adaptation (Ahmed et al., 2018). Video details including satellite imagery are provided in SI Section S4.

[1] For Study 1, place attachment is the average index over ten 5-point Likert items measuring place identity and place dependence (Williams & Vaske, 2003). For Study 2, place attachment is an average index over 3 out of these 10 standardized 5-point Likert items asking about whether their place is special to them, means a lot to them, and how attached they are to it.

After viewing both videos, respondents rated on an 11-point Likert scale which information 'people like them should ignore,' used here as a behavioral measure of selective information dismissal. Because both videos are grounded in published satellite-based evidence capturing real geomorphological processes in the study region, the task distinguishes engagement with both pieces of evidence from an explicit recommendation to ignore one of them. Pre-exposure beliefs were not elicited immediately before the videos, to reduce context and demand effects; this measure therefore cannot identify whether dismissal aligns with a measured pre-treatment stance. Because selective dismissal can reflect multiple processes (e.g., skepticism, relevance-weighting, or affective disengagement), additional analyses clarify what can and cannot be inferred from the measure. Respondents' stated reasons for dismissal were also elicited and, in regression analyses, hazard exposure and other covariates are conditioned on; details are reported in SI Section S1.1.

Perceptions of SLR impacts are measured through self-reported assessments of sea-level rise, coastal erosion, and salt-water intrusion over the past 10 years and in the future, using 5-point Likert scales. Perceived threat to livelihoods is measured using an 11-point item.

**Sunk-cost sensitivity (Study 2):** Much of the experimental literature on sunk-cost effects relies on hypothetical or low-stakes decisions, whereas evidence from high-stakes domains often comes from observational designs (Arkes & Blumer, 1985; Friedman et al., 2007; Hinton & Sun, 2020). To capture sunk-cost-type reasoning, we examine respondents' stated rationale for preferring to remain in a climate-risky area. Respondents first indicated whether they would prefer to move permanently or continue living in their current location, regardless of current relocation ability. Respondents who preferred to stay then selected their primary reason from a list (with an open-ended option) that included structural constraints (e.g., land entitlement risks, financial insecurity) as well as a sunk-cost–framed rationale: 'I have already invested too much in this house and land.'

Sunk-cost sensitivity is operationalized as selecting this specific rationale. This measure captures whether respondents explicitly frame the stay decision in terms of irrecoverable past investments rather than prospective consequences, consistent with standard behavioral definitions of sunk-cost effects (Arkes & Blumer, 1985). This is interpreted as an indicator

of sunk-cost–type reasoning rather than a definitive diagnosis that the decision is irrational, because past investments may also correlate with other factors (e.g., attachment or location-specific assets). The timing of investment-related questions (before/after migration preference) did not significantly affect responses (SI Figure S3).

#### 3.2.2 Cross-study behavioral measures

Across both studies, risk-taking, patience/impatience, perceived adaptation self-efficacy, and mobility type are used to examine Stage 3. Because risk and time preferences were elicited with different instruments across studies, continuous behavioral measures are standardized or normalized to 0-100 scales, and missing complementary risk and patience items are imputed as described in SI Section S1.2. Mobility types combine stated stay-or-move aspirations with a lower-bound indicator of financial feasibility based on sellable household assets and estimated relocation costs. Full construction details, imputation procedures, and robustness checks are provided in SI Sections S1.2-S1.3 and Tables S3, S9-S10.

Perceived adaptation self-efficacy was measured using two five-point Likert items: "I feel uncertain about the best options to adapt to climate change" and "I feel that climate change is too big for me to be able to adapt." The self-efficacy index shows modest internal consistency (Cronbach's alpha = 0.51 in Study 1, 0.64 in Study 2), reflecting the small number of items. Results using this index should be interpreted as descriptive associations subject to measurement error, which likely attenuates estimated relationships. As a robustness check, Table S9 (columns 4–5) reports subgroup differences for the individual items; the patterns are qualitatively consistent, with place attachment emerging as the strongest predictor for both items.

To examine Stage 3 (action/implementation), respondents are classified by the intersection of mobility aspirations and financial feasibility, following Schewel's (Schewel, 2020) typology. The main comparison in Section 4.4 focuses on the financially able subgroup, contrasting those who aspire to migrate with those who aspire to stay. Aspirations were measured by asking preference for current location versus "some other place in Bangladesh." Financial ability combined: (i) value of sellable household assets (livestock,

solar systems, vehicles, equipment) adjusted for household size; and (ii) estimated relocation costs to Dhaka including travel, food, and first-month accommodation. Respondents were classified as financially able if their adjusted assets exceeded median relocation costs: $326 PPP in Study 1 (2018) and inflation-adjusted $341 PPP in Study 2 (2021). This is a lower-bound measure of capability, as it does not account for non-financial costs of migration.

#### 3.2.1 Estimation strategy

The analysis is descriptive and cross-sectional; it estimates conditional associations, not causal effects. All standard errors are heteroskedasticity-robust. Missing values in Study 2 are multiply imputed (m = 20) using predictive mean matching. Full model specifications are provided in SI Section S1.3.

## 4 Results

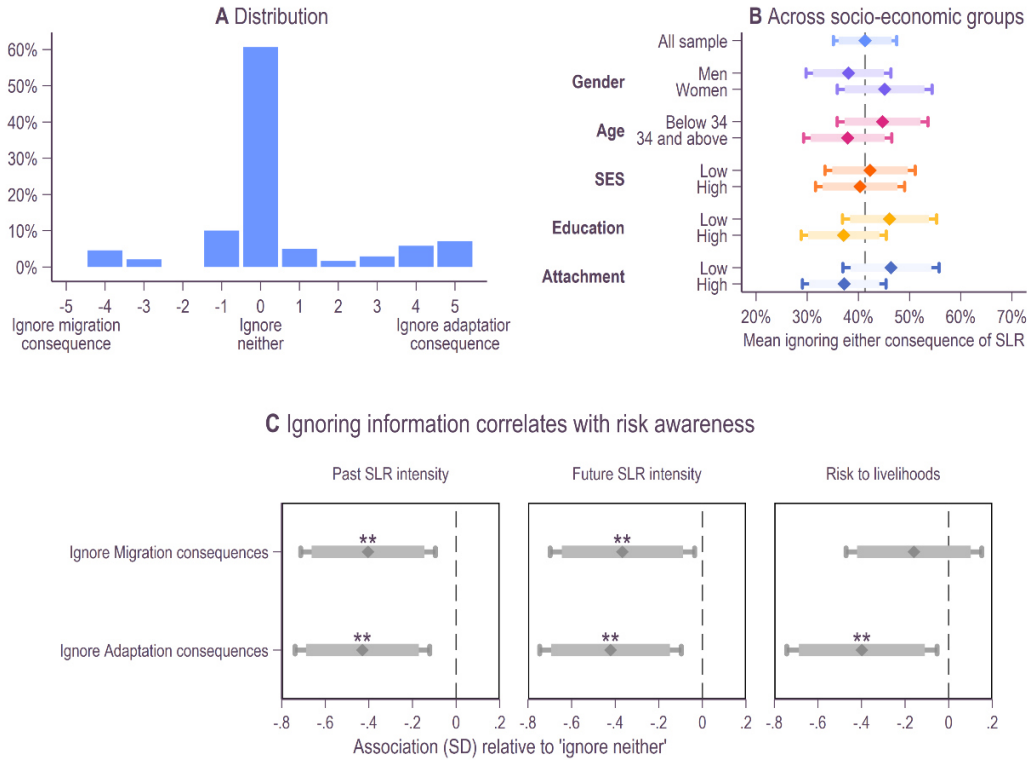
### 4.1 Stage 1: information avoidance and climate change awareness

The results indicate that a substantial share of respondents selectively dismisses one of the two evidence-based messages about SLR-related coastal change. As shown in Figure 2, panel A, 59% of respondents showed no signs of biased information processing, choosing not to ignore either migration or adaptation-related information, whereas approximately 41% displayed selective dismissal. Specifically, 20% recommended ignoring information related to migration in response to coastal erosion, while 21% disregarded adaptation information due to changing shorelines. This pattern suggests that selective disengagement from decision-relevant evidence is common in our sample.

Figure 2, panel B, highlights demographic differences in information avoidance. While gender, wealth, and place attachment did not significantly affect whether respondents ignored relevant information, age and education did. Older respondents were 12% points less likely to ignore information ($\beta = -0.12$, $p < 0.10$), and those with higher education were 13% points less likely (AME = $-0.13$ $p < 0.10$ ). This suggests that older and more educated

individuals may be less prone to selective information processing, and therefore, more open to acknowledging the full scope of climate hazards and their adaptation implications.

**Figure 2. Information avoidance patterns**




Notes: Panel A shows the distribution of information avoidance (percent). Panel B shows average marginal effects from SI Equation (S1) across demographic subgroups, with 95% (thin bars) and 90% (thick bars) confidence intervals. The dashed line indicates the sample average (41%). Panel C shows OLS estimates from SI Equation (S2) for three standardized risk-perception outcomes. All models use robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Full regression outputs of AME are reported in SI Table S6-S7.

In line with Stage 1 of our framework, we evaluate whether ignoring information is correlated to differences in awareness of SLR in related hazards. Figure 2, panel C, shows conditional associations between dismissal and perceived changes in hazard intensity. In terms of past changes in the intensity of sea-level rise hazards respondents who ignored migration (ß = −0.40, p = 0.01, 95CI = −0.71, −0.09) or adaptation (ß = −0.43, p < 0.01, 95CI = −0.74, −0.12) consequences evaluate these hazards as having changed significantly less by 0.4 SD than respondents who ignored no information. For future changes in these hazards, the association is of similar size as for changes in the past 10 years independent of which information was ignored by respondents. Lastly, related to perceived threats for one's

livelihoods today, only respondents who ignore the adaptation consequences perceive this as less of a threat (ß = −0.40, p = 0.02, 95CI = −0.74, −0.05) but not those who ignore the migration information (ß = −0.16, p = 0.31, 95CI = −0.47, 0.15).

Taken together, these results suggest that selective information dismissal is systematically related to lower reported risk perceptions. We interpret this as descriptive evidence consistent with our framework in which disengagement from decision−relevant information may weaken awareness & appraisal, while emphasizing that the associations are not causal and may also reflect unobserved differences between respondent groups.

### 4.2 Stage 2: Sunk costs and relocation intentions

In Study 2, we examine relocation intentions (Stage 2) and the prevalence of sunk-cost framed reasoning. Exposure to environmental hazards is widespread: respondents experienced on average seven events in the past five years, and only 3 of 385 reported no exposure. The most severe hazards were mainly tropical storms, followed by floods (including land erosion) and storm surges. Impacts were substantial: 20% reported personal injuries and 20% injuries to other household members; three households reported a fatality. Property losses were also common, with 38% reporting partial housing damage and 54% total destruction; 56% lost at least some livestock, and 9% experienced major land loss.

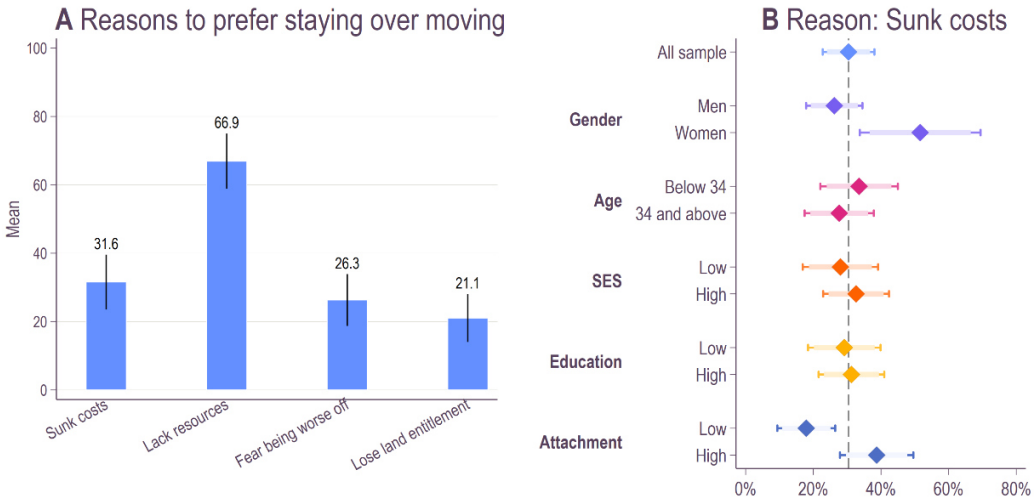
Despite this, most respondents stayed and rebuilt in the same place (or within 500 meters), on average more than four times (mean = 4.3, SD = 2.68, median = 4). Rebuilding in place is more common among less educated respondents ($r = -0.19$, $p < 0.01$) and those with strong place attachment ($r = 0.38$, $p < 0.01$).

Figure 3 summarizes preferences to stay versus relocate permanently, irrespective of financial capacity. Overall, 73% reported a preference for staying. Panel A summarizes the distribution of stated reasons among those who preferred to stay. Among stayers, the most frequent reason is a lack of resources to relocate (67%). This need not reflect financial constraints alone: even assuming sufficient money, respondents may perceive deficits in other resources (e.g., destination networks or reliable information). A substantial share (32%) of respondents also attributed their preference to stay to the perception that they had ‘already invested too much in their house and land’, consistent with the sunk-cost fallacy.

This makes sunk-cost sensitivity the second most prevalent rationale, exceeding fears of worsening conditions (26%) or losing land entitlement (21%).

Women and individuals with strong place attachment were significantly more likely to cite sunk costs as a reason for staying (Panel B). Being female is associated with a 29% point increase in the probability of reporting sunk costs ($\beta = 29.17$, $p < 0.01$), while above-median place attachment is associated with a 21% point increase ($\beta = 20.92$, $p < 0.01$). Note that women constitute 14% of Study 2 respondents ($n = 52$), reflecting the targeting of household heads who are predominantly male; the estimate should therefore be interpreted with this compositional caveat in mind. This gendered tendency to remain aligns with recent evidence from Bangladesh which suggests that women's adaptive capacity is often deeply rooted in place-specific social relations (Khalil & Jacobs, 2021), making in-situ adaptation a strategic response to avoid the gender specific vulnerabilities associated with migration (Alam & Khalil, 2022).

**Figure 3. Sunk-cost bias**




Notes: Overall, 73% of respondents preferred staying. Panel A shows the distribution of stated reasons among stayers (multiple responses permitted; shares do not sum to 100%). Panel B shows average marginal effects from SI Equation (S3) across demographic subgroups, with 95% (thin bars) and 90% (thick bars) confidence intervals. The dashed line indicates the sample average (31.6%). Full regressions outputs in SI Table S8.

### 4.3 Stage 3: Risk aversion, impatience, and self-efficacy as barriers to action?

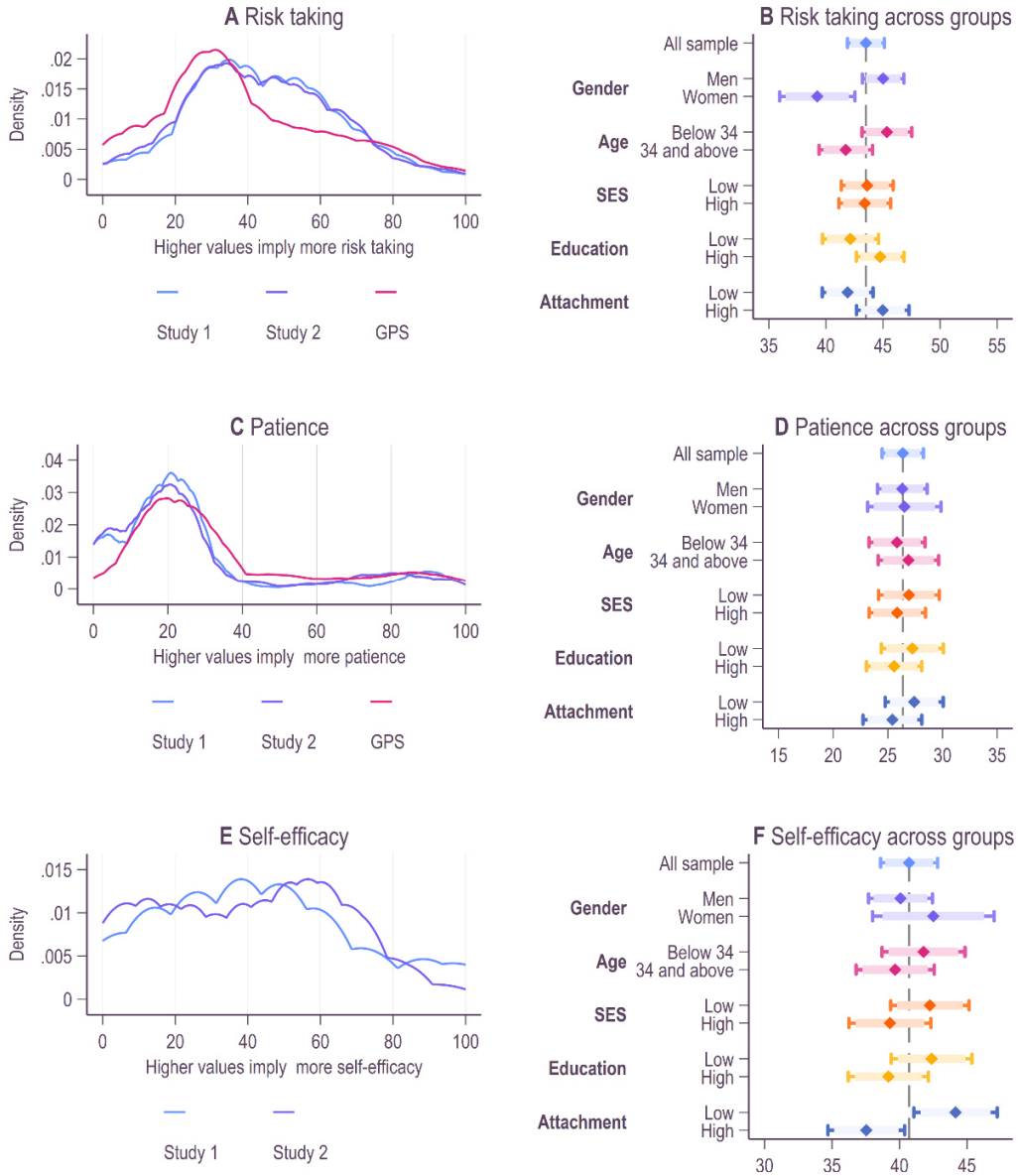
Figure 4 presents the results for risk, patience, and self-efficacy. Panel A and Panel C compare respondents' risk-taking and patience with those of the broader Bangladeshi population, using data from the Global Preference Survey (GPS). Respondents living in

environmentally vulnerable areas are generally more inclined to take financial risks (Kruskal-Wallis test (KWT) Chi2 = 34.35, $p < 0.01$) and exhibit less patience (KWT Chi2 = 44.63, $p < 0.01$) than the average Bangladeshi. Across the two studies, patience (KWT Chi2 = 0.03, $p = 0.85$) and risk-taking (KWT Chi2 = 0.15, $p = 0.69$) do not differ significantly.

Further analysis of socio-economic factors (Panels B and D) reveals that certain groups within our study population exhibit distinct patterns in these preferences. Older respondents showed lower risk-taking propensity ($p < 0.10$), while women showed a similar tendency that did not reach significance. No socio-economic variable significantly predicted patience levels. These patterns are consistent with the idea that, in high-risk settings, shorter time horizons may make it harder to sustain investments with upfront costs and delayed benefits, a mechanism relevant for both in-situ adaptation and planned mobility. Prior work shows that higher discounting is associated with lower investment in future-oriented outcomes in other domains (Brownback et al., 2026; Falk et al., 2023; Meier & Sprenger, 2010).

Figure 4, panel E, presents the distribution of self-efficacy beliefs across both studies and highlights differences among key socio-economic groups. Self-efficacy beliefs play a central role in motivating individuals not only to form intentions to adapt but also to take timely action (Valkengoed & Steg, 2019; van Valkengoed et al., 2024). Average self-efficacy scores are around 40 out of 100 on the normalized index, with no significant difference between Study 1 and Study 2 (T-Test diff. = 3.30, t630 = 1.50, $p = 0.13$). Across socio-economic groups (Figure 4, panel F), respondents with higher levels of education ($p < 0.1$) and stronger place attachment ($p < 0.01$) tend to report lower self-efficacy beliefs regarding climate adaptation. If confirmed in future work, the combination of strong place attachment and low self-efficacy may help explain why some households remain in place while feeling unable to implement effective in-situ adaptation.

**Figure 4. Patience, risk aversion and self-efficacy compared to average in Bangladesh**




Notes: Panels A, C, and E show kernel density distributions of risk-taking, patience, and self-efficacy (each normalized to 0–100) for Studies 1 and 2; Panels A and C include the Bangladesh subsample of the GPS as a benchmark. Panels B, D, and F show subgroup mean differences across demographic groups, with 95% (thin bars) and 90% (thick bars) confidence intervals. Higher values indicate greater risk-taking, patience, and self-efficacy respectively. Full outputs: SI Table S9.

### 4.4 Adaptation Space: Differences in behavioral factors across mobility types

Respondents are classified based on the interaction between migration aspirations and financial abilities. While the largest group consists of the acquiescent immobile (47%), who neither aspire to move nor possess the means to do so, a large share of respondents (42%)

possesses the financial ability to relocate. Within this financially capable group only 30% (n=80) aspire to migrate (potentially mobile), while the majority, 70% (n=184), prefer to remain (voluntary immobile). 'Financially able' here captures monetary feasibility only and thus provides a lower-bound proxy for broader migration capability, while 'potentially mobile' should be read as an upper-bound classification of mobility potential rather than a prediction of realized movement, because non-monetary constraints and psychological frictions may still prevent aspirations from translating into action.

To reduce the scope for a purely constraint-driven interpretation, we compare these two financially able groups. The analysis reveals that mobility decisions are correlated with cognitive traits (see SI Figure S4). Potentially mobile respondents exhibit significantly higher risk tolerance ($\beta = 9.67$, $p < 0.05$) and lower self-efficacy for in-situ adaptation ($\beta = -13.52$, $p < 0.01$) than their immobile counterparts. While potentially mobile respondents also report lower patience ($\beta = -8.47$, $p = 0.15$), this difference does not reach statistical significance. Additionally, they report a 14 percentage-point reduction in self-efficacy for in-situ adaptation ($\beta = -13.52$, $p < 0.01$). We interpret these differences as descriptive evidence that, even among respondents for whom relocation is monetarily feasible, aspirations to migrate are associated with a distinct profile: greater willingness to take risks, shorter time horizons, and lower perceived ability to adapt in place. The direction of the patience coefficient is consistent with shorter time horizons, though the imprecise estimate precludes a firm conclusion.

## 5 Discussion & Conclusion

This study adds a behavioral layer to explanations of climate-related (im)mobility. Selective dismissal of credible risk information and sunk-cost-framed reasons for staying are common in the two Bangladesh samples and are systematically associated with mobility- and adaptation-relevant perceptions. The evidence is descriptive and should not be read as proof that these mechanisms cause immobility. Its contribution is more specific: financial constraints and information deficits do not fully capture how people evaluate staying, moving, or adapting under repeated climate risk.

In addition to these cognitive biases, the study finds marked differences in core economic preferences. Individuals in the sample display higher risk tolerance and lower patience relative to national averages, a pattern consistent with research showing that long-term exposure to environmental stress can alter preferences related to time, risk and pro-sociality (Steimanis et al., 2021; Steimanis & Vollan, 2022). The mobility typology provides a descriptive upper bound on mobility potential: 42% are monetarily feasible, and within that group 30% report migration aspirations. Yet the preference and self-efficacy patterns suggest that, even among those for whom relocation appears financially feasible, behavioral frictions may weaken the translation of aspirations into realized movement.

Across the stages in the framework, the results are consistent with behavioral factors and preferences reinforcing immobility. While causal ordering cannot be inferred from cross-sectional data, the staged pattern is compatible with reinforcing feedbacks. Selective disengagement from threatening long-run risk narratives may keep attention on near-term coping, while continued staying and rebuilding can accumulate commitments and perceived losses from past investments, increasing the salience of sunk-cost–framed reasoning. Sustained exposure to hazard-related stressors may also shift time and risk preferences and reduce perceived control, consistent with lower patience and self-efficacy; together, these frictions can weaken the translation of aspirations into implementation even among households that appear financially feasible to relocate. In the data, self-efficacy is low (around 40%) and lower among more place-attached respondents, consistent with its role in planned-behavior and adaptation models, and suggesting a potential "double bind" in which commitment to staying coincides with low perceived feasibility of in-situ adaptation, which may help explain why risk awareness or place-based motivations do not necessarily translate into sustained adaptation investments. This interpretation aligns with broader work on adaptation constraints emphasizing the role of values, perceptions, and institutional barriers in shaping responses to climate risk (Adger et al., 2009; Neef et al., 2018). The contribution is to add a behavioral layer to these constraints: the patterns documented here suggest that selective disengagement from decision-relevant evidence, sunk-cost–framed reasoning, and preference profiles (risk and patience) may act as psychological frictions that interact with (and potentially amplify) structural immobility in high-risk areas (Adams, 2016; Black,

Bennett, et al., 2011; Hauer et al., 2020). Understanding these frictions may help refine how information, support, and relocation options are designed and delivered. For those unable or unwilling to migrate, interventions such as assisted relocation or community-based adaptation strategies may help mitigate the risks of maladaptation (Magnan et al., 2016) and reduce socio-economic marginalization (Haasnoot et al., 2021; Mach & Siders, 2021; Sherbinin et al., 2011).

This study provides new descriptive evidence on behavioral correlates of mobility and adaptation decisions in climate-risk areas. Several limitations are important. The cross-sectional design does not allow causal inference about how biases or preferences shape mobility outcomes. Self-reported reasons for staying may reflect post hoc rationalization or social desirability. Unobserved constraints and prior adaptive experiences may confound observed associations. Finally, because baseline mobility preferences were not elicited immediately before video exposure, the information-avoidance measure captures selective dismissal rather than belief-consistent updating relative to measured priors. Future work could implement a pre/post design that elicits baseline beliefs prior to exposure and tests whether evaluations disproportionately favor the message that aligns with those priors.

Policy implications should be interpreted cautiously given these limitations. The results suggest that policies need to address not only financial constraints but also psychological frictions that can weaken the link between risk information, intentions, and follow-through. Risk communication is likely more effective when it reduces selective disengagement by using trusted messengers, pairing messages with feasible action pathways, and avoiding designs that inadvertently trigger defensive avoidance, similar to how cyclone warnings in Bangladesh are disseminated through trusted local channels linked to cyclone shelters. Complementary approaches that encourage reflection and collective sense-making, such as deliberative or participatory forums, may be particularly valuable where strong place attachment makes threatening information feel like an identity challenge (Burger et al., 2023). Such forums can provide a socially supported space to engage with uncomfortable evidence without framing it as a demand to abandon valued places, while enabling communities to co-produce adaptation pathways that protect what people value about place. This collective process can also strengthen adaptation self-efficacy by translating abstract

risks into concrete staged plans and by lowering procedural barriers through simplified administrative support. The prevalence of investment-framed reasons for staying further implies that relocation support should explicitly acknowledge perceived losses from past home and land investments, for example through compensation structures and transparent, credible implementation (e.g., beneficiary selection and basic service provision in large rehabilitation sites such as the Khurushkul Climate Refugee Rehabilitation Project in Cox's Bazar). Recognizing these behavioral mechanisms as part of the broader constraint set may support more effective and context-sensitive adaptation and mobility policies in the face of accelerating climate risks.

## Declaration of Interest Statement

The authors declare no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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