

Article

# Local Expert Perceptions of Migration as a Climate Change Adaptation in Bangladesh

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**Abstract:** People have long migrated for many reasons, often with a combination of forced and voluntary reasons combining to push them away from current situations and to pull them towards new situations. Bangladesh is one example where environmental changes have long been amongst the multitude of reasons for migrating, with contemporary climate change suggested as a major impetus towards more migration. This paper examines local expert perceptions of migration as a climate change adaptation strategy for Bangladeshis. Seventeen in-depth interviews were conducted with local experts in Bangladesh and Assam (India) on environmental change and migration to understand the perspectives of those with formal education and expert-related jobs who come from the areas being directly affected by Bangladeshi migration. Findings show that local experts consider that migration is used and will be used for climate change adaptation in Bangladesh, but migration is not solely for climate change adaptation, instead interweaving with all other factors influencing migration-related decisions.

**Keywords:** adaptation; Bangladesh; climate change; climate migration; environmental migration; India; migrants

## 1. Introduction

Over the last few decades, the interplay between climate change and human movement has received attention from academia, policy-makers, and researchers [1–8]. Yet population mobility across various space and time scales due to changes in the climate—including variability and trends—has been a regular historical phenomenon. Nonetheless, if climate change does turn out to be a major contemporary push factor for migration, then the scale might outstrip all historical examples and contexts because of high population numbers and densities in highly affected locations. An example could be sea-level rise inundating low-lying coastal zones including urban areas. In addition to such direct effects, climate change could affect migration indirectly, perhaps through affecting economic

drivers of migration (e.g., crops, livestock, and fisheries) and political drivers of migration (e.g., conflict, conflict reduction, and choices on where to provide services, such as health and education). These influences on migration are for both choosing to migrate and choosing not to migrate [1–8].

Due to all these interplays and complexities, one single factor is rarely a sufficient reason for migrating, irrespective of how much the migration is from choice, i.e., voluntary, or lack of choice, i.e., forced [8–13]. Instead, forces affecting migration decisions and lack of opportunities to decide tend to be multifaceted. Climate change seems likely to add to already increasing levels and complexities of population mobility [6,8,14–16], although it is challenging to disaggregate the specific scale and scope of climate change related impacts [3,5,7,13,17,18].

In order to understand the scope and impact of climate change on mobility choices, and lack thereof, empirical studies examining motivations for migration have been increasing, aiming to disaggregate the push and pull factors and to provide empirical evidence from migrants regarding their perceptions of their situations. Examples are focusing on migration within and from drought-affected areas [19–21]; migration-related interests in the context of projected sea-level rise from small island communities [22–24]; and migration responses to floods and storms [14,25,26].

This paper adds to the empirical evidence by asking for Bangladesh: How do local experts perceive (i) the role of environmental factors in migration-related decision-making; and (ii) migration as a climate change adaptation strategy?

In-depth interviews were conducted face-to-face (although one was conducted via Skype (Microsoft Corporation, Luxembourg) from 2008 to 2009 with local experts on topics related to the environment, climate change, development, and migration. The reason that local experts were selected was to understand the perspectives of those with formal education and expert-related jobs on this topic, while also coming from the areas being directly affected by the potential interplay between climate change and migration. This approach contrasts with most other studies which interview either locals in the areas affected, mainly subsistence farmers and fishers, but also including other livelihoods such as tourism, or external experts who analyze for themselves the locations affected. Studies rarely consider the views of local experts, providing a unique interview cohort here.

The next section discusses environmental change and migration in Bangladesh, setting the scene for the methodology section. Then, the results and discussion are combined, providing quotations and interpretations from the interviews in the context of previous literature. Conclusions indicate further research directions.

## 2. Environmental Change and Migration in Bangladesh

Bangladesh is frequently labeled as being amongst the most vulnerable countries to climate change [27–31]. One consequence could be that about 20 per cent of the entire country eventually becomes submerged due to sea-level rise and subsequent erosion, with the loss of coastal land projected to reach up to 3% by the 2030s, 6% by the 2050s, and 13% by 2080 [32]. Given that Bangladesh is one of the most densely populated countries in the world, if these projections manifest in reality, then it is highly likely that significant numbers of Bangladeshis will move from their current homes.

About 6000 km<sup>2</sup> of the Ganges-Brahmaputra delta, which comprises most of Bangladesh and is the largest delta in the world, lies less than two meters above sea level [33]. By 2050, sea-level rise of over 0.25 m and wind speed intensification of about 10 per cent [34] are likely to occur, resulting in the loss of much land suitable for living and agriculture along with salt water intrusion into surface water and groundwater [35]. Additionally, worse floods induced by more intense precipitation in the monsoon period [36] are expected through increases in the peak discharges of the Brahmaputra and Ganges Rivers [37].

Despite rising sea levels and coastal erosion [28,38], not all climate-related hazards in Bangladesh originate in the sea [39,40]. River flooding is a major natural hazard, adversely affecting the lives of millions of people in Bangladesh each year, and expected to be exacerbated by climate change over the coming decades—but river flooding is also needed and desired for many livelihoods in

Bangladesh [40–42]. Climate change related alterations in the snow and snowmelt regime in the Hindu Kush Himalayan Region feeding major South Asia river basins—such as the Ganges, Indus, and Brahmaputra [43]—have the potential for making the situation worse.

Another growing phenomenon is river bank erosion [44], annually affecting about 140 km<sup>2</sup> of land [45] and rendering landless thousands of people, who are mainly holders of smaller properties [39]. Eroded material is then transported by the river and deposited downstream, leading to blockages and flooding. The loss of arable land and the destruction of houses along the watercourse contribute to the economic harm and livelihood losses which Bangladeshis experience.

To deal with such challenges, Bangladesh's *Climate Change Strategy and Action Plan* [46] devised six pillars of climate change adaptation measures, such as ensuring food security, social protection, and health. Aspects of the approaches meld climate change adaptation and disaster risk reduction, especially given how challenging it is to separate these processes [47]. For example, cyclone shelters continue to be built, providing a relatively safe haven for around 1.5 million people [46]. Research and knowledge management are also supported [46], to ensure updated information on climate change and especially to project better the temporal and spatial framework of climate change impacts.

Bangladesh has a *National Plan for Disaster Management* drawn up for 2010–2015 [48]. The plan [48] includes measures such as cyclone and flood warning systems; construction of private houses with raised ground floors; drainage schemes to protect urban areas from river flooding; and coastal embankments and polders (diked areas) to keep salt water away from agricultural plots. In 2010, Bangladesh had 123 polders, an early warning and evacuation system, and more than 2400 emergency shelters, usually for residents living within a 1.5 km radius of a facility [49]. Under climate change, it is estimated that 59 of the 123 polders would be overtopped during a storm surge and another 5500 cyclone shelters, each with a capacity of 1600 people, would be needed [34,50]. Bangladeshis are researching irrigation schemes and saline-, drought-, and flood-adapted varieties of crops.

Within all these challenges and solutions, migration has long been a typical and important response strategy, including for families from coastal fishing communities who lose their properties and livelihoods [51] and for male household members seeking livelihoods in cities after the end of emergency aid following Cyclone Aila in 2009 [52]. Migration is not a new strategy. Twenty years ago, river erosion rendered 1.2 million people homeless from 50 out of 64 districts in Bangladesh [36,53]. A sizeable number of these displacees moved to the cities and ended up squatting [54,55].

It, thus, seems reasonable that migration would be considered and implemented for continuing environmental changes under climate change, effectively becoming a climate change adaptation strategy [1]. The concept of archetypal barriers to climate change adaptation in countries such as Bangladesh and India demonstrates that poverty traps are the most important and relevant barriers to adaptation, although others include interests and priorities other than adaptation [56]. Furthermore, Bangladesh is an example of how rural-to-urban migration has become a common adaptation strategy as climate change impacts start to be felt [1].

Despite these studies, for Bangladesh and elsewhere, people moving for environmental reasons do not have a well-defined category in research, policy, or law, so scholars have long used their own work to attempt to provide contextual definitions [7,13,14,57,58]. One of the earlier works [4] defines “environmental refugees” as people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people), jeopardizing their existence and/or affecting their quality of life. Another approach [59] defines “environmental refugees” as people who can no longer gain a secure livelihood in their homelands because of drought, soil erosion, desertification, or other environmental problems. Critics [7,8,18,29,60] point out that the lack of consensus about environmental influences on migration is partly due to the scarcity of reliable data while scientists have largely failed to embark on a common methodological grounding for estimating the scope of environmentally-induced migration at both global and national levels.

Most typologies and definitions of environmental migrants, climate migrants, environmental refugees, climate refugees, climate change refugees, and similar phrases generally do not take into account the variation in environmental motives for migrating or different time and space characteristics. In one attempt, amongst many, at reconciling various definitions and discussions [61], three forms of environmentally-induced migrants are categorized—environmental migrants, environmental displacees, and development displacees—which are described and interpreted for Bangladesh in Table 1.

**Table 1.** One typology of environmental migrants (modified from [61]).

Category →	Environmental Migrants	Environmental Displacees		Development Displacees
		Slow-onset environmental displacees.	Rapid-onset environmental displacees.	
Characterisation	People who move relatively voluntarily, primarily due to serious environmental concerns.	People who move relatively involuntarily, primarily due to environmental processes leading to adverse consequences.		Intentionally relocated or resettled people due to planned land use changes or development.
Types of environmental change	Pollution, natural hazards, and land use changes.	Resource deficiencies, such as freshwater or land, and slow-onset hazards or environmental changes, such as drought and precipitation trends.	Rapid-onset hazards, such as hurricanes, floods, earthquakes, chemical releases, or sudden pollution.	River dams, irrigation canals, transport infrastructure, factories, and urbanization.
Strategy	Pro-active strategy, mainly the migrants' decisions to move.	People have a relatively longer time for displacement, so may seek options for places to live and to pursue livelihoods.	People move from the place of origin almost immediately before or after a hazard manifests.	Forced resettlement, usually at the pace of the project's implementer.
Causes of migration	A complex of set of environmental, social, demographic, economic, and political "push" and "pull" factors—and their overlaps.	Long-term experience with environmental changes effectively precluding livelihoods.	Few opportunities to continue immediately with life and livelihoods in the hazard-affected location.	Planned change of land use or realization of a development project.
Example in Bangladesh's context	Drops in crop production due to river bank erosion or sea-level rise, so an expectation of better environmental conditions for livelihoods elsewhere.	Impacts of India's Farakka Barrage on the River Ganges, sea-level rise, and drought.	Cyclones, flash floods, and sudden river-bank erosion.	Kaptai dam construction.

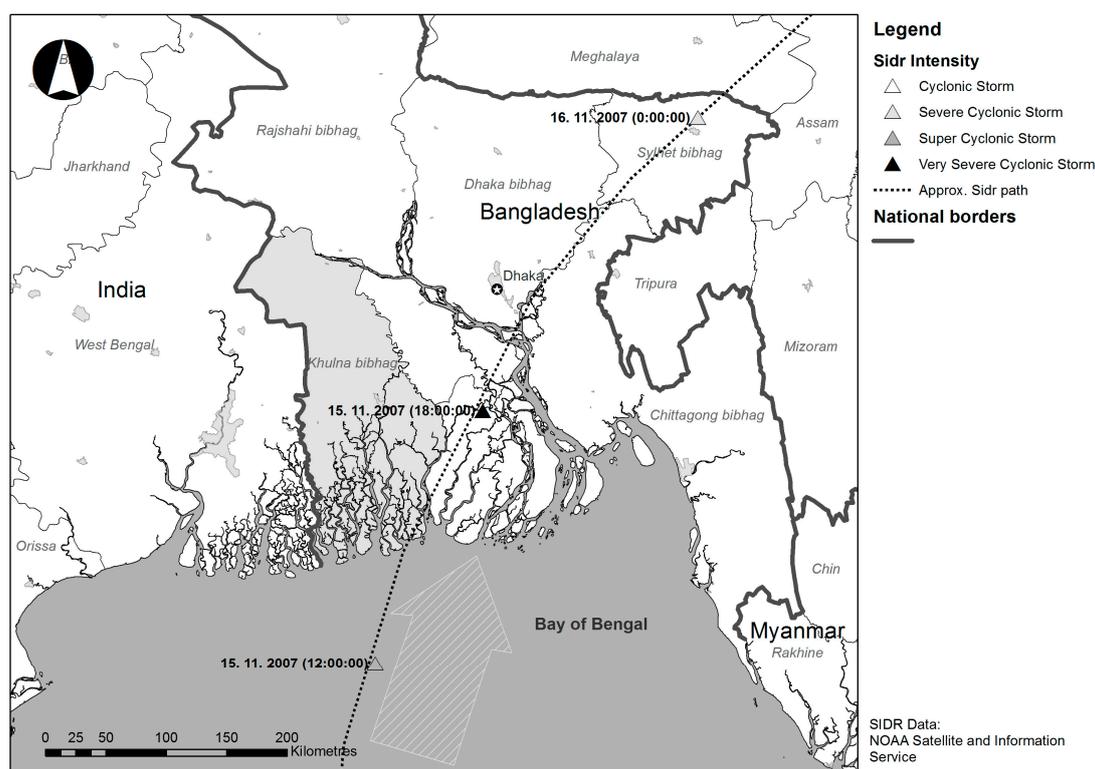
### 3. Methodology

The field data for this paper comes from 17 in-depth, semi-structured interviews in English with local experts on migration, environment, and development in Bangladesh and Assam (India). Table 2 provides the question guide used. The geographic focus was on Southwest Bangladesh (Figure 1).

The respondents came from academia (universities), the private sector (consultants, including to international bodies), public (national) service, and the non-profit sector. Positions included top managers (directors), public officers, university teachers and researchers, independent consultants, and program officers (Table 3). The first few respondents were invited to be interviewed based on their publications, websites, and recommendations from experts outside the region. Then, snowball sampling was used to invite further respondents after checking their publications and professional background. The criteria for selecting respondents were expertise and experience in the topic, their position in their organizations or institutions, and seeking a balance of nationality, location, occupation, and expertise. While a gender balance was sought and would have been preferred, males dominated the experts recommended and found, so they dominated the respondents.

**Table 2.** Interview question guide.

<p><b>1. What are the major reasons for migrating (internal and external) in Bangladesh over the past two-to-three decades?</b></p> <ul style="list-style-type: none"> <li>- Why have people been migrating for the last two-to-three decades? What are the main causes of migration?</li> <li>- What are the main destinations for permanent migration abroad?</li> <li>- Is there any role played by environmental factors, including climate change, in the decision-making process?</li> </ul>
<p><b>2. What are the source and destination regions?</b></p> <ul style="list-style-type: none"> <li>- Where are migrants coming from (in the context migration from Bangladesh to India)?</li> <li>- Where are migrants going to (in the context migration from Bangladesh to India)?</li> </ul>
<p><b>3. Who are migrating?</b></p> <ul style="list-style-type: none"> <li>- What are the typical occupations, genders, and household economic and social conditions, etc.?</li> <li>- Why do some people remain in areas affected by environmental change, including natural hazards, while others migrate?</li> </ul>
<p><b>4. How has climate change affected, and how could it affect, localities in southwest Bangladesh (especially Khulna District) and a main migrant target area of Indian Assam (the broader surroundings of Guwahati)?</b></p> <ul style="list-style-type: none"> <li>- How do you perceive recent climate change impacts in Bangladesh (mainly southwest Bangladesh)?</li> <li>- Which environmental problems or changes do you perceive as being the most serious?</li> <li>- What are the future trends of environmental and climate change in the region?</li> <li>- What are the main impacts of environmental and climate change on the local population, livelihoods, economy, and agriculture, etc.?</li> <li>- Do adaptation strategies exist on national, regional, and local levels?</li> <li>- Have any adaptation measures been realized recently?</li> <li>- Do you know about projects dealing with adaptation strategies?</li> </ul>
<p><b>5. What are possible projections of future migration flows and the role of environmental factors including climate change—emphasizing migration policy, migration as adaptation, and forced migration?</b></p> <ul style="list-style-type: none"> <li>- What are expected future climate change impacts in Bangladesh?</li> <li>- How is it possible to adapt to climate change impacts?</li> <li>- Is migration an appropriate future strategy for adaptation?</li> </ul>



**Figure 1.** Map of Bangladesh highlighting the area of focus for this study and showing Cyclone Sidr's track from 11 to 16 November 2007.

Due to the sensitivity of the topics, especially for the region, all respondents were guaranteed and desired full confidentiality and anonymity, which included neither asking for, nor estimating, their age or age range, so these data are not reported. The sensitivity also means that respondents'

answers could have been influenced by the questions' focus, such as not necessarily expanding beyond the strict wording of the question; giving answers which the respondent thinks are expected by the interviewer or thinks are popular views (i.e., social desirability bias); or using the situation to explain the respondent's preferred views or expectations rather than necessarily summarizing their research. Since this study discusses respondents' perceptions and comments, it is important what is said, irrespective of corroboration or disagreements amongst respondents.

**Table 3.** List of respondents.

Respondent	Nationality	Interview Location	Interview Length (in Minutes)	Gender	Occupation	Expertise
A	Bangladesh	Dhaka, Bangladesh	41	M	Private consultant	Environment
B	Bangladesh	Cairo, Egypt	30 (Skype)	M	University researcher	Migration
C	Bangladesh	Dhaka, Bangladesh	20	M	University department director	Migration
D	Bangladesh	Dhaka, Bangladesh	37	F	University Lecturer	Anthropology
E	Bangladesh	Dhaka, Bangladesh	45	F	Government research officer	Development
F	Bangladesh	Dhaka, Bangladesh	40	M	Research officer at a non-profit organization	Climate change
G	Bangladesh	Dhaka, Bangladesh	20	M	Director of a non-profit organization	Environment
H	India	Guwahati, India	25	F	University professor	Environmental geography
I	Bangladesh	Dhaka, Bangladesh	25	M	Research officer at a non-profit organization	Social sciences
J	Bangladesh	Khulna, Bangladesh	30	M	Programme officer at a non-profit organization	Environmental hazards
K	Bangladesh	Khulna, Bangladesh	25	M	Director of a non-profit organization	Development assistance
L	India	Guwahati, India	12	M	University Reader	Migration
M	India	Guwahati, India	67	M	University Lecturer	GIS and land use
N	India	Guwahati, India	29	F	PhD candidate	Migration
O	India	Guwahati, India	45	M	University Professor	Geography
P	India	Kathmandu, Nepal	15	M	University Lecturer	Migration
Q	India	Kathmandu, Nepal	27	M	PhD Candidate	Development

Each interview was recorded with the respondent's consent, transcribed, and coded to draw out specific themes related to environmental change and migration. In reporting the results here, the general views of the interviews are summarized, supplemented by selected and illustrative quotations representing the respondents' attitudes while providing insights through their direct words. In quoting the respondents, minimal correction has been applied to their English, so grammatical errors appear with the aim being to preserve the full essence of the respondent's view as much as feasible.

In India, interviews were conducted in only Assam. Bangladeshi immigrants are concentrated in Assam, particularly in the capital Guwahati. The respondents in India agreed with this assessment and did not recommend travelling outside of Assam. The researchers nonetheless investigated possibilities

for travelling to other locations, but the security situation did not permit it. Special permission would have been required, but even that would not guarantee access or safety, due to significant numbers of military checkpoints and the reported danger of violence. Overall, the respondents here represent a balance between a variety of perspectives and a focused cohort who can build up a picture of local expert perceptions of migration as climate change adaptation in Bangladesh, contributing to the literature's empirical evidence via a group usually not involved in interviews regarding this topic.

#### 4. Results and Discussion

##### 4.1. Local Expert Views on Migration, Environmental Change, and Livelihoods

The respondents revealed perceptions of a combination of a set of factors influencing migration, but focused on livelihoods and economic opportunities. As summarized by Respondent L, "There are many reasons why people migrate from one place to another place . . . it is mainly for seek better opportunities". Respondent N echoed this overview, stating that the most important reason for Bangladeshis migrating is economic: "better livelihood conditions, access to land". Meanwhile, from Respondent B: "There are many reasons why people migrate from one place to another place and like in any other places in the world, it is mainly for seeking better opportunities".

The classical but critiqued notion of push-pull factors for migration was mentioned, with a changing environment being identified as one push factor. Regarding a changing environment, the respondents generally felt that people would move due to river bank and river island erosion; river and coastal floods; tropical cyclones bringing storm surge, rain, and erosion; drought and rainfall variability in the rainy season; and scarcity of resources such as land and safe drinking water. The connection to climate change appeared to be both a given point which was not up for discussion and also rather tenuous in terms of connecting migration directly to climate change.

The respondents were certainly aware of the scientific literature on climate change and Bangladesh, cited above, so they accepted the projected environmental changes; those changes' expected impacts on livelihoods; and the likely desire of Bangladeshis to migrate in search of better livelihoods—ostensibly an environmental push factor. The respondents also accepted that the expected environmental changes under climate change are typical environmental changes experienced in Bangladesh and they have long influenced livelihoods there, irrespective of climate change. For instance, Respondent A described:

"So this land is always changing, along the rivers . . . new islands coming up and some islands are disappearing, so people also move from island to island . . . And when some people lose their land, they become migrants . . . so that is one of the major causes of people migrating to cities, because they lose their job, they lose their livelihood and the easiest way is to come to Dhaka or any other nearby large towns".

Similarly, Respondent I noted:

"If there is a cyclonic storm, this is a very low lying area, maybe few inches above the sea level, so if there is a cyclonic storm, it pushes and then you have few feet of sea water coming and then it may destroy the villages here, so again you see people sometimes have to move out, to nearby cities, maybe even to Dhaka".

Migration to cities, including Dhaka, following a storm is seen as being typical without invoking climate change.

Respondent D corroborated this viewpoint, stating "One major reason for [migration] in Bangladesh is the flood and disaster because of river erosion . . . that is another problem, so river erosion now affects more severely, than it affected earlier" indicating that erosion has always led to migration, yet it appears to be worsening. Support comes from Respondent C:

"Bangladesh is unique in that sense that many parts of the country have got river bank erosion. The land, rivers, the mighty rivers from the Himalayas, they devour the banks and

as a result. Many people lose out and they lose their land. As a result there is hardly any opportunity for these people, scope for these people, land is gone. They are forced some of them, many stay behind. But some members, household members move on to find work in the city”.

The links from environmental changes to livelihood loss to migration is made clearly—along with a note that not everyone migrates, but only certain household members, whilst the others stay behind. This view counters the narrative of mass migration of swathes of people, instead supporting a typical migration pattern, seen in Bangladesh and elsewhere, in which one member or some members of a household who can work choose to migrate to urban areas, sometimes to send money back and sometimes to set up for the rest of the family to follow later [6,62–65].

Respondent K referred to entire families moving after Cyclone Sidr in 2007 (Figure 1): “the people lost everything, houses, animals, crops . . . Some people move to cities, to Khulna, to Dhaka”. The respondent further suggested that 5%–10% of people moved to nearby districts while others (not quantified) go to Dhaka. Respondent O’s words matched these views: “When some people lose their land, they become migrants” and then again highlighted the move from rural to urban areas: “If they lose their own agricultural land, they either move to the city or move to neighboring areas . . . and the easiest way is to come to Dhaka or any other nearby large towns”.

The explanations for migration, though, are not always simplistic or one-layered, matching the previous discussion [5–7,9,13,64]. Respondent E describes how the migrants they study in Dhaka are mainly farmers and agricultural laborers but “people do not say that they have directly come because of the river erosion or they have come because of flood. They say we have to conquer better employment opportunity or in search for livelihood and etc. Upon further probing then I found what the immediate cause was . . . the erosion or flood. They lost everything”. It is not known whether or not leading questions might have been used by Respondent E when interviewing or if the respondents downplayed the erosion or flood because it seemed less relevant than employment and livelihoods which are the baseline reason for moving. Respondent M provides support for this suggestion:

“Normally if we looked to the natural disasters like the river bank erosion, cyclone in the coastal area, due to the drought there is job unavailability in the rural area, people move to the urban area, finally to get job opportunity, seek the job in the urban area . . . this is a usual trend, like, there is a cyclone in the coastal area people immediately move to the nearest urban town to seek the job, and then to the next larger town. That is where they move from one place. But this is a temporary and this is a seasonal trend of migration”.

The emphasis is on jobs and employment as the reason for migrating, even when the trigger might be a storm or a drought. The migrants appear to accept the necessity of moving for livelihoods and are often pushed by a natural hazard. As Respondent D said, “Flood is a very common phenomenon in Bangladesh, sometimes it becomes severe, sometimes it is a regular one” but people move in the aftermath of any flooding.

This viewpoint from the respondents melds the environmental push factors and the economic pull factors for migration, seeing them as joint and regular factors inducing migration. Some nuances were suggested beyond this straightforward statement. Respondent B described an “obvious disparity in education, health, job, and other opportunities between urban and rural areas”. Respondent Q suggested that Bangladeshis comprise the majority of the population in several Assam districts and that the immigration is encouraged by India since the Indian government gains politically from the immigrants supporting the Congress party. This statement is surprising considering that not all Indian governments have been Congress, nationally or for Assam (even with the latter often being dominated by Congress), and it seems unlikely that many immigrants would vote (legally).

Another nuance was the respondents tending to divide Bangladesh into two parts. Their views suggested that pull-related economic factors dominated migration decisions in northern regions of Bangladesh, with a main exception being examples of river bank and river island erosion. Meanwhile,

push-related environmental factors play a more prominent role in migration decisions in the southern, coastal areas. Respondent B summarized for several others in describing how “Regional factors play the most important role . . . South Bangladesh is prone area for river erosion. People do not have shelter, land, jobs, money” and then emphasizing that “River erosion is basically main reason for migration from the areas”.

Yet all environmental changes mentioned are typical for Bangladesh, both in the north and in the south. Respondent H called the people “river nomads” indicating that it was not clear how or why climate change would alter their migration tendencies, especially to Assam where Respondent H is based and where both rural and urban migrants end up seeking employment. Respondent P agrees, explaining that “Migrants cultivate temporary islands” and complaining that “River erosion and following migration cause ‘slumification’ in cities in western parts of Assam”, a charge which also incensed Respondent Q who went further, claiming that the Bangladeshi immigrants “caused deforestation and land degradation” in Assam.

Having established baselines for reasons why Bangladeshis migrate, the respondents were then more willing to consider climate change’s impact on their observations. They tended to focus on climate change impacting environmental hazards rather than on climate change being a direct causal link to migration. Respondent F provided a reasonable scientific summary, referring to three predominant points emerging due to climate change:

“One is the frequency of the event, whatever that frequency will increase in future. The second is the intensity of an event, the hard damage of the extreme event . . . Like usually the floods happen in July-August, reach September . . . the timing is going to be shifted. Third dimension is important in terms of its link with the production system. The flood decision timing is huge implications on an agricultural productivity”.

Other respondents explained their expectations under climate change with Respondent G highlighting “The sea level may rise. The rising temperature and this is a very low-lying area as I told you, just few feet above the sea level”. Cyclones were a popular topic. Respondent D asserted that severe cyclones tend to hit Bangladesh every 3–4 years but “The space gap between the cyclone and now is gradual decreasing, since due to the global warming”. That statement is not supported by the scientific literature suggesting expectations that tropical cyclones in the Bay of Bengal are most likely to decrease in frequency but increase in intensity [66–68]. Respondent J was closer to this literature, indicating that Bangladesh had experienced “stronger” cyclones, especially over the last decade.

Linking climate change to migration was indicated by several respondents, but not always strongly. Respondent H epitomizes: “About future trends, the impact of climate change and rise of sea level in Bangladesh . . . I expect increasing of migration flows; this is alternative strategy for survival”. The respondents were being careful and appropriately scientific, discussing expectations and suggestions for the future under climate change rather than giving definitive statements. They also indicated that migration in response to climate change was an “alternative strategy”. Other options are adjusting in situ, rather than assuming inevitable migration as adaptation.

The respondents’ perceptions—integrating economic reasons and environmental reasons including climate change—are layered on their experiences and understandings of Bangladesh as being amongst the poorest countries in the world with low development indices by multiple metrics [69–72]. While changes to weather patterns have strong prospects for being dealt with through disaster risk reduction activities, for Bangladesh one of the main projected consequences of climate change is coastal areas being affected by sea-level rise and, therefore, reducing the country’s land area. Sea-level rise, though, happens gradually and, despite some effects potentially being visible today, it is expected to cause most of its major problems in the coming decades. Additionally, for the local people, it might manifest as a specific cyclone with record high storm surge [50] or as a continual degradation of land quality through salinization until crops fail completely in one season. Then, migration might occur

comparatively suddenly and in large numbers, potentially being attributed to climate change when, in fact, it has been part of a long-term process, simply exposed by specific climate change impacts [64].

To concatenate the respondents' views with regards to environment-livelihoods interaction, Table 4 provides a matrix describing the respondents' perceptions of the sensitivity of livelihoods to environmental change, including sea-level rise under climate change. As shown in Table 4, the respondents highlighted that a significant part of the population depends on its own agricultural production, which is often affected by environmental hazards as well as having strong potential for climate change impacts.

**Table 4.** Climate change affecting Bangladeshi livelihoods based on the respondents' perceptions.

Climate Change Manifestation	Impact of Climate Change	Affected Ecosystem Services	Affected Livelihood Activities
Water erosion/riverbed sedimentation	Greater intensity.	Land availability.	Housing and farming.
Sea-level rise	Acceleration.	Freshwater availability and damage to mangroves.	Housing and farming.
Floods	Greater intensity and frequency.	Water supply and quality plus land availability.	Housing, rice, vegetables, fruit, livestock, and crops.
Tropical storms/cyclones/tornadoes	Greater intensity.	Water supply and quality plus land availability.	Housing, rice, vegetables, fruit, livestock, and crops.
Drought/water deficiency	Greater intensity.	Water supply, grazing, and soil quality.	Rice, vegetables, fruit, livestock, and crops.

#### 4.2. Migration as Climate Change Adaptation?

The juxtaposition of multiple layers of migration and climate change connections and lack of connections emerges from the results and discussion. In line with much of the international literature, the respondents viewed climate change as happening and as significantly affecting Bangladesh now and in the future [12,28,31,32], but as only one factor amongst many influencing Bangladeshi migration [5,8–10]. Migration as adaptation occurs, and will continue, in Bangladesh, according to the respondents, but it might or might not play a major role. At the moment, it is not a dominating factor in livelihood and migration decisions for Bangladeshis.

In terms of environmental migration more generally, all forms of migrants from Table 1 are seen, but the categories are not always so clearly delineated. Overlaps occur, especially with Respondents E and M describing how an immediate reason for choosing or being forced to move now sometimes masks long-term trends or desires which underlie the impetus to migrate and which might have made migration inevitable at some point. A rapid-onset environmental hazard might trigger or catalyze migration which was more or less inevitable. This point applies to both environmental and non-environmental reasons for migrating, blurring the distinction between the two categories and expanding beyond Table 1.

For example, Respondent K highlighted Cyclone Sidr as a reason for migrating which would classify the people as rapid-onset environmental displacees, but since cyclones are a regular occurrence in Bangladesh, why were they not able to deal with the storm? The answer is the poverty, lack of resources, and lack of options which most Bangladeshis face under any circumstances [69–72], in effect creating disaster vulnerability which is exposed by the cyclone catalyzing forced migration. The respondents implied this vulnerability discourse and referred to specific elements within it, but did not frame it in this vocabulary or connect it to publications and theories from disaster research. There is no especial reason why they should have: Bangladesh's history, from long before independence, involves interconnecting migration, poverty, livelihoods, and calamity from environmental hazards and from conflict, amongst other factors. Migration, even when principally

forced rather than voluntary, in the respondents' views, is used to cope with and adapt to a wide variety of circumstances including but not limited to climatic influences, a viewpoint corroborated by the literature on Bangladesh [27,39,41,63–65]. The literature beyond Bangladesh also aligns with this view [1–3,5,8,25,26] including for locations such as small islands [9,22–24] and the Sahel [19–21].

Migration as adaptation occurs, but there is no exceptionalism today or for climate change. It is a typical strategy which is part of Bangladeshi migration and of migration elsewhere, typically occurring within wider migration and livelihoods contexts.

#### *4.3. Wider Contexts of Knowledge and Expertise*

This study has shown that local experts perceive that climatic conditions including climate change impact migration-related decision-making processes within the wider “push” factor of environmental change, but this push factor inevitably works in tandem with economic and livelihood “pull” factors. The experts' expectations are that climate change will have significant and detrimental impacts on livelihood activities and quality of life in Bangladesh, so many Bangladeshis will consider moving in order to try to offset those changes and to make a better life. That is, the experts consider that migration is used and will be used as adaptation to climate change in Bangladesh, but migration is not solely for climate change adaptation, instead interweaving with all other factors influencing migration-related decisions. The experts point out that the situation across Bangladesh is not homogenous, but has nuances related to urban-rural and north-south differences.

Studies on climate change and mobility rarely invite and analyze perspectives from local experts as an interview cohort, so this paper provides a comparatively original addition to the literature. No claim is made that the local expert views are especially right or especially wrong. The knowledge of those without formal scientific training is needed and is highly respected for climate change, especially when combined with and accepted as being equal to other knowledge forms including external, formalized knowledge [73]. The key is to neither venerate nor disparage any form of expertise, internal or external, but to accept that knowledge is biased and that any individual has expertise and lack of expertise in numerous areas [74]. All knowledge forms have advantages and disadvantages. Even major governmental reports combining knowledge and purporting to bring together the world's experts on a topic [6,28] undergo deconstruction and critiques by other experts who voice opinions and directions which the reports' own experts might not have recognized, acknowledged, or accepted [5,75,76]. The weighting which ought to be given to different experts (formally trained or not) for environment-related decision-making is, in effect, a political decision imbued with values [77]. Expertise by itself neither inevitably nor indisputably confers credibility of, usability of, or desire to use, the knowledge and opinions.

Another element of knowledge that emerges from interviews, including with experts, is social desirability bias: respondents might provide answers which they expect the interviewers are seeking or which are popular (or populist) rather than expressing the respondents' true opinions [78,79]. Experts are not immune to this form of bias, especially given that the experts interviewed for this study are highly educated, follow media and academic discussions on the topic, and are aware of majority views, especially amongst prominent scientists. Any interview involves a power relationship and it is feasible that an expert being interviewed by another expert might shape their answers according to assumptions regarding the interviewer's opinion and expertise.

An example of an important dimension which was not mentioned by the experts interviewed in this study, but which should be explored further, is the level of choice which the migrants truly have when they make decisions to migrate or not to migrate. Imposing the push-pull paradigm has the tendency to imply that potential migrants are indeed either pushed, pulled, or simultaneously pushed and pulled, rather than having some form of self-determination and active choice. This statement does not deny that push and pull factors significantly influence migration decisions, so migrants are forced to some degree. Instead, it suggests that further exploration of this topic could investigate how much choice migrants do and do not have or feel that they do and do not have.

Ultimately, a collection of factors drives migration and non-migration decisions, amongst which are projected and actual climate change impacts as well as responses to expected climate change impacts. In Bangladesh, migration-related decisions—such as to use or not to use migration as climate change adaptation—take place against a background of chronic vulnerability to multiple conditions (termed “multiple exposure”); in particular, high levels of poverty, high population density, and deeper development conditions of governance, power, and inequality. Yet Bangladeshis have some level of ability to deal with some of the vulnerability, giving them some degree of choice and control over their own lives. Consequently, irrespective of climate change, migration will continue to play a major role in the life and livelihoods of Bangladeshis aiming to adapt to a swathe of conditions.

## 5. Conclusions

This paper asks: For Bangladesh, how do local experts perceive (i) the role of environmental factors in migration-related decision-making; and (ii) migration as a climate change adaptation strategy? Overall, the experts’ perceptions match the nuances and subtleties present in migration and livelihoods literature which are not always prominent in studies adopting a climate change perspective. The local experts saw environmental factors playing different roles in different circumstances for migration-related decision-making, meaning that, at times, migration is used as a climate change adaptation strategy, but not exclusively so. These local perceptions exemplify an historical, cultural, and political depth which is sometimes lacking from international approaches that permit contemporary climate change perspectives to dominate.

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