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Cyclone-Induced Migration in Southwest Coastal Bangladesh

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Summary
This research investigates the relationship between disasters, migration, and resulting social change in southwest coastal Bangladesh. The focus is on individual households' adaptation strategies in the aftermath of cyclones. Migration is understood here in the context of Cyclone Sidr (2007) and Cyclone Aila (2009), and is defined as the temporary or even permanent migration of at least one family member in search of better economic opportunities. The corresponding social change for the affected households, their home locations, and their new locations is described as an outcome of their migration. The research results are based on field surveys that were conducted in 2009 and 2010 with 1,555 respondents from 45 villages in southwest coastal Bangladesh, as well as on additional qualitative interviews. The findings show that after the phasing out of emergency aid, male members of a significant number of households started moving to neighboring cities. These migration patterns were then related to the distribution of income and assets at the community level.

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Introduction[1]

Environmental disasters have across the globe and throughout history influenced population movement in different ways, depending on the affected countries and communities. According to the Intergovernmental Panel on Climate Change (IPCC 2012), there is a lack of clear evidence for a systematic trend of migration patterns — in the sense of actively pursued migration — in the aftermath of episodes of extreme climate events. To date, only the impact of extreme hydrometeorological events on immediate population displacement has been confirmed. For example,

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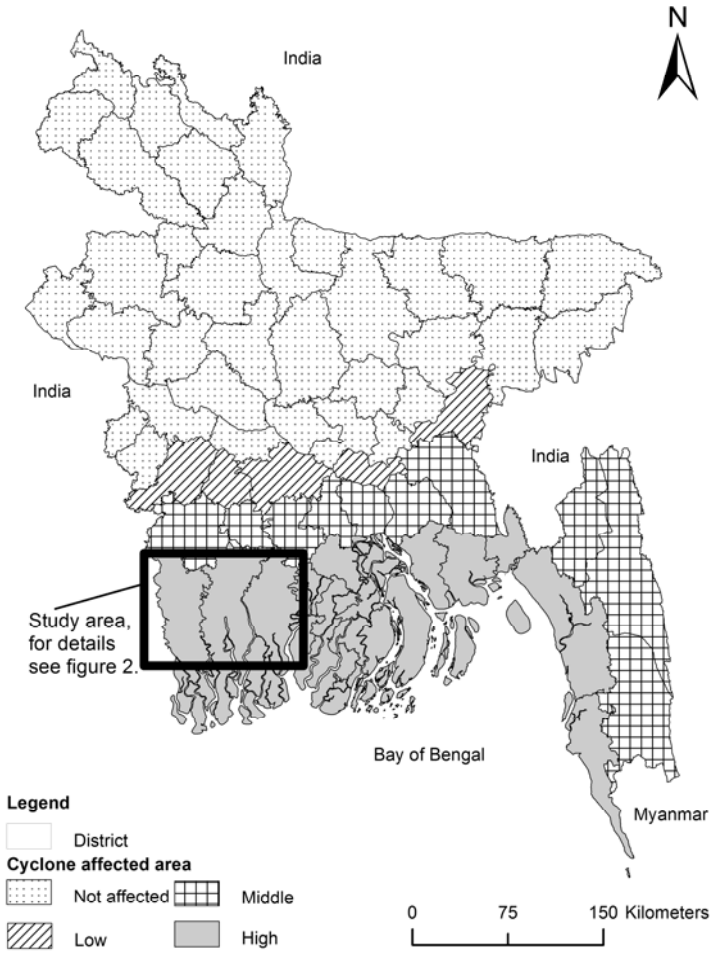
floods in Mozambique led to the displacement of 200,000 people in 2001, 163,000 people in 2007, and 102,000 people in 2008 (International Organization for Migration, IOM 2009: 309). Hurricane Katrina — for which social vulnerability, race, and class played an important role in both outward and return migration (Stringfield 2009) — resulted in the displacement of over one million people. More actively pursued migration movements — as compared to immediate displacement — have, however, been observed in recent extreme climate events. In the Mekong River Delta region, for example, changing flood patterns appear to have influenced migratory movements (IOM 2009). It has also been predicted that over 35 million people will have to leave the coastal areas of Bangladesh due to an anticipated 45 centimeter sea level rise by 2050 (Hasan et al. 2013). Furthermore, large parts of Bangladesh's coastal areas are affected by cyclones (see Figure 1), leading to both immediate displacement and ongoing migration. All these facts indicate that there is a close relationship between extreme climate events, immediate displacement, and more long-term migration patterns.

According to the IOM (2009: 3), many people have migrated from the coastal zones of Bangladesh to urban low-income areas due to frequent cyclones, storm surges, river erosion, and other environmental occurrences. For instance, the process of disaster-induced rural–urban migration had been dramatic in 1970, when a strong cyclone hit the coastal regions of the country with a subsequent death toll of 300,000. Since then, Bangladesh has experienced significant growth in its economy, a decreasing population growth (from 2.9 percent per year in 1974 to 1.58 percent per year in 2012), a declining percentage of headcount poverty ratio (from 59 percent in 1974 to 31.5 percent in 2010), and an improved Human Development Index (from 0.347 in 1975 to 0.515 in 2013) (Bangladesh Bureau of Statistics, Government of People's Republic Bangladesh 1975, 2013; Ministry of Environment and Forest 2012; United Nations Development Programme 2013). Despite notable developments in different sectors, more than 50 million people in Bangladesh still live in poverty — and many of them are located in remote and ecologically vulnerable environments such as coastal areas, flood plains, or river islands, where cyclones pose a major threat. In 2007, 2008, and 2009, three severe cyclones — Sidr, Nargis, and Aila — hit the southern coastal region of Bangladesh. A large number of people were immediately displaced as a result of these cyclones, with many households deciding to migrate to other locations (IOM 2009: 4). However, as established above, currently insufficient data exists on those who have migrated and particularly on the role that socioeconomic conditions and political connections play in the decision to migrate.

Figure 1: Cyclone-affected areas in Bangladesh



Source: Author's own compilation, based on Disaster Management Bureau (DMB) (2010), Karim and Mimura (2008), and Mallick and Vogt (2011).

In terms of political connections, research on the pre- and post-disaster interventions for Cyclone Aila in Bangladesh, for example, has revealed that becoming a recipient of aid depends on the willingness to give of the local representatives of the ruling party, and furthermore that socioeconomically vulnerable groups are significantly negatively affected by local corruption (Mahmud and Prowse 2012). In contrast, Ishrat Jahan's (2011) research on Cyclone Aila showed that despite corruption, discrimination, and disappointment during the distribution of emergency aid,

the overall results of post-cyclone recovery programs could be declared quite satisfactory. Of particular importance was that the most poor and vulnerable received food and reconstruction materials, because of which they thus far survived in the two years following Cyclone Aila. She also concluded that without this emergency relief the population would have to migrate to neighboring cities, which would have led to massive social upheaval and other related problems.

Similarly, Alice Ponchelet et al. (2010) reflected on disaster-induced migration in Bangladesh based on the economic, political, and social consequences of Cyclone Sidr in 2007. Focusing on the positions and steps taken by the Bangladeshi government in response to the emerging population movements, they concluded that extremely "helpless" households are those most likely to migrate. Katha Kartiki (2011) also observed similar patterns in the aftermath of Cyclone Aila, in her investigation of the factors influencing migration from five coastal villages of Bangladesh. In addition to the research conducted so far, this paper aims to scrutinize the social classification of cyclone-induced migrants and will investigate their decision-making process vis-à-vis migration. Two events form the basis for this research, namely Cyclone Sidr in 2007 and Cyclone Aila in 2009. If households or household members migrated in the aftermath of these two cyclones, this research asks about the background causes and also, further, about what type of changes were observed both in the origin and destination living environment of the migrants.

The remainder of this article is organized as follows: The subsequent section provides an overview of the concepts underlying migration theory as well as the vulnerability of households to environmental disasters. Following, the case study areas are introduced, along with the methodology of the field surveys and the analytical tools. In the section "Findings" the relationships between the decision to migrate and socioeconomic vulnerability, the influence of that decision on family relationships, the relevance of support networks, and the impact of participation in relief programs are examined based on the empirical surveys. The section furthermore analyzes the consequences of migration for the places of origin and destination of the migrants, while the final section concludes the article by summarizing its findings and suggesting some possible next steps for both policymakers and researchers.

Background

Migration studies

The most important theoretical element in the field of migration is the concept of "push and pull." It refers to the factors that influence individuals to leave or stay in a particular place, according to the shocks that they face at the point of origin or the opportunities at their destination. This notion of push and pull factors behind migration was first developed in 1885 by Ernest Ravenstein in *Laws of Migration*. It supports the idea that different factors (positive and/or negative) influence the mobility

of individuals, with these including improved economic opportunities and geographical distance. Everett S. Lee (1966) then refined this theory by stating that the relevance of push and pull factors also depends on age, class, gender, education, family relationships, among others.

Migration implies some form of permanent or semi-permanent relocation by an individual or a household. It is the permanent or semi-permanent nature of such movement that distinguishes it from tourism and commuting. However, it is currently unclear how temporary and periodic these movements should be before we can classify them as migratory movements. To simplify these definitional problems, migration is considered here as relocation or displacement to a location that is too far away for those in question to continue, under normal circumstances, commuting to the same job/services/profession as previously. Clearly, geographical distance and the degree of spatial separation are important elements of movement patterns — determining whether these are understood as commuting or relocation (and thus migration). Similarly, the reasons for migration are often diverse. It is difficult to know the exact root causes of population movements — whether people migrate in search of better employment opportunities or because of environmental concerns at home.

In the case of Bangladesh, many landless households from inland areas are now migrating to the coast and settling in newly created char-land[2] or khas-land,[3] which due to their location are often heavily damaged during cyclones and tidal surges. The intensification and increasing number of disasters taking place is creating acute problems regarding unemployment in rural areas, and thereby worsening the socio-economic conditions of those immediately displaced by such occurrences. Rural–urban migration is mostly practiced as an alternative strategy to cope with the adverse effects of disasters (Afsar 2000; Poncelet et al. 2010). While research has indicated that rural–urban migration often pushes migrants deeper into poverty (Poncelet et al. 2010), it also reconfigures the social dynamics of change — especially in terms of access to resources, land ownership patterns, social images, and local level political representation.

2 Chars (*car*) in Bangladesh can be considered a "byproduct" of the hydromorphological dynamics of rivers. Char-lands are the sandbars that emerge as islands within the river channel or as land attached to the riverbanks as a result of the dynamics of erosion and accretion occurring in the rivers of Bangladesh. Those char-lands that are not eroded away in the first four years of their emergence can be used for either cultivation or settlement by the end of this four-year period (Sarker et al. 2003).

3 Khas (*khās*)-land refers to unoccupied land that is legally owned by the government and managed by the Ministry of Land. The main sources of khas-land are: land already possessed by the government; land newly created by sea or river sediment deposits; land vested in the government as ceiling surplus; land purchased by the government in auction sales; and, miscellaneous land such as that which has been surrendered, abandoned, or confiscated (Momen 1996).

Vulnerability and resilience

Vulnerability is commonly understood as the susceptibility of groups or individuals to harm due to social and/or environmental changes (Adger 1999). It is determined by exposure to risk, external or structural characteristics of risk, sensitivity, the internal or inherent properties of the system (for this study: the household), and the capacity and the ability to respond to or cope with the shock. The vulnerability of an individual or a household can be defined in two specific ways: hazard-independent vulnerability and hazard-dependent vulnerability (Birkmann 2006; Bogardi and Birkmann 2004).

The term "resilience" originated in the discipline of Ecology and refers to an ecosystem's ability to absorb and recover from the occurrence of a hazardous event (Akter and Mallick 2013). There are two approaches that are commonly applied to explain disaster resilience in human communities: (1) outcome and (2) process. The outcome-based approach defines resilience as the ability of human communities to withstand and recover from an environmental shock (Simon 2007). The process-based approach describes resilience as a mechanism of self-organization, the capacity to learn from experience, to process information, and to adapt accordingly (Akter and Mallick 2013).

Theoretical debate over whether resilience is an outcome or a process manifests itself in an operational divide amongst scholars. The existing operational frameworks for disaster resilience assessment vary depending on whether they were developed within the outcome or the process realm. Outcome-oriented frameworks are fairly straightforward and assess resilience in terms of end results (Cannon et al. 2004); the process-orientated frameworks, meanwhile, pose a challenge in terms of operationalizing the definition of resilience.

Nexus between environmental disasters and migration

Extreme weather phenomena, like disasters, challenge the adaptive capacities of individuals and communities, and overwhelm some of these actors by interacting with and exacerbating existing problems of poverty. The role of climate change in population displacement is not a linear relationship of cause and effect between environmental "push" and economic "pull." Oli Brown (2008: 8), for example, has stated that migration is not usually just a consequence of an environmental "push" arising from a climate-related process like rising sea levels. Except in cases of environmental disaster, where people are obliged to flee for their lives, migration requires some kind of "pull" factor — be it environmental, social, or economic. There has to be the hope of a better life elsewhere, however much of a gamble seeking it might be (Kartiki 2011). Katha Kartiki's study on Cyclone Aila pointed out that when the land of the population affected becomes no longer capable of sustaining livelihoods, people will be forced to migrate to areas that present better livelihood opportunities (ibid.; Poncelet 2009: 18). The risks of remaining and the

extent of damage to one's assets also affect the decision to relocate or not (Kirschenbaum 1996). It is also evident that the possibility of a family's return one day to their community becomes a critical factor in recovery from a sudden shock, like a cyclone (Miller et al. 1981). The poor and marginalized are more likely to live in poorly built settlements located in hazard-prone areas. As a result, they are more exposed and more sensitive to the risks posed by natural disasters.

Environmental disaster-induced migration is best understood as a continuum, ranging from clear cases of forced displacement to those of voluntary movement — with a large grey zone lying in between these poles. In general, the migration literature has focused theoretically and empirically on questions related to why individuals move or to their process of leaving altogether (Afsar 2003; Chapman 1999; Guest and Keith 1993; McLeman 2009; Poncelet et al. 2010; Tacoli 2009). However, with the occurrence of a disaster this question of individual movement becomes more salient to multiple areas of research, such as for issues of climate refugees, environmentally induced displacement, and societal changes occurring as a result of environmental migration (Bates 2002; Jolly 1994; Stringfield 2009). Most of those studies related to natural disasters and migration have been done in the context of developing countries (Brown 2008; Najam 1996; Poncelet et al. 2010) — these include, among others, Bangladesh, Indonesia, Mali, Mozambique, and Sri Lanka. These studies have focused on the socioeconomic (Afsar 2003; Najam 1996) as well as environmental factors (Bates 2002; Dessai and Wilbe 2011; Hunter 1998, 2005; Poncelet et al. 2010; Tacoli 2009) that influence the decision to migrate in the wake of a disaster. Victims are "pushed" to leave the area and to see the incident as an opportunity, thus creating an incentive to move (Bates 2002; Poncelet et al. 2010).

The desire to migrate may maximize both social exclusion pressures on the original community of the victims and social inclusion pressures on the new community. Here, social exclusion is defined as "the detachment of an old member from the original settlement" and social inclusion as "the addition of a new member to a known or unknown social community." The concept of social exclusion is seen as conditioning and informing a remarkably wide range of social and economic problems in this context (Luhmann 1995; Sen 2000). Amartya Sen (2000: 3), for example, defined social exclusion as a part of "capability poverty." He added: "Indeed, Adam Smith's focus on the deprivation involved in 'not being able to appear in public without shame' is a good example of a capability deprivation that takes the form of social exclusion" (ibid.: 4). Although the objective of this article is not to analyze this issue in detail, the concept provides some revealing perspectives on social segregation within the victims' communities as reported by them in the empirical surveys.

Methodology

The study area

The coastal zone of Bangladesh — an area covering 47,211 km² facing the Bay of Bengal — is regularly affected by disasters both natural and manmade. The major types of these include floods, cyclones, storms, tornadoes, drought and desertification, river erosion, earthquakes, the arsenic contamination of ground water sources, and general environmental pollution (DMB 2010). A total of 19 districts out of 64 are defined as coastal ones by the government of Bangladesh. This study focuses on three of them in particular — Bagerhat, Khulna, and Satkhira. On the southern fringes of these districts lie the Sundarbans, a mangrove forest that plays the role of a natural safeguard against cyclones and tidal surges. This research focuses on settlements defined by their proximity to the coast, and accordingly on communities that encountered a high level of destruction during the two selected cyclones. Out of 11 unions[4] in the southwest coastal districts, 45 villages have been sampled in the investigation (see Figure 2). In these villages, almost three-quarters of the land is used for either agriculture (mainly paddy fields) or aquaculture (mainly shrimp farming). Communities of fishermen are found along the rivers and most of them are used to entering the Sundarbans or even the Bay of Bengal in search of fish. Many creeks and canals are found in the area, which are also treated as significant sources of fish.

Data collection

The empirical investigations were undertaken in two ways. The first part comprised a standardized survey of households in order to gather information on their socio-economic parameters, their livelihood activities, and their vulnerability and resilience in cases of extreme weather. The second part consisted of qualitative methods — i.e. in-depth interviews and focus group discussions were conducted.

The household survey was completed by six trained data collectors (four males and two females), who were active in the selected villages of the eleven unions subject to this research. The first part of the survey was undertaken in March 2009, 18 months after the area had been hit by Cyclone Sidr. Initially it was planned to interview the respondents on the facts related to Cyclone Sidr. Then Cyclone Aila hit the coast, and the household survey was subsequently stopped and data collection approaches were adapted to the revised situation. For example, the survey team took part in different emergency relief action programs and kept notes on their observatory findings. In addition, the survey team began conducting group discussions with the survivors of Cyclone Aila, as observations of the ongoing emergency relief and

4 A “union” refers here to the lowest administrative unit of local government in Bangladesh; several villages taken together form such a unit.

intervention programs. As most of the emergency service providers — for example non-governmental organizations (NGOs), government organizations, and private initiators — were listing the names of possible recipients of their emergency aid without providing any substantial material supports (monetary/non-monetary), it was extremely difficult to conduct an interview with a person who was at the same time seeking such emergency aid. In reality there was no possibility of conducting a structured interview with the victims. From the beginning of July until the end of August 2009, the field team once again conducted a household survey. A total of
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In order to receive additional information about the migrants, qualitative interviews were conducted with those who had migrated. This included both the respondents who moved without families and those who moved with their families to nearby cities. Snowball sampling was applied, and a total of 30 migrants were interviewed. For instance, one of the migrants who took his family to Khulna was contacted. He pulled a rickshaw and lived in a slum near the main railway station. Being contacted by him personally, his neighbors and new friends who had also migrated due to the cyclone events attended a group discussion session and could afterward be interviewed individually.

The hazard-dependent social vulnerability index (SOVI)

The hazard-dependent SOVI represented one result in the survey and was pivotal for the following analysis of the data. "Hazard-dependent vulnerability" is here defined based on the concept of "household dynamics" (Mallick 2011). In other words, each and every household is understood as a system, with each having its internal and external capabilities — the extent of which are measured mainly on the basis of the time elapsed between the cyclone onset and them bouncing back to begin pursuing once more the household's normal livelihood. For example, if a household is affected by a cyclone (an external effect), it has to overcome the adverse effects that were caused by it. The easiest way to do this is to use the household's own capital/resources (internal capabilities) or to take assistance from the government, NGOs, or social networks (external capabilities) so as to cover the period of emergency until the household's members are back to "normal life" (duration of regeneration). These three aspects, i.e. internal capabilities, external capabilities and duration of regeneration, of each individual household define the propensity to be vulnerable or resilient to a natural disaster or other external disruptions of their livelihood. The vulnerability and resilience of a household also influences the migration decision of those affected. Based on this analytical framework, this research first identified where on the vulnerability–resilience spectrum the interviewed households lay. A SOVI[5] was developed by applying principal component analysis

5 Firstly, the standardization process was applied to the input variables in order to avoid potential problems in PCA. Therefore, 30 input variables were standardized and used in the PCA to reduce the variables to a smaller set of components. The results — seven components derived from 30 variables — are linear combinations of correlated variables that represent a broader measure of how certain components contribute to vulnerability. We followed the previously published literature on SOVI and used the Kaiser criterion (eigenvalue is greater than 1.0) to select the set of factors for constructing the SOVI (Cutter et al. 2003; Schmidtlein et al. 2008). After the components were selected, a varimax rotation was used on the solution to make the results easier to interpret. Varimax rotations in uncorrelated components tend to maximize the variance of single components. Following Cutter et al. (2003), it was considered that component loading is meaningful for values higher than 0.5 or lower than –0.5. Once the components were derived, their directionality was adjusted based on their influences on vulnerability. Plus (+) was assigned to components believed to increase vulnerability, i.e. financial poverty; and minus (–) was assigned to components believed to decrease vulnerability, i.e. housing conditions. All the components were then placed in an additive model where each

(PCA) — a commonly used statistical analysis tool. The SOVI profile of each household was then crosschecked with their migration profile (migrants or not migrants), which helped to identify the social strata of those who migrated.

Findings

Migrants' social vulnerability profile

Table 1 shows that after Cyclone Aila hit the rate of migration decreased, varying in relation to the interval between the survey period and the occurrence of the cyclone. For example, respondents who were interviewed under Survey A (approximately 60 weeks after Cyclone Sidr hit) reported less cases of migration, whereas in Survey B — conducted in the immediate aftermath of Cyclone Aila — about one-third of the respondents' families reported that at least one family member left the community in search of better economic opportunities for their family. The results of Survey C — conducted 43 weeks after Cyclone Aila hit — again indicated a decreasing rate of out migration. This is because emergency rehabilitation measures — such as cash for work and pond reclamation programs — were available in the affected areas. Those who could not meet their daily living costs moved temporarily, leaving in search of alternative and better income opportunities.

Table 1: Migration patterns according to distance in time from cyclone events

Particulars	**Cyclone Sidr**	**Cyclone Aila**	
Event occurred on	November 15, 2007	May 25, 2009	
Survey period	Survey A March 15, 2009– May 24, 2009	Survey B July 1, 2009– August 30, 2009	Survey C March 15, 2010– April 25, 2010
When survey started after the cyclone event (week)	60th week	5th week	43rd week
No. of respondents surveyed	493	656	406
No. of reported migrant households (at least one member) (% of the sample)	72 (14.6 % of Survey A)	179 (27.3 % of Survey B)	101 (24.8 % of Survey C)

Source: Author's own field surveys.

All three surveys reveal that only 22.59 percent of the sampled households (see Table 2) reported a connection to migration. According to the respondents, most of them had moved to neighboring cities immediately after the emergency relief works stopped — i.e. four weeks after the cyclone first hit. In order to analyze migration

component was assigned an equal weight. Accordingly, in the original application of the SOVI an equal weighting of components approach was used. The sensitivity of the SOVI to the equal weighting assumptions was explored according to the suggestions of Schmidtlein et al. (2008).

patterns based on households' vulnerability, the SOVI was calculated for all survey respondents. The SOVI varies between –1 to +1 — in other words, a minus value indicates the propensity to be "vulnerable" and a positive value indicates the ability to be "resilient." In the context of all three surveys, the number of extremely vulnerable respondents ($-1.0 < SOVI \geq -0.50$) is 4.4 percent, vulnerable respondents ($-0.5 \leq SOVI \geq 0$) is 47.8 percent, nearly vulnerable respondents ($0 \leq SOVI \geq 0.5$) is 41.1 percent, and 6.6 percent are counted as "resilient" respondents ($0.5 \leq SOVI \geq 1$). Using this classification for the SOVI, the profiles of the migrant families are presented in Table 2.

Table 2 shows that migration took place among all households, regardless of whether they were mostly vulnerable or nearly resilient. For example, among the "nearly resilient" households one out of each six respondents reported an instance of migration. In contrast, the "mostly vulnerable" group had one migrant member per two respondents. The "vulnerable" group depicted a migration case in every third respondent of its category, whereas the "nearly vulnerable" group reported a migration case in every fifth respondent of its category. These results clearly show that, according to the applied SOVI, the tendency to migrate is strongest among the mostly vulnerable group. For all the sampled households in the survey, 22.59 percent of respondents reported at least one case of migration in their family. Those families who reported migration described how this decision was taken due to the widespread unemployment caused by the cyclone. Besides, the link between loss of assets and the decision to migrate was supported by the lack of coordination in relief distributions.

Table 2: SOVI of the respondents' households and their migration status

Respondents classification according to the SOVI	% of the surveyed household (n = 1555)	
	Reported migration in family	Reported no migration in family
Mostly vulnerable (4.4%)	1.99	2.44
Vulnerable (47.8%)	12.59	35.23
Nearly vulnerable (41.1%)	7.00	34.11
Nearly resilient (6.6%)	1.01	5.14
Total % households in the survey	22.59	76.92

Source: Authors' own field surveys.

Reasons for migration

Alice Poncelet et al. (2010) discovered that the "poor and helpless" section of the community migrated after Cyclone Sidr. Accordingly, the author of this paper here identifies the factors responsible for "helplessness" of a household as: (i) the death, and injury of family members; (ii) being affected by criminal activities, such as the

household resources having been stolen; (iii) not receiving sufficient emergency food supplies; (iv) not receiving rehabilitation and reconstruction support; (v) being forced to sell immobile property, especially land; (vi) not being able to continue with farm-based activities; (vii) not being able to repay old credits; and, (viii) not being supported by the "safety net" program of the government. The findings of this study show that cyclone-induced losses and damages have a direct impact on the decision to migrate. Similarly, the opportunity to diversify one's income also influences the choice to move to a nearby city. These two causes of the migration occurring after a cyclone event signify both the environmental push and the economic pull of migration literature theory. Further, the data analyzed for this study shows that lower income groups (<30 USD per month) started to migrate earlier (less than four weeks after the event) and tried to settle down in neighboring cities, whereas the middle and higher income groups waited a little longer (until at least four weeks after the event) before moving to the cities.

The survey also revealed that the male members of 22.59 percent of all sampled households, mostly poorer people, moved to neighboring cities immediately after the emergency relief works had been phased out (completed about four weeks after Cyclone Aila hit). Most of them (78 percent) moved to big cities in the same district, namely Bagerhat, Khulna, and Satkhira; where they assumed the possibility existed to at least become a rickshaw or rickshaw van[6] driver. Among the remaining 22 percent, 12 percent moved to the capital city Dhaka because their relatives who lived there expressed some interest in offering work. The remaining 10 percent moved to Chittagong, the second-largest city of Bangladesh, to work in the dockyards or as fishermen. The family members of those who moved to Dhaka or Chittagong could not specify what the jobs of their migrating family members were. They only received updates via phone or during occasional visits, and thus were only informed that their migrant family members were working but not about in which specific capacities.

Not analyzed, though, are the causes of their displacement and specifically the factors that influenced their decision to migrate. Did family members move only because of an economic crisis? Did they move because they were not included in the "social safety net" or "aftermath recovery programs"? Migration immediately after Cyclone Aila (Survey B) did not show any causal relationship between the respondents' socioeconomic conditions and their participation in aftermath intervention programs. This seems to be linked to the immediate need of securing economic resources to maintain their livelihood, in other words the short-term recovery support offered was not relevant to their migration decision. However, other reported cases covered by this study show the relevance of aftermath recovery measures and reconstruction activities to that decision — that is, how the long-term intervention

6 A rickshaw van is a three-wheeled cycle commonly used for transporting goods and, especially in rural areas, people.

actions undertaken by different stakeholders were indeed important. If there was a significant loss of household assets and resources as a consequence of the cyclone, people would decide to migrate (both in Survey A and Survey C) to other places to remedy such losses. 12 percent of the respondents of Survey A and 10.5 percent of the respondents of Survey C decided to migrate due to thefts that occurred in the aftermath of the cyclone. However, none of the total respondents (1,555) decided to migrate due to not receiving immediate emergency assistance within 48 hours.

Similarly, it is also evident that once the emergency recovery support was in full swing every respondent received assistance from at least one external source — such as local government, local politicians, a NGO, relatives, or other private initiatives. However, the data shows that 21.9 percent and 26.9 percent of respondents to Survey A and Survey C respectively had decided to migrate because they did not receive emergency support from NGOs. In addition, 21.9 percent of respondents to Survey A neither received support from local government nor from NGOs and thus decided to migrate; such cases were not found among the respondents of Survey C. Besides, households who had prior knowledge about where they could migrate to and who had some local networks (such as relatives or friends) in place to access available livelihood opportunities in other locations found the decision to migrate easier. They then also forwarded the information to others and encouraged them to migrate as well.

Family relationships and support networks

The respondents perceived migration as a way of maximizing their family's income and minimizing the risks of poverty. In general, migrants and families both benefit from the migration process. Ideally, the person who migrates gains membership of a new support network at his/her destination while the family's resources are enlarged through the economic endeavors of the migrant. Of all the households who had experienced migration in the three surveys, 89 percent of the family members moved to cities only temporarily with a motivation to take care of their wives and children who remained behind in the rural home. Those temporary migrants reported the experience of day-to-day employment insecurity, resulting in a lack of financial security. To overcome the latter and avert a crisis, migrant respondents often resorted to borrowing from friends and neighbors in the new location (25 percent of the respondents), co-workers (57 percent of the respondents), and from informal moneylenders (18 percent of the respondents). They then sent money to their families at home with the help of relatives or neighbors.

The survey results underline the reality of a high rate of (financial) support reaching the household members who remained behind in the rural home. 78 percent of the respondents in the rural home reported that they had received financial support at least three times since the departure of their family member from the locality, 12 percent reported having received financial support two times and 6 percent reported

having received financial support only once. 4 percent of the respondents reported that they had not received any money since the departure of their family member. Furthermore, communication patterns between the migrants and their families in the villages surveyed revealed the existence of mostly strong family relationships and bonds. The survey results pointed at 46 percent of respondents in the village receiving a phone call twice per week, 34 percent receiving one call per week, 12 percent receiving at least one call per month, while the remaining 8 percent received hardly any such calls.

Although most of the migrants sent money to their family members in the village, the rather sporadic financial support offered — in many cases coupled with irregular communication —forced the mainly female family members who had stayed in the village to consider other possible sources of financial capital. 65 percent reported borrowing money from neighbors in the village, 32 percent borrowed money from moneylenders and 3 percent even reported that they had had to leave their original location. Thus household members who received inadequate financial support and who could not afford to move to their husband's new location faced a multitude of problems. Their household's vulnerability increased and the household struggled to meet its daily needs. A few of them were forced to earn money by begging or by working as maidservants to the local landlords or political leaders. One woman reported in an in-depth interview that the local landlord for whom she worked sometimes forced her to fulfil his sexual desires. While this compromised her social prestige and honor in the village, her work as a maidservant was necessary for the survival of her family. Such incidences underline the processes of social exclusion that especially female households can experience in their rural homes when the household's male members have to migrate in order to seek further means of financial support for the family.

Furthermore, efforts were made to acquire information about those migrants who took their families to the cities. For this, snowball sampling was applied. In one group discussion it was revealed that the women and children of migrant families were more likely to work if they had moved to the city. The necessity that young children support the household by taking employment also put them at a greater risk of remaining uneducated and hence being unqualified for better jobs in future. A majority of the migrating household members and families also had to cope with low living standards in their new locations. They could afford only low-cost housing, and therefore their livelihood starts in settlements often referred to as "slums." These low-income settlements are commonly characterized by a lack of sanitation facilities, a lack of access to drinking water, and greater exposure to health risks.

In one focus group discussion with migrants in Khulna it emerged that three people who did not bring their families to the city and who were known to the discussants got married again. They had stopped communicating with their family members in the villages and had started a new life in the city. Exceptional cases were also

reported by the participants in the focus groups, where migrants hid their new life from their families in the villages and all the while continued to regularly send money home.

Migration decision, relief programs, and local networks

Analyzing the changes in the socioeconomic status of deprived groups along with the relief programs in place after cyclones can provide more specific information about the impacts of disaster intervention processes. For the respondents of Survey C (i.e. households affected by Cyclone Aila), none of the "mostly vulnerable" social groups (according to the SOVI, see Table 1) received any support from local politicians/political parties or influential groups, whereas 3 out of 17 "nearly resilient" respondents (according to the SOVI, see Table 1) had received support from local politicians/political parties. The impression that more vulnerable groups did not receive large support was quite similar for Cyclone Sidr-affected households. In Survey A, 4 out of 19 "mostly vulnerable" respondents and 1 out of 31 "nearly resilient" respondents received support from local politicians/political parties. In contrast, the less vulnerable households (i.e. higher income groups) were more likely to receive support from relief programs. The survey results on this point show once again that higher income groups were in the cases studied much less likely to migrate as compared to other groups.

Another factor influencing migration is the availability and accessibility of jobs following disasters. For instance, when the emergency relief activities for Cyclone Aila survivors ended, the government and other development organizations started to reconstruct the road networks, embankments, and local public institutions, like schools, hospitals, banks etc., alongside other restorative activities. Accordingly, employment opportunities were made available in the affected areas. However, to whom the jobs generated by those activities were allocated was mostly influenced by local political decisions (Das 2010; Mallick and Vogt 2011). The local elite or so-called "social supreme" (Mallick and Vogt 2011) took control of the projects' leadership and manipulated what the selection criteria for labor forces were. Although the local elite helped the development partners or even government officials to identify the most badly affected victims of the disaster, they at the same time tried to maximize the participation of like-minded people (in what resembles patron–client relationships) in these income opportunities, blocking the access thereto of the socially deprived or underprivileged members of the community.

However, although the results suggest, in terms of vulnerability, a high proportion of out migration by low-income groups, some low-income households did also decide against treading this path. The reason behind their decision not to migrate was the benefits that they received from government and NGO relief schemes. Furthermore, these households often also had access to support from affluent families in the village (see, for example, Gardner 2009 for the background to such support structures

in rural areas). While humanitarian relief addressed some of the immediate concerns like food supplies, water and sanitation, and primary health care, a lack of long-term and sustainable solutions to their problems might nonetheless later on lead to migration and displacement. It was also revealed in group discussions that during relief distribution phases some previously unknown families were present in the studied villages. People who had settled in cities or other unaffected locations moved to the cyclone-affected areas in order to get relief and rehabilitation support with the help of their informal social networks in the locality.

Significantly, the assistance of local politicians or other influential people plays a definitive role in relief support and thus also affects the migration decision. 19.2 percent of households in Survey A reported that one of their family members decided to migrate because they were not supported by local politicians. For instance, when the reconstruction activities under the government-funded "Food for Work" (FFW)[7] project had started none of the migrant families were included on the list of those offered employment. This resulted in at least one family member leaving the home village in search of an alternative means of income.

The preselection by local authorities and politicians of who receives certain benefits or access to public resources is a common practice in Bangladesh (see also, Bebbington et al. 2007; Hackenbroch and Hossain 2012). Those who supported the ruling party were able to enlist, while a majority of those who did not could not easily obtain relief support. Accordingly, 11.9 percent of the respondents of Survey C reported that they had decided to migrate because they could not acquire access to relief support. The inclusion in FFW activities therefore can be interpreted as a sign of connectedness to local politics, politicians, and other patronage networks, and such connectedness to patronage networks represents a deciding factor for survivors of whether or not they can gain access to the locally available opportunities for financial support.

Among other factors, livelihood constraints prompted families to move to the neighboring cities and seek new income alternatives. Those who moved away from their original locality were individuals excluded from both governmental and NGO relief schemes. One respondent explained how she was excluded from the emergency relief support and why her husband was forced to migrate to the neighboring city. Laksmi Rani, a 32 year-old woman and resident of a village in Atulia Union, declared:

> If you want to have some relief goods, your name should be put on the list by an NGO officer. My husband has gone to Satkhira to work as a rickshaw puller. Nobody is here for me and my children; no one can put our name on the NGO list. What shall we do?

7 The program is open to all rural poor persons who are prepared to do manual, unskilled labor. It is implemented as a centrally sponsored scheme. Food grains are provided to the workers who participate in this program.

> How long can we survive without food? Maybe we will have to move to Satkhira as well. (Lakshmi Rani, June 24, 2009)

The social consequences of migration

At place of origin

The respondents professed migration to be a way of maximizing their family's income and minimizing the damages and losses caused by the cyclone, because family members in the original location received economic support from their migrant relatives. The surveys revealed that 83 percent of the family members who moved to cities sent money to their relatives left behind. Apparently, two-thirds of respondents' families spent the remittance only on basic needs, whereas 20 percent spent it on agricultural costs, 4 percent on children's education, and 11 percent on the treatment of sick family members. A significant proportion of the remittance related to basic needs was spent on food (90 percent). The remainder was spent on house repairs (7 percent), clothes (2 percent), and medicine (1 percent). This focus on food as the main expenditure implies that families remaining in the original location were for the most part dependent on these remittances for their survival. In such an uncertain situation for the family, women were often forced to work under harsh conditions. For many rural households this meant a reshaping of gender roles in their local society. Accordingly, this represents an explicit social change in the family unit, one contrary to the common and traditional practices that men are in cities and women and children stay in rural areas. While this paper does not address these issues in detail, they evidently require a more explorative and thorough investigation.

At the destination

Migrants faced problems in finding employment from the moment that they arrived in the city. For example, Zahir Hasan, 34 years old from Shyamnagar village, expressed how tough his first few days in Khulna city were:

> I came to Sonadanga bus-stand [a nearby town] 10 days after Cyclone Aila hit our villages. I had no place to sleep here. I knew a cousin of mine who also pulled a rickshaw, and he took me to his rickshaw garage and helped me to hire a rickshaw. However it was harder than it sounds. We had to manage 2,000 Taka for deposit, and neither my cousin nor I had the money. We had to borrow it from the other rickshaw-pullers of his garage. All of them helped me, and I am now paying their loan back. It is taking me too long to repay their loans as I am regularly sending money to my parents. Without my cousin, I would have died here! (Zahir Hasan, August 8, 2009).

This interview quote underlines how a personal network is one of the foremost preconditions for finding employment in the city. Without a recommendation, no-one is able to hire a rickshaw to pull for lack of a guarantee for the vehicle's owner. Besides, victims of these disasters who are moving together with dependents but lack a personal network at their destination face considerable hardship in surviving in the cities — given that they arrive mostly without income, without a place to live

in, and without the means to buy food. However, those who move with dependents and have a personal network are able to manage income opportunities more easily. Both of these groups are new arrivals to the urban low-income communities and their settlements.

Conclusion

This paper examined a number of pathways through which environmental disaster may lead to migration, which in turn may lead to social changes in the affected communities. The relationship between poverty and damage costs appears to be more complex than the literature has hitherto suggested (see, for example, Poncelet 2009). This paper has explored the influence of cyclones on the choice to migrate of families in southwest coastal Bangladesh, and thus contributed to understanding the rural–urban patterns of disaster-induced migration in the country. This research has identified the push factors behind migration occurring immediately after a cyclone, and also how the migration decision impacts on family relations as well as on both the places of origin and destination.

The paper classified the vulnerability and resilience of surveyed households with the help of the SOVI, an index value that was derived from multilevel statistical analysis. As such, the observations made might be different in reality with regard to a different environmental hazard context, though the findings here satisfy the tenets of a nontrivial interrelationship between “vulnerability” and “resilience” (Akter and Mallick 2013; Gallopin 2006).

The research undertaken here revealed that once relief activities came to an end people began moving to cities countrywide, mostly without their families. The high

this, military and civil relief workers struggled to deliver food, fresh water, and shelters to regions severely affected by the surge of sea levels and destructively high winds. In addition, the misuse of political power was observed in making the lists of relief recipients. Accordingly, current sociopolitical influences and practices hinder emergency relief distribution and thus also trigger disaster-induced migration. To control such local power practices, the government could create a "resource profile of every household" so that in the aftermath of an environmental disaster relief organizations have a baseline for the distribution of emergency support. The launch process and development of such resource profiles could be integrated during "community series surveys." Such a database could, therefore, assist government actors, NGOs, development partners as well as research institutes in formulating, designing, and implementing a range of suitable activities related to environmental disaster risk reductions.

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