



# When the disaster strikes: Gendered (im)mobility in Bangladesh

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## ABSTRACT

Gender influences people's behaviour in various ways. This study investigates gendered (im) mobility during cyclone strikes in Bangladesh. During such strikes people have described being unable to move away from environmentally high-risk locations and situations. The Q-based Discourse Analysis used by this study shows how and why gender-roles (im)mobilised people in three coastal locations during the cyclones. People (and especially women) explained that failing to evacuate to the cyclone shelters when a disaster strikes was not uncommon. Gender, or feminine and masculine social roles, played a significant role in these evacuation decisions while facilitating or constraining their mobility. The gendered subjectivities presented different accepted social behaviours and spaces for women and men. In this way, immobility (social, psychological, and geographical) was strongly gendered. Masculine roles were expected to be brave and protective, while female 'mobility' could be risky. Women's mobility therefore ended up being constrained to the home. In other words, when the disaster strikes, everyone did not have the same ability to move. These empirical insights are important to inform climate policy in a way that it better supports vulnerable populations worldwide as they confront global environmental changes today and in the future.

## 1. Introduction

The uneven impacts on women from global environmental changes put gender at the frontline of all three 2015 climate agendas (Cutter, 1995, 2017; Wahlström, 2015; UNFCCC, 2015). Empirical evidence illustrating gendered vulnerabilities to environmental stress will be crucial to the development of the robust policy frameworks. These scenarios include immobility as vulnerable populations may be unable to escape environmental risks. The literature on climate-induced immobility largely relates to Trapped Populations<sup>2</sup> (Ayeb-Karlsson et al., 2018) – a concept put forward as an effective policy tool to safeguard vulnerable people in a climate changed world (Foresight, 2011; Black et al., 2011, 2013; Black and Collyer, 2014). The emergence of an immobility perspective expanded the environmental migration debate. People are known to migrate away from environmentally risky locations and situations but may also be unable to move (Nawrotzki and DeWaard, 2018; Farbotko and McMichael, 2019; Thornton et al., 2019). Initially, people were proposed to be involuntary 'trapped' but are now recognised to alternatively be voluntary immobile (or choose to stay). However, as noted in the conceptualisation of the term, distinguishing between those who choose and those who are forced to stay behind is extremely complex (Black et al., 2013; Black and Collyer, 2014; Ayeb-Karlsson et al., 2018).

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<sup>2</sup> Manuscript terminology: Trapped Populations is used in this article to refer to the existence of the concept (noun); 'trapped' is used to refer to when a person is labelled as being thus (adjective); and trapped is used to refer to the action of being rendered immobile in such a way (verb).

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The conceptual idea of Trapped Populations can be useful to better understand gender vulnerability. To date, the term was primarily used to describe rural non-migration behaviour due to financial constraints, but the body of literature is rapidly growing (Ayeb-Karlsson et al., 2018, 2020; Nawrotzki and DeWaard, 2018; Farbotko and McMichael, 2019; Thornton et al., 2019; Zickgraf, 2019; Blondin, 2020). In line with this, more people-centred studies (Ayeb-Karlsson et al., 2016; Tebboth et al., 2019; Conway et al., 2019) better acknowledging the human aspects of climate change, including internal psychological, subjective and emotional processes, are encouraged (Brown et al., 2019; Tschakert et al., 2019; Ayeb-Karlsson et al., 2020). The UNFCCC climate policy space has similarly observed the conceptual creation and development of ‘Non-Economic Loss and Damage’ (UNFCCC, 2013; Boyd et al., 2017; Tschakert et al., 2019).

This article investigates gendered (im)mobility, or how gender influences people’s evacuation behaviour, during cyclone strikes in Bangladesh. Gender roles are important psychosocial factors that can enable and constrain (im)mobility decisions. The analysis supports an explanation of *why* people (often women due to power relations) fail to evacuate when a cyclone strikes. The Q-based Discourse Analysis (DA) examines people’s subjective values around hazards and risks and their connections to reasonings on seeking shelter or staying behind.

## 2. (Im)mobility and gendered disasters

Disaster immobility is mainly framed around ‘non-evacuation behaviour’ and ‘involuntary immobility’ during specific events such as US Hurricanes Katrina and Rita (Elliott and Pais, 2006; Stein et al., 2010; Thiede and Brown, 2013), while *Trapped Populations* is slowly emerging in the disaster literature (Penning-Rowsell et al., 2013; Logan et al., 2016; McCaughey et al., 2018).

Women often suffer disproportionately from environmental hazards due to social inequality. Effects observed in everything from food insecurity, mental (and physical) ill health, and gender-based violence during and after climatic stress. This conceptually aligns with the critical understanding of hazards turning into disasters when they negatively impact vulnerable populations. Hazard severity is therefore a reflection of location, intensity and number of vulnerable people hit by the disaster (Blaikie et al., 1994; Kelman, 2019; Ayeb-Karlsson et al., 2019a). Food hierarchies may pose greater risks of malnutrition and water scarcity for children and women (especially when pregnant or breastfeeding) during population movements or displacement (Rivers, 1982; Cutter, 2017; Watts et al., 2018, 2019). Similarly, income inequality and financial dependence make it more difficult for women, children, disabled and elderly to bounce back after hazards, or independently decide whether to migrate, stay put, or evacuate (Enarson, 1998; Jordan, 2018; Ayeb-Karlsson et al., 2019a, 2020).

In Bangladesh, women, children and the elderly are often left behind while men migrate towards the cities. Women also tend to delay more in responding to cyclone warnings or are left behind while others evacuate (Bhatta et al., 2015; Ahsan et al., 2016). Studies show that most women cannot swim, that clothing and responsibilities for children restrict their movements, and that fear of sexual and physical abuse increases outside the home (Sultana, 2007; Fordham, 2012; Jordan, 2018).

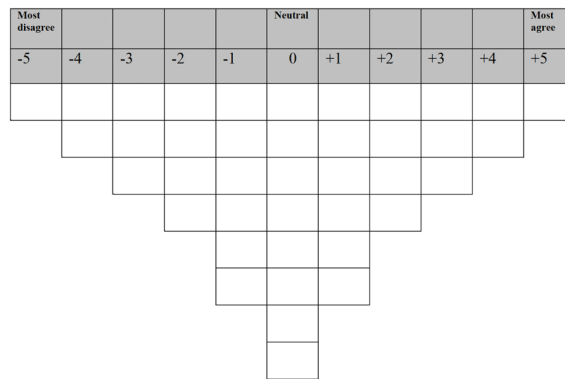
More women than men died in Bangladeshi cyclone strikes such as Sidr in 2007 and Gorky in 1991. 90% of the fatalities in 1991 cyclone Gorky, for example, were women (Chowdhury et al., 1993; Alam and Rahman, 2014). Gender-based disaster mortality differences extend to a global level, while acknowledging potential underestimates and uncertain approximates (Brunkard et al., 2008; Jonkman et al., 2009; Bradshaw and Fordham, 2013). Some disaster mortality investigations show that women face higher risks of dying during cyclones in the global south (Doocy et al., 2013; Cutter, 2017). Critical studies analysing the root causes of gender vulnerability will support the understanding of diverse vulnerabilities (Blaikie et al., 1994; Cannon, 2000; Juran and Trivedi, 2015). Structural social and political processes coupled with socio-cultural patriarchal power systems generally enforce gender imbalances (Anbarci et al., 2005; Neumayer and Plümper, 2007; Rhodes et al., 2010). Gender vulnerability (including socially and geographically reduced mobility) must be understood as part of larger psychosocial factors including gender identity, patriarchal attitudes, religious or traditional practices, shame and honour, gendered division of labour, and internal psychological processes such as feelings and emotions (Rashid and Michaud, 2000; Stephens et al., 2013). When access to disaster preparedness training, early warning messages, shelter space or post-disaster relief is gendered, social positions determine life and death (Fordham, 2012; Nadiruzzaman and Wrathall, 2015).

Critical gender scholars caution reproduction of climate change discourses describing women as vulnerable or virtuous (Butler, 1997, 2011; Cornwall et al., 2007; Swim et al., 2018) while maintaining postcolonial vulnerabilities (Cannon and Müller-Mahn, 2010; Baldwin, 2016; Ayeb-Karlsson et al., 2018). We must remember that gender norms affect women and men, or produce female and male identities and behaviours. Gendered disasters therefore include social expectations of men proving their courage by facing storms head on (O’Brien et al., 2007; Bradshaw, 2010; Arora-Jonsson, 2011).

This study addresses some important gaps in the current literature body. Most investigations exploring gendered disasters and vulnerabilities in Bangladesh tend to be overly simplistic, presenting linear comparisons between women and men. Women are often perceived as one coherent social group with collectively shared vulnerability. This idea neglects vulnerability differences due to socio-economic status, age, religion, social background, marginalisation and stigma. Outlining these nuances around gendered disaster (im)mobility and vulnerability contradicts such generalisation. This Q-based Discourse Analysis explores discursive values around cyclone evacuation in Bangladesh and whether people felt constrained, socially immobile or ‘trapped’ by their gendered subjectivity.

## 3. Method and study sites

*Q-methodology* (Stephenson, 1935, 1986; Brown, 1980, 1996; Stenner, 2008; Watts and Stenner, 2012) encapsulates people’s



**Fig. 1.** Q-grid used in study. As recommended by Watts and Stenner (2012:80) and previously applied in an empirical Q-based Discourse Analysis to investigate climate-induced (im)mobility, an 11-point (-5 to +5) distribution Q-grid was used for the Q-sorting activities (Ayeb-Karlsson et al., 2020: 6).

subjectivities around a topic or within a social or geographical group. Q is often called the ‘science of subjectivity’ (Stephenson, 1935, 1986), where subjectivity is understood as ‘*how an individual understands oneself within a social context, and what it momentarily feels like to exist in this set of social relations, space and place*’ (Morales and Harris, 2014:706). To date, studies using Q to understand viewpoints on climate change policy, environmental risks, migration or immobility are still scarce (Niemeyer et al., 2005; Ockwell, 2008; Wolf et al., 2009; Morinière and Hamza, 2012; Oakes, 2019; Ayeb-Karlsson et al., 2020).

After Q-methodology was introduced within Human Geography in the early 2000s (by Robbins and Krueger, 2000) a group critical discourse scholars proposing more reflexive and innovative ways to execute Q emerged (López-i-Gelats et al., 2009; Duenckmann, 2010; Jepson et al., 2012; Sneegas, 2020; Ayeb-Karlsson et al., 2020). The group challenged propositions of Q-methodology as an ‘objective’ identification of subjectivities and argued that to be of real value it must be combined with (Critical) Discourse Analysis (see, for example, Wodak, 2011; Fairclough, 2013). Yet, Q-studies attempting to combine Q and Discourse Analysis are still few (but include Dryzek, 1994; Stainton-Rogers, 1997; Barry and Proops, 1999; Ockwell, 2008; Wolf et al., 2009; Morinière and Hamza, 2012; Ayeb-Karlsson et al., 2020). Some Q scholars suggest that Discourse Analysis has been excluded from Q-circles ‘discursively’ - according to similar forces separating binary opposites such as black-white, woman-man, south-north, messiness-tidiness, or DA-Q (see, for example, Sneegas, 2020 and Ayeb-Karlsson et al., 2020). This study applies an innovative methodological approach that combines Q and Critical Discourse Analysis to empirically investigate climate-induced (im)mobility (first carried out in Ayeb-Karlsson et al., 2020).

The Q-element in this study followed a standardised Q-procedure of a Q-set creation, Q-sorting exercise, and factor analysis in PQMethod<sup>3</sup> (Watts and Stenner, 2012; Sneegas, 2020). The Q-analysis was then combined with an extensive textual Critical Discourse Analysis of the unstructured post-sorting interview and survey responses (Ayeb-Karlsson et al., 2020). 40 statements generated from 100 qualitative field quotes from qualitative research sessions conducted in the three study sites between 2014 and 2015 on gendered disaster (im)mobility were used in the Q-sorting activity (Fig. 1). The 100 original field statements were grouped into re-occurring topics, themes and storylines, to achieve an effective, balanced and well-covered final Q-set. The Q-sorting activity was combined with an (im)mobility survey<sup>4</sup> that offered a discursive understanding of the informant’s (im)mobility history and demographic background.

The recorded and factor analysed Q-sorts identified 15 different discourse (or factor) groups<sup>5</sup> (see Table 1). The three study sites’ 62 Q-sorts (in total 186 snowball sampled informants of 93 women and 93 men) were first factor analysed together as a whole, and then grouped and analysed according to study sites. In addition to ensuring a gender-balance, the selected informants reflected the socio-economic, religious, age, and livelihood makeup of the study sites. The discursive narratives appearing in the 15 discourse groups identified, (five in Dalbanga South, four in Mazer Char and six in Gabtola) were critically analysed textually as well as with the help of the informant details registered in the survey questionnaire.

The selection of study sites used was justified by the socio-environmental diversity and different experiences of cyclone strikes in each. Consultations with local stakeholders and people during initial site visits guided the selection. *Dalbanga South* had not suffered extensive losses of human lives during recent cyclones, but reported lacking disaster preparedness measures such as a functional early warning system and their only cyclone shelter could not accommodate the whole village. *Mazer Char* islanders expressed being cut off or isolated from the mainland during cyclone strikes as people could not reach the mainland by boat. Meanwhile, people in *Gabtola* described having sufficient shelters, but feeling traumatised by having lost approximately one third of the village population in cyclone Sidr in 2007 (Nadiruzzaman and Wrathall, 2015; Ayeb-Karlsson et al., 2016).

<sup>3</sup> PQMethod was designed by Peter Schmolck and can be downloaded from <http://schmolck.userweb.mwn.de/qmethod/index.htm#PQMethod>.

<sup>4</sup> For more details, see the questionnaires used in the research sessions in the supplementary material (omitted for peer-review).

<sup>5</sup> In this article, ‘discourse group’, ‘discourse’ or ‘group’ refer to the identified factor groups through the Q-analysis which identified people’s subjectivities around disaster (im)mobility in a way that they reflect the broader discourses (as described in Watts and Stenner, 2012).

**Table 1**  
**Q-Statement overview.** List of the 40 Q-statements used in this study and how each discourse group ranked them during the Q-sort activity. The selected statements were based on the qualitative fieldwork sessions carried out in the three study sites between the years of 2014 and 2015.

No	Q-statements	The planner (female)	The troubled (male)	The protector (male)	The follower (female)	The stayer (female)	The cautious (female)	The realist (male)	The believer (female)	The anxious (female)	The religious (female)	The saviour (male)	The rational (male)	The housewife (female)	The guardian (male)	The optimist (mixed)
1	Early warning messages are crucial to our survival.	4	-1	2	1	3	5	3	2	3	3	3	1	2	0	2
2	I am afraid someone will steal my belongings.	1	2	-1	0	2	-1	-1	-1	-3	0	0	0	-3	3	1
3	One can never know whether you will reach the shelter safely.	0	1	0	-1	0	0	1	3	2	0	2	0	-1	0	0
4	Women are not safe in the shelter.	3	-3	-1	-5	5	-2	-4	-2	-2	-2	-2	0	-3	-3	-3
5	If people in the village told me to evacuate I would go.	0	-1	0	2	-3	2	0	4	0	1	2	2	-2	-2	2
6	The outcome is not in my hands.	1	1	1	-1	1	0	2	1	0	2	0	-1	-1	0	1
7	I will not leave my valuables behind.	0	4	-1	0	2	-2	1	0	0	2	-1	3	0	-4	-1
8	Something could happen to my family.	0	1	2	2	-1	1	0	1	1	-1	0	-1	1	1	2
9	People normally tell me when to evacuate.	-1	2	-1	-2	-1	0	-1	1	2	1	1	2	1	-2	3
10	The disaster training is helpful.	3	0	4	0	0	2	2	1	1	1	2	1	0	5	4
11	I only go when I see others evacuate.	-2	2	-1	-1	-2	1	1	3	0	-1	0	1	-3	3	-3
12	One should never leave their family behind.	1	2	4	-1	1	0	3	2	1	-1	4	-1	1	4	0
13	I know just how to prepare when I see an early warning flag.	-1	-1	2	-3	-3	3	0	0	0	-2	1	2	0	0	1

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Table 1 (continued)

No	Q-statements	The planner (female)	The troubled (male)	The protector (male)	The follower (female)	The stayer (female)	The cautious (female)	The realist (male)	The believer (female)	The anxious (female)	The religious (female)	The saviour (male)	The rational (male)	The housewife (female)	The guardian (male)	The optimist (mixed)
14	I feel safe after reaching the shelter.	2	0	1	-4	-3	-1	1	0	0	-2	1	0	-1	2	-1
15	Evacuating is the right thing to do.	0	0	5	3	-2	1	4	5	1	4	2	0	0	4	5
16	I am afraid of dying in the cyclone strikes.	1	1	-2	1	0	1	-3	1	2	-2	-2	-1	-5	1	0
17	I am better off because my valuables can be taken into the shelter.	-1	-1	1	-3	-4	-2	0	0	-3	0	-1	1	-1	0	-1
18	I never get the warning messages.	-2	0	-3	-2	-2	-3	-4	-3	-2	-4	-4	-3	-4	-1	-4
19	The shelter is not a place where I should be.	-2	-4	-4	1	1	-1	-3	-3	-5	-4	-3	-2	0	-3	-3
20	There is no point going to the shelter.	-5	-3	-4	-1	-2	-4	-2	-2	-4	-3	-5	-4	4	-4	-2
21	If the warning signal is low the cyclone will not be dangerous.	1	0	1	0	0	3	-1	0	3	0	0	-2	1	0	2
22	Most people live too far away from the cyclone shelter(s).	0	4	3	1	3	0	4	-1	1	2	3	3	-1	1	0
23	I normally get the warning too late.	-4	1	-1	0	-5	-3	-2	-5	-3	-3	-3	-5	-2	-3	-3
24	There is not enough space for everybody in the cyclone shelter.	-3	0	3	0	2	2	5	-4	0	0	3	3	2	-1	3
25	Nobody wants to leave their belongings behind.	3	3	2	-2	3	-2	1	-1	2	-1	0	5	2	-1	-2
26	My place is at home.	-3	-2	0	1	4	-3	-2	-3	-1	-3	-1	-3	5	-5	0
27	You cannot trust warning messages from people coming from other villages.	-1	-2	-2	0	0	0	-3	-1	1	-1	-4	0	-2	1	0

(continued on next page)

Table 1 (continued)

No	Q-statements	The planner (female)	The troubled (male)	The protector (male)	The follower (female)	The stayer (female)	The cautious (female)	The realist (male)	The believer (female)	The anxious (female)	The religious (female)	The saviour (male)	The rational (male)	The housewife (female)	The guardian (male)	The optimist (mixed)
28	God decides who lives and dies.	0	3	0	0	1	0	2	4	0	3	4	4	4	0	0
29	An unmarried woman should not go to the shelter.	-1	-4	-5	-2	-1	-1	-5	-4	-1	0	-2	1	0	-2	-5
30	You can tell from the storm whether the cyclone will be strong.	4	-2	1	4	-1	3	0	3	-1	3	1	0	0	-1	-1
31	Some people are not allowed into the shelter.	-3	-5	-3	-3	0	-4	-2	-2	-2	-5	-3	-2	-4	-1	-2
32	Lack of time is the main problem.	2	0	-3	-1	-4	2	0	0	-2	-1	0	1	3	0	1
33	Terrible things may happen to you in the way to the shelter.	2	5	0	1	2	1	1	0	5	0	0	-1	0	3	0
34	When a volunteer tells me to evacuate I will.	2	-1	3	-4	0	-1	0	-1	3	2	1	-2	-2	-2	4
35	It is wrong for a man to evacuate and leave his wife behind.	1	0	1	4	4	4	3	2	4	1	5	4	3	1	0
36	The cyclone can rip the shelter apart.	-1	-1	-2	2	-1	1	0	1	-1	0	-2	2	1	2	1
37	It is better to die at home than in the shelter.	-2	-3	0	2	1	-1	-1	2	4	5	-1	-3	3	-2	-4
38	It does not feel right to leave the house.	-4	1	0	3	1	-5	-1	0	-1	1	-1	0	2	2	-1
39	I am afraid something may happen in the shelter.	0	-2	0	3	0	0	-1	-1	-1	1	-1	-1	1	1	3
40	People depend on natural warning messages.	5	0	-2	5	-1	4	2	-2	-4	4	1	-4	-1	2	-1

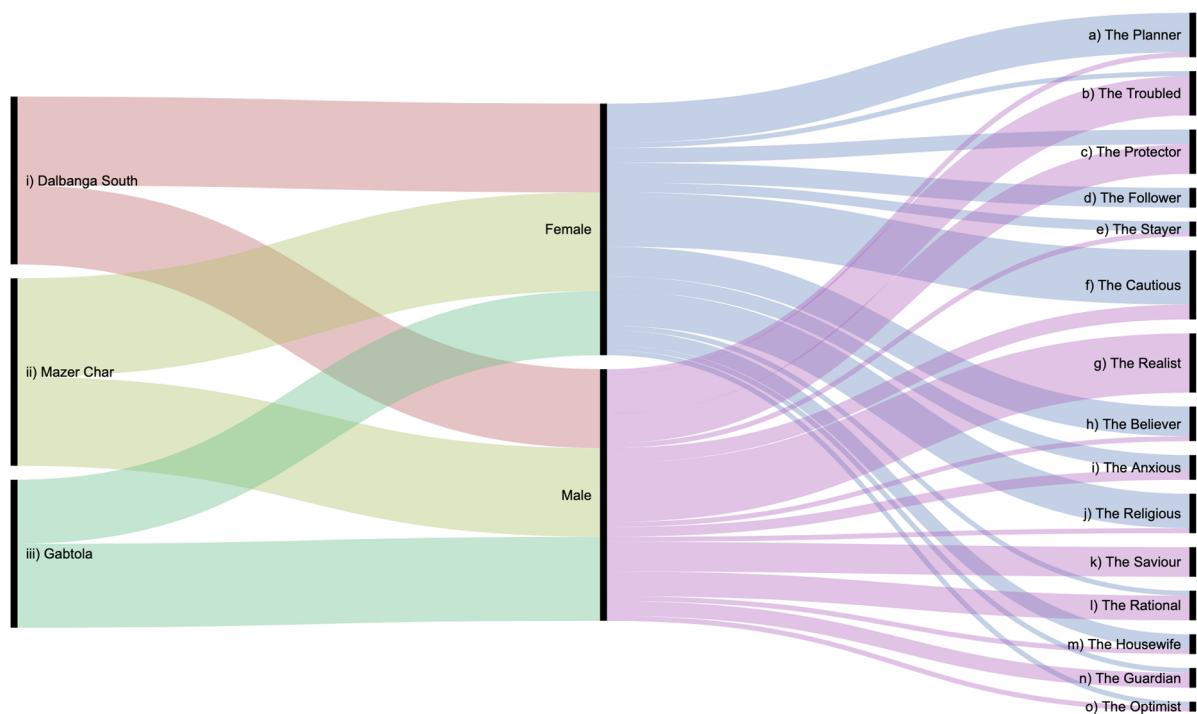


Fig. 2. Gender balance. Illustrates the gender balance (amount of male and female participants) in the analysed discourse groups and its division within the study sites.<sup>6</sup>

#### 4. Disentangling gendered (im)mobility

The discourse groups were identified through centroid factor analysis to detect factor patterns or inter-correlation between the Q-sorts, and rotated using Varimax in PQMethod (Watts and Stenner, 2012:96-100). Varimax rotation ensured that each Q-sort (or participant sorting of Q-statements) only loaded on or reflected the viewpoints of one factor group. The significant factor loading was calculated through the equation  $(2.58 \times (1/\sqrt{\text{No. of Q-sorts in Q-set}}))$  e.g.  $(2.58 \times (1/\sqrt{62})) = 0.33$ . Q-sorts loading on more than one factor group (cofounded) or non-significant Q-sorts (below 0.33) were not selected for further analysis. Eigenvalue above 1.00 served as selection criteria for factor extraction (Watts and Stenner, 2012:127-128, 197-199).

Out of the 15 discourses, a remarkable 14 were predominantly associated with either female or male participants (Fig. 2). The analysis will refer to male and female discourses (groups predominated by male or female participants) while acknowledging that gendered characteristics are social constructs reproduced by men and women. The groups named after the Q-based Discourse Analysis represent different discourses of cyclone evacuation (im)mobility (Table 2). For transparency, the interview extracts are referenced in brackets with informant number, statement number and sort value e.g. (informant: statement sort value) or (014:2 + 5) for informants and (2 + 5) for group ranking.

##### 4.1. Disaster preparedness can save lives but women are still not safe

Five discourses were identified in Dalbanga South where the selected un-rotated factors explain 48% of the study variance. 34 of the 62 participants were highly associated with the discourses. Study variance is the proportion of shared meaning (or factors) that the factor groups explain. Factor analysis (or the data reduction technique) inspects the correlation that identifies patterns of regularity in the Q-sorts (or viewpoints) expressed by the Q-participants (Watts and Stenner, 2012:98).

**The planner** (female) discourse group expressed the feeling that warning messages and evacuation save lives (Fig. 3). References to early warning messages included natural and technological systems. Natural early warning systems include practices, observations and indigenous knowledge used to estimate or project an oncoming cyclone. The natural warning systems used combine observations of changes in weather, movements of animals, and directions of wind and rivers:

Q1: Our elders are very experienced. They understand from the nature what is happening (014:40 + 4).

Q2: We start preparing when we get the warning signal (013:1 + 4).

<sup>6</sup> The author would like to acknowledge the generous contribution of Dr Christopher D. Smith who helped create Fig. 2, Fig. 3, Fig. 4, Fig. 5 and Fig. 6.

**Table 2**  
**Discourse groups' survey informant background.** An overview of the discourse groups' informant background, as well as their migration and evacuation histories that were captured in the survey questionnaire and post-sorting interview.

Discourse group	The planner (female)	The troubled (male)	The protector (male)	The follower (female)	The stayer (female)
<b>Women</b>	8	1	3	4	2
<b>Age</b>	26-62	39	19-34	27-56	27-34
<b>Livelihood</b>	Housewife	Day labour (fishing)	Housewife (1), farming (1), day labour (1)	Housewife	Housewife (2), farming (1), day labour (1)
<b>Men</b>	1	8	6	0	1
<b>Age</b>	16	32-66	30-60	-	55
<b>Livelihood</b>	Day labour	Fishing (5), farming (3), day labour (2), business (1)	Farming (5), fishing (2), day labour (2)	-	Day labour
<b>Total</b>	9	9	9	4	3
<b>Education</b>	Never attended school (3), up to 4 years (3), 8-10 years (3).	Most attended school up to 5 years (7).	Several informants attended school up to 9-12 years (3), others 2-4 years (5).	Most never attended school (3).	All attended school for 5-9 years.
<b>Migration history</b>	Most have never migrated anywhere. Only one informant migrated seasonally as a household for 1 month of work.	Most have never migrated anywhere. Three households have had family members migrated to Dhaka or Barisal several times for work (fishing and garment).	Most have never migrated anywhere. Two of the men have migrated to Dhaka in the past for day labour work.	Have not tended to seasonal, temporary or permanent migration.	Most have never migrated anywhere. One woman spent 10 years total in Dhaka working in the harbour.
<b>Evacuation history</b>	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 2 Evacuated: 3 To shelter: 1 <b>2009 Aila</b> Warning: 4 Evacuated: 6 To shelter: 1 <b>2013 Mahasen</b> Warning: 3 Evacuated: 4 To shelter: 1 <b>2014 Hudhud</b> Warning: 1 Evacuated: 2 To shelter: 1 <b>2016 Ronau</b>	<b>1970 Bhola</b> Warning: 1 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 1 To shelter: 0 <b>2007 Sidr</b> Warning: 4 Evacuated: 2 To shelter: 2 <b>2008 Nargis</b> Warning: 5 Evacuated: 3 To shelter: 1 <b>2009 Aila</b> Warning: 5 Evacuated: 2 To shelter: 4 <b>2013 Mahasen</b> Warning: 6 Evacuated: 2 To shelter: 4 <b>2014 Hudhud</b> Warning: 3 Evacuated: 0 To shelter: 1 <b>2016 Ronau</b>	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 1 To shelter: 0 <b>2007 Sidr</b> Warning: 6 Evacuated: 0 To shelter: 0 <b>2008 Nargis</b> Warning: 6 Evacuated: 3 To shelter: 1 <b>2009 Aila</b> Warning: 7 Evacuated: 2 To shelter: 2 <b>2013 Mahasen</b> Warning: 6 Evacuated: 4 To shelter: 4 <b>2014 Hudhud</b> Warning: 1 Evacuated: 0 To shelter: 0 <b>2016 Ronau</b>	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 1 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 1 Evacuated: 0 To shelter: 0 <b>2009 Aila</b> Warning: 0 Evacuated: 3 To shelter: 1 <b>2013 Mahasen</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2014 Hudhud</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2016 Ronau</b>	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 1 Evacuated: 1 To shelter: 0 <b>2007 Sidr</b> Warning: 1 Evacuated: 0 To shelter: 0 <b>2009 Aila</b> Warning: 2 Evacuated: 1 To shelter: 0 <b>2013 Mahasen</b> Warning: 1 Evacuated: 1 To shelter: 1 <b>2014 Hudhud</b> Warning: 1 Evacuated: 1 To shelter: 1 <b>2016 Ronau</b>

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Table 2 (continued)

Discourse group	The planner (female)	The troubled (male)	The protector (male)	The follower (female)	The stayer (female)
	Warning: 3 Evacuated: 2 To shelter: 1 <b>Evacuate next cyclone</b> Certainly: 8 Maybe: 1 No: 0 Never: 0	Warning: 5 Evacuated: 1 To shelter: 2 <b>Evacuate next cyclone</b> Certainly: 8 Maybe: 1 No: 0 Never: 0	Warning: 7 Evacuated: 0 To shelter: 2 <b>Evacuate next cyclone</b> Certainly: 7 Maybe: 2 No: 0 Never: 0	Warning: 0 Evacuated: 0 To shelter: 0 <b>Evacuate next cyclone</b> Certainly: 1 Maybe: 1 No: 1 Never: 1	Warning: 0 Evacuated: 0 To shelter: 0 <b>Evacuate next cyclone</b> Certainly: 2 Maybe: 1 No: 0 Never: 0
Discourse group	The cautious	The realist	The believer	The anxious	The religious
	(female)	(male)	(female)	(female)	(female)
<b>Women</b>	11	0	6	3	7
<b>Age</b>	15-58	-	14-50	14-45	29-60
<b>Livelihood</b>	Fishing (9), housewife (7), farming (5)	Fishing (4), housewife (4), business (1), day labour (1)	Farming (4), fishing (4), house wife (4), business (1), day labour (1)	Housewife (3), farmer (3), fishing (1)	Housewife (7), farming (4), fishing (4), day labour (3)
<b>Men</b>	3	12	1	2	1
<b>Age</b>	31-66	21-71	46	28-48	61
<b>Livelihood</b>	Fishing (2), farming (2), day labour (1)	Fishing (10), farming (9), business (3)	Farming, day labour	Farming (1), business (1), day labour (1)	Day labour
<b>Total</b>	14	12	7	5	8
<b>Education</b>	Never attended school (5), 2 years (1), 5 years (5), 8-11 years (3)	3 years (4), 5 years (4), 6-7 years (2), 8-10 years (2)	2 years (1), 5 years (2), 7 years (4)	Never attended school (1), 2 years (1), 5 years (1), 8 years (1), 10 years (1)	Never attended (2), 1-3 years (3), 5-7 years (3)
<b>Migration history</b>	Most have never migrated anywhere (11), but three people have seasonally migrated to Dhaka or Sylhet to carry out day labour for 1-4 years in total, one household have a family member who permanently migrated to Saudi Arabia.	Seven have not migrated in the past, four have carried out seasonal migration to Chittagong or Dhaka to work in construction or the garment industry, four households migrated for up to four years to Saudi Arabia and the UAE for day labour work.	Four have not tended to seasonal or permanent migration. Two migrated seasonally to Dhaka and Barisal to work in the garment factories, as day labours, or rickshaw pullers. Three moved to Dhaka and Chittagong for longer, 10-20 years, to work in the garment factories.	Two have not migrated in the past. Three migrated seasonally to Chittagong and Dhaka for day labour work for 2-5 years. Two migrated permanently to Dhaka and Chittagong for garment and security guard work but returned after 2-3 years. One migrated to Saudi Arabia for almost 6 years for day labour work.	Three women and one man tended to seasonal migration cutting woods or fishing in the Sundarban and coastal area having been away from home for about 6-7 years in total. Five of them have household members having migrated permanently to Dhaka or Chittagong for work but had to return.
<b>Evacuation history</b>	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 5 Evacuated: 6 To shelter: 2	<b>1970 Bhola</b> Warning: 1 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 11 Evacuated: 1 To shelter: 5	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 5 Evacuated: 0 To shelter: 0	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 5 Evacuated: 2 To shelter: 3	<b>1970 Bhola</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>1991 Gorky</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2007 Sidr</b> Warning: 5 Evacuated: 5 To shelter: 1

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Table 2 (continued)

Discourse group	The cautious (female)	The realist (male)	The believer (female)	The anxious (female)	The religious (female)
	<p><b>2008 Nargis</b> Warning: 2 Evacuated: 0 To shelter: 1 <b>2009 Aila</b> Warning: 5 Evacuated: 7 To shelter: 2 <b>2013 Mahasen</b> Warning: 4 Evacuated: 0 To shelter: 1 <b>2014 Hudhud</b> Warning: 3 Evacuated: 0 To shelter: 1 <b>2016 Ronau</b> Warning: 3 Evacuated: 0 To shelter: 1 <b>Evacuate next cyclone</b> Certainly: 9 Maybe: 2 No: 1 Never: 2</p>	<p><b>2008 Nargis</b> Warning: 7 Evacuated: 1 To shelter: 3 <b>2009 Aila</b> Warning: 10 Evacuated: 0 To shelter: 6 <b>2013 Mahasen</b> Warning: 8 Evacuated: 1 To shelter: 4 <b>2014 Hudhud</b> Warning: 2 Evacuated: 0 To shelter: 2 <b>2016 Ronau</b> Warning: 9 Evacuated: 1 To shelter: 3 <b>Evacuate next cyclone</b> Certainly: 10 Maybe: 2 No: 0 Never: 0</p>	<p><b>2008 Nargis</b> Warning: 4 Evacuated: 3 To shelter: 3 <b>2009 Aila</b> Warning: 5 Evacuated: 5 To shelter: 2 <b>2013 Mahasen</b> Warning: 4 Evacuated: 1 To shelter: 1 <b>2014 Hudhud</b> Warning: 2 Evacuated: 0 To shelter: 1 <b>2016 Ronau</b> Warning: 5 Evacuated: 4 To shelter: 3 <b>Evacuate next cyclone</b> Certainly: 4 Maybe: 1 No: 2 Never: 0</p>	<p><b>2008 Nargis</b> Warning: 4 Evacuated: 2 To shelter: 4 <b>2009 Aila</b> Warning: 5 Evacuated: 3 To shelter: 4 <b>2013 Mahasen</b> Warning: 3 Evacuated: 1 To shelter: 3 <b>2014 Hudhud</b> Warning: 1 Evacuated: 0 To shelter: 1 <b>2016 Ronau</b> Warning: 1 Evacuated: 0 To shelter: 1 <b>Evacuate next cyclone</b> Certainly: 4 Maybe: 1 No: 0 Never: 0</p>	<p><b>2008 Nargis</b> Warning: 3 Evacuated: 2 To shelter: 0 <b>2009 Aila</b> Warning: 7 Evacuated: 5 To shelter: 4 <b>2013 Mahasen</b> Warning: 2 Evacuated: 1 To shelter: 0 <b>2014 Hudhud</b> Warning: 0 Evacuated: 0 To shelter: 0 <b>2016 Ronau</b> Warning: 5 Evacuated: 2 To shelter: 0 <b>Evacuate next cyclone</b> Certainly: 6 Maybe: 1 No: 0 Never: 0</p>
Discourse group	The saviour (male)	The rational (male)	The housewife (female)	The guardian (male)	The optimist (mixed)
<b>Women</b>	0	1	3	1	1
<b>Age</b>	-	24	26-56	26	14
<b>Livelihood</b>	-	Farming, business, housewife	Housewife (2), day labour (1), fishing (1)	Housewife	Fishing
<b>Men</b>	6	5	1	3	1
<b>Age</b>	30-66	18-49	47	34-70	34
<b>Livelihood</b>	Day labour (5), farming (3), business (2), fishing (2)	Fishing (4), day labour (1)	Fishing	Business (1), day labour (1)	Business, farming
<b>Total</b>	6	6	4	4	2
<b>Education</b>	Most attended 2-3 years (4), 5-6 years (2).	Never attended (1), 3-4 years (2), 6-10 years (3).	Most never attended school (3).	Most attended 5-8 years (3).	Attended 8-10 years (2).
<b>Migration history</b>	Four men migrated seasonally for about 7-10 years in total to cut wood or construction work. Two of them also migrated to Dhaka permanently but later returned.	Most have never migrated anywhere (4). One man migrated seasonally to Dhaka for two months to work in a garment factory, and another man permanently to	One woman estimate that her husband have been in the Sundarbans for 20 years in total cutting wood, and one man in Dhaka seasonally for 8 years in	One man and one woman migrated seasonally for garment factory work for a total of 4 years each.	The man migrated permanently to Dhaka and opened up a shop there for a year. The woman work in a garment factory in Chittagong.

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Table 2 (continued)

Discourse group	The saviour (male)	The rational (male)	The housewife (female)	The guardian (male)	The optimist (mixed)
Evacuation history	<p>1970 Bhola Warning: 0 Evacuated: 0 To shelter: 0</p> <p>1991 Gorky Warning: 1 Evacuated: 0 To shelter: 0</p> <p>2007 Sidr Warning: 5 Evacuated: 2 To shelter: 2</p> <p>2008 Nargis Warning: 6 Evacuated: 2 To shelter: 1</p> <p>2009 Aila Warning: 6 Evacuated: 5 To shelter: 2</p> <p>2013 Mahasen Warning: 2 Evacuated: 0 To shelter: 0</p> <p>2014 Hudhud Warning: 0 Evacuated: 0 To shelter: 0</p> <p>2016 Ronau Warning: 2 Evacuated: 0 To shelter: 0</p> <p>Evacuate next cyclone Certainly: 6 Maybe: 0 No: 0 Never: 0</p>	<p>Chittagong to work in a garment factory there but returned after 5 years.</p> <p>1970 Bhola Warning: 0 Evacuated: 0 To shelter: 0</p> <p>1991 Gorky Warning: 0 Evacuated: 0 To shelter: 0</p> <p>2007 Sidr Warning: 5 Evacuated: 2 To shelter: 1</p> <p>2008 Nargis Warning: 6 Evacuated: 1 To shelter: 1</p> <p>2009 Aila Warning: 6 Evacuated: 5 To shelter: 2</p> <p>2013 Mahasen Warning: 5 Evacuated: 3 To shelter: 2</p> <p>2014 Hudhud Warning: 5 Evacuated: 3 To shelter: 2</p> <p>2016 Ronau Warning: 6 Evacuated: 4 To shelter: 3</p> <p>Evacuate next cyclone Certainly: 6 Maybe: 0 No: 0 Never: 0</p>	<p>total pulling rickshaw, as well as migrating permanently twice - once to Dhaka and once to Khulna for about 6-7 years each time.</p> <p>1970 Bhola Warning: 0 Evacuated: 0 To shelter: 0</p> <p>1991 Gorky Warning: 0 Evacuated: 0 To shelter: 0</p> <p>2007 Sidr Warning: 3 Evacuated: 0 To shelter: 1</p> <p>2008 Nargis Warning: 2 Evacuated: 1 To shelter: 0</p> <p>2009 Aila Warning: 4 Evacuated: 4 To shelter: 2</p> <p>2013 Mahasen Warning: 1 Evacuated: 1 To shelter: 1</p> <p>2014 Hudhud Warning: 1 Evacuated: 1 To shelter: 1</p> <p>2016 Ronau Warning: 1 Evacuated: 1 To shelter: 1</p> <p>Evacuate next cyclone Certainly: 1 Maybe: 1 No: 1 Never: 1</p>	<p>1970 Bhola Warning: 1 Evacuated: 0 To shelter: 0</p> <p>1991 Gorky Warning: 2 Evacuated: 0 To shelter: 0</p> <p>2007 Sidr Warning: 4 Evacuated: 1 To shelter: 0</p> <p>2008 Nargis Warning: 3 Evacuated: 2 To shelter: 1</p> <p>2009 Aila Warning: 4 Evacuated: 3 To shelter: 2</p> <p>2013 Mahasen Warning: 3 Evacuated: 1 To shelter: 1</p> <p>2014 Hudhud Warning: 3 Evacuated: 1 To shelter: 1</p> <p>2016 Ronau Warning: 3 Evacuated: 1 To shelter: 1</p> <p>Evacuate next cyclone Certainly: 3 Maybe: 1 No: 0 Never: 0</p>	<p>1970 Bhola Warning: 0 Evacuated: 0 To shelter: 0</p> <p>1991 Gorky Warning: 0 Evacuated: 0 To shelter: 0</p> <p>2007 Sidr Warning: 1 Evacuated: 1 To shelter: 1</p> <p>2008 Nargis Warning: 2 Evacuated: 1 To shelter: 0</p> <p>2009 Aila Warning: 2 Evacuated: 2 To shelter: 1</p> <p>2013 Mahasen Warning: 2 Evacuated: 1 To shelter: 0</p> <p>2014 Hudhud Warning: 1 Evacuated: 0 To shelter: 0</p> <p>2016 Ronau Warning: 1 Evacuated: 0 To shelter: 0</p> <p>Evacuate next cyclone Certainly: 2 Maybe: 0 No: 0 Never: 0</p>

## Dalbanga South

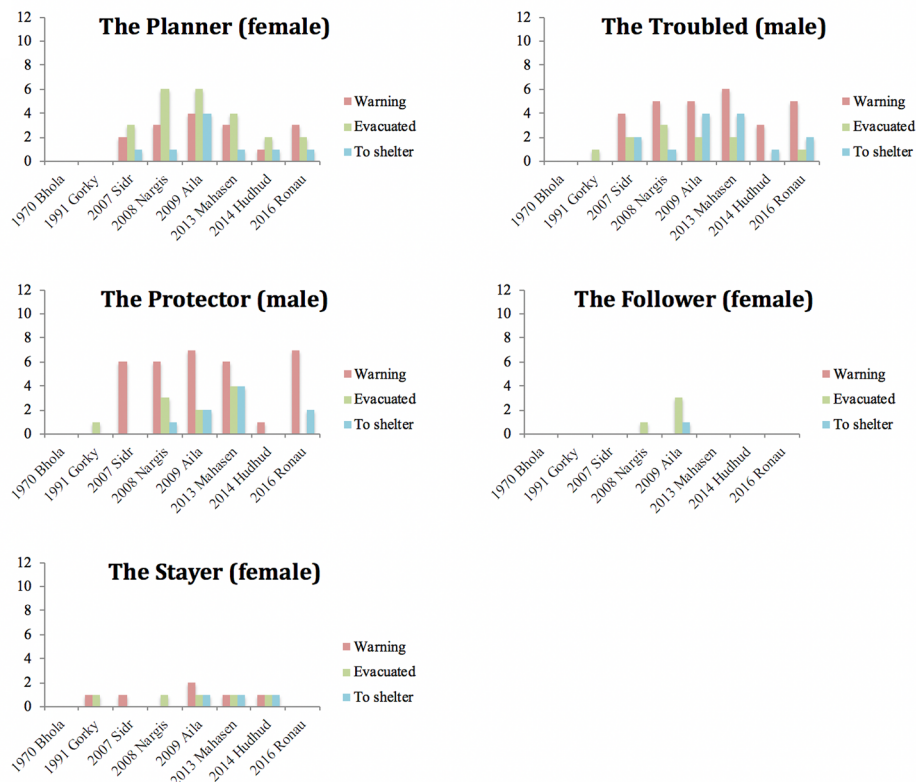


Fig. 3. Dalbanga South early warning and evacuation history. The graphs present an overview of people's survey responses regarding having received early warning messages and having evacuated during previous cyclone strikes.

*The planner* clearly separated the home and shelter as unsafe and safe spaces. The shelter was safer since a house could not save lives, or withstand flooding and storm surges:

Q3: The shelter is safer than my house so I must go there (002:20 +4).

Q4: We will not be able to save our lives if we stay at home (053:38 -5).

Q5: If the water level raises too high, a house will not be able to save us (055:38 -5).<sup>7</sup>

*The troubled* (male) expressed diverse fears related to shelter evacuation and the cyclone strikes. Their unwillingness to evacuate was often explained by fear of leaving valuables behind. Future scenarios of what may happen to the valuables and how this could affect the family's wellbeing created distress. The Bengali term '*mulloban jinispotro*' was used to define 'valuable things' – mainly portable valuables such as documents of value (often for property, assets and agreements) and jewellery. Valuables were often behind delays or failure to evacuate to the shelter:

Q9: It has taken me hard work to get my valuables together so I cannot just leave them behind (025:7 +5).

Q10: It is very hard to leave without my valuables (027:7 +4).

The narratives also captured fear around what may happen on the way to the shelter. The dangers described included injuries and deaths from falling trees. In other storylines the severity of the dangers were clarified with adjectives such as 'terrible' or 'horrendous':

Q11: Sometimes when we go, people get injured or even die from falling trees (034:33 +4).

Q12: We are very afraid that something terrible may happen to us (035:33 +4).

Despite their fears around evacuation, *The troubled* strongly emphasised that everyone, women and men, had the right to

<sup>7</sup> See supplementary material Q6 to Q8 for more examples.

## Mazer Char

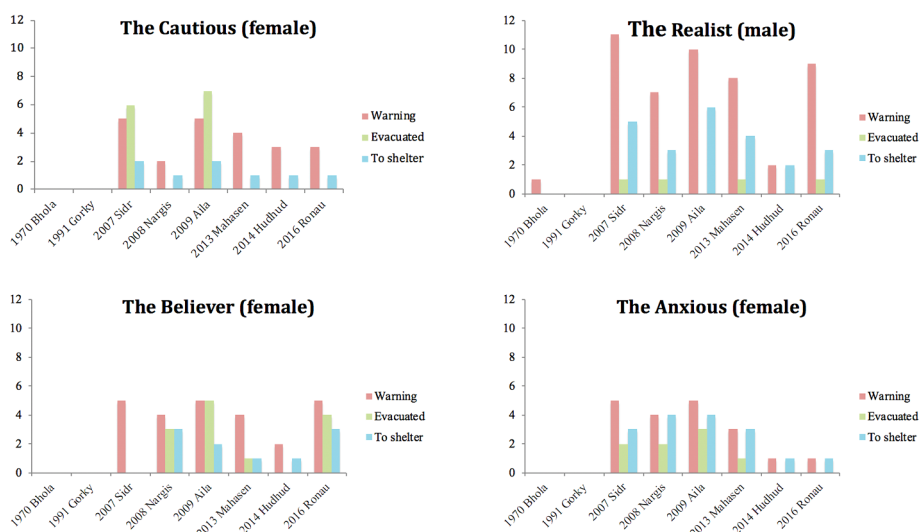


Fig. 4. Mazer Char early warning and evacuation history. The graphs present an overview of people's survey responses regarding having received early warning messages and having evacuated during previous cyclone strikes.

evacuate and seek safety in the cyclone shelter:

Q13: That would not be fair. Everybody deserves safety (043:19 –5).

Q14: Every man can go there (025:19 –4).<sup>8</sup>

*The protector* (male) shared some values with *The troubled* by outlining the right for everyone to seek shelter. *The protector*, however, added the importance of disaster training and that a man must protect his whole family (not just himself). The move to the shelter was narrated as a responsibility to keep family members safe so that a man ought never to leave their family behind. The narratives described collective mobilities where evacuation always had to come first. The time to discuss why people may not have wanted to evacuate was when everyone was in safety in the shelter:

Q17: I must go to be able to keep my family safe (015:15 +4).

Q18: Everyone must go there, then after arriving we can discuss (029:15 +5).

Q19: I have a responsibility towards my family (028:12 +4).

Concerning *The protector's* individual evacuation decision-making, no priorities came before safety. It would simply not be wise to refrain from seeking shelter:

Q20: Being safe is my first priority (015:19 –4).

Q21: That would be a bad decision [to not go to the shelter] (018:20 –5).<sup>9</sup>

*The follower* (female) also brought up the importance of natural early warning messages. It is interesting that several female discourses pointed this out. According to *The follower*, it would be wrong of a man to evacuate and leave his wife behind. A husband's first priority must be to protect his wife. This 'natural' order was explained by the superior knowledge and ability of the male. A man was simply smarter than a woman and knew better how to handle difficulties:

Q24: I will know first of all due to the nature (012:40 +5).

Q25: A wife should be a husband's first priority (011:35 +4).

Q26: A husband knows how to handle things smarter (012:35 +4).

The shelter was not particularly unsafe for women but *The follower* did not feel safe there. When it came to the word of a disaster volunteer it did not measure up to the word of a husband. *The follower* would not necessarily evacuate because it was the order of a

<sup>8</sup> See supplementary material Q15 to Q16 for more examples.

<sup>9</sup> See supplementary material Q22 to Q23 for more examples.

volunteer since the husband was the ultimate decision-maker:

Q27: My house is safer than the shelter (010:14 –4).

Q28: They can very well tell me to evacuate but I will follow my husband's instructions (012:34 –4).<sup>10</sup>

Female **The stayer** was certain that women were unsafe in the cyclone shelters - a woman belongs at home. The lack of safety in the shelter is related to the crowds that increased risks to females. The storylines described other women's lack of safety as well as their own. **The stayer** expressed strongly disliking the shelter space and not feeling comfortable in there:

Q35: Crowds create an increased risk for women so they are not safe in the shelter (057:4 + 5).

Q36: I agree with this, women are not safe in the shelter (017:4 + 4).

Q37: I do not like the shelter. I must agree with this (017:35 + 5).

**The stayer** also clarified that the lack of safety had nothing to do with fear of the shelter collapsing or that delayed warning messages would pose increased evacuation risks. **The stayer** did not lack time to evacuate, nor did they get the warning messages too late. The discourse group felt strongly that they should not seek shelter outside the home. This tied into their female responsibility over the house and its family members. Their ultimate role was to stay behind and look after the cattle, furniture and household:

Q38: I cannot just leave my house that easy. I should try to stay until the end. I have a responsibility to my household, to my cattle, and my furniture (004:26 + 5).

Q39: I usually get the warning quickly (004:23 –4).

Q40: I do not think there is any chance of the shelter breaking (057:36 –4).<sup>11</sup>

Out of the five, only **The stayer** disagreed with the statement '**Evacuating is the right thing to do (15–2)**'. The narrative strongly illustrated how gender and social roles regulated normative behaviour.

#### 4.2. 'Natural' female intuition and masculine protection

Female and male discourses in Dalbanga South paid importance to early warning systems. However, interestingly, only female discourses mentioned natural systems. Women described trusting and depending on nature, feelings and intuition to anticipate the cyclones. Meanwhile, male discourses described a responsibility and a duty to protect and guard over finances and personal safety. It was problematic to leave valuables or family members behind. The family's survival was a husband's core liability. **The follower** (female) confirmed this obligation as resulting from male psychological and emotional pressure. The distress was articulated by male discourses through the fear, worry and anxiety surrounding the risks that evacuation posed upon family members.

The analysis revealed different viewpoints around women's safety, their right to seek shelter outside the home, and the nature of inappropriate spaces – particularly for unmarried women. It should be acknowledged that 'unmarried women' often referred to 'unmarried girls' as in rural Bangladesh many women marry at a relatively young age. Male discourses outlined everybody's right to safety and shelter place (including unmarried women), but female **The follower**, although agreeing with their right to be safe, clarified that no place is safe. As nobody truly knew their destiny, the house felt safer. Meanwhile, **The stayer** (female) pushed women's lack of safety in the shelter further as crowds implied increased risks to women. The concrete building may be physically strong, but is viewed as unsafe due to social risks. Women were narrated as better off waiting out the cyclones at home and felt obliged to stay behind to care for the household. Long evacuation distances also posed dangers so the correct choice was to stay at home. The discourses revealed several gendered immobility aspects that delicately illustrate the value of analysing 'trapped' populations through a gender-lens. The gendered disaster immobility, and its aligned evacuation reasoning, ran through female as well as male discourses.

#### 4.3. Safe uncertainty – Fearing death but trusting God's decision-making power

Four discourses, whereof three female, were identified on Mazer Char island. The selected un-rotated factors explain 48% of the study variance and 38 of the 62 participants were highly associated with the discourses. Overall, people focused more on the lack of space in the shelter(s) and less on women's safety. **The cautious** (female) explained how important early warning systems are for people as they anticipate the approaching dangers (Fig. 4). This included natural systems such as the observation of rivers and animals:

Q44: That is how I will know when the danger is coming (065:1 + 5).

Q45: We read various natural signals. We, for example, observe the sound and movement of the river and how the crabs move (068:40 + 5).

<sup>10</sup> See supplementary material Q29 to Q34 for more examples.

<sup>11</sup> See supplementary material Q41 to Q43 for more examples.

## Gabtola

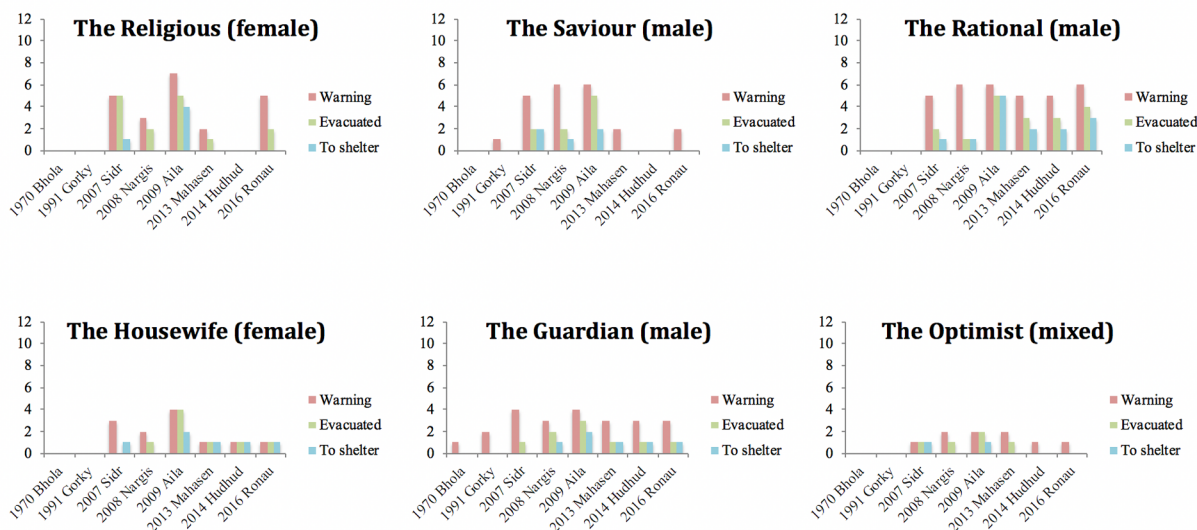


Fig. 5. Gabtola early warning and evacuation history. The graphs present an overview of people's survey responses regarding having received early warning messages and having evacuated during previous cyclone strikes.

*The cautious* felt strongly that men never ought to leave women or children behind during the cyclone strikes. Men were described as stronger and more intelligent and therefore must protect and keep their families safe:

Q46: A husband is responsible and must protect his wife (074:35 +4).

Q47: A husband should keep his wife and family safe as he is stronger and more intelligent (069:35 +4).

*The cautious* opposed any likelihood of staying behind and waiting out the cyclones at home. To survive they had to evacuate to the shelters emphasizing that the shelter was made for everyone:

Q48: If we want to live we will have to go to the shelter (093:38 -5).

Q49: The shelter is made for everyone (076:31 -4).<sup>12</sup>

*The realist* (male), a young group in their 20–30 s, thought the main issue was the lack of space in the shelter. The village simply needed more cyclone shelters. It was not that people did not want to evacuate, but that the limited space prevented them from trying:

Q57: There is not enough space in the shelter but we still have to go there (087:24 +5).

Q58: We need more cyclone shelters (078:24 +5).

Q59: If there is not enough space there, then people will stop going (089:24 +4).

Besides the limited space, most people in this group also lived too far away from the shelters. The long distances meant that people often could not come to the shelter without putting their lives at risk:

Q60: It is because of the long distance that most people cannot come to the shelter (100:22 +5).

Q61: The shelter is quite far from us. People may die on the way there (085:22 +4).

*The realist* did not think that the warning messages were irregular, confusing, or unclear, but that they were heard loud and clear. Women (including unmarried) were also safe in the shelter, but *The realist* felt that they should be accompanied by a father or brother who could protect them:

Q62: An unmarried woman should be accompanied by her father or brother (085:29 -5).

Q63: They are safe in the shelter (087:4 -4).

Q64: I hear the warning loud and clear (089:18 -4).<sup>13</sup>

<sup>12</sup> See supplementary material Q50 to Q56 for more examples.

**The believer** (female) had to evacuate to the shelters for their own safety. Evacuating was the right thing to do so one should listen to villagers or accommodate around things making sure to seek shelter when encouraged. In the end however, **The believer** explained, who was to live and who was to die would all be up to God's will:

Q80: We need to go there for our safety (072:15 +5).

Q81: Allah can do what he wants as he is the Almighty (116:28 +4).

Q82: Allah knows everything (120:3 +5).

**The believer** clarified that the shelter did not lack space but that the space was badly organised. The warning messages came through various channels including TV, radio and volunteers so the system worked fine. Finally, **The believer** clarified that unmarried women had the same human rights as others. They should therefore evacuate or seek shelter just like the rest of the village:

Q83: I get the warning from the volunteers, TV and radio. There are no obstacles here (072:18 -4).

Q84: There is enough space but it is not organised (120:24 -4).

Q85: Unmarried women are human beings too (118:29 -4).<sup>14</sup>

**The anxious** (female), in their 40 s, differed substantially from other female discourses. The discourse did not think people relied on natural warnings as people required more time to read them. **The anxious** explained that they sometimes did not even evacuate when told to by the disaster preparedness volunteers:

Q95: Most people do not wait or listen to natural early warning messages (102:40 -5).

Q96: Sometimes we do not go to the shelter although the volunteers tell us to evacuate (110:34 0).

The reasoning around the non-evacuation behaviour was emotionally loaded. **The anxious** expressed pure terror around what could happen to them. They could very well end up dying on the way to the shelter, a fear that may be incomprehensible for those who never experienced a cyclone strike. All in all it was simply better to die at home than in the shelter:

Q97: If we try to go to the shelter after the cyclone has started, we could all end up dying on the way there (110:33 +5).

Q98: He who has not experienced a cyclone may never understand its danger (109:16 +4).

Q99: I very much agree with this statement. I want to die in my house (102:37 +4).

Despite the fear and hesitance of evacuating **The anxious** thought it was wrong of a man to leave a woman behind. Everyone should stay together as a family – survive or die together. The shelter space was not described as an inappropriate space for women, but anything could happen there so unmarried women better stay home:

Q100: Your family may die. We have to stay together. If we die, then we all die together (109:12 +5).

Q101: Anything could happen to unmarried girls (097:29 +4).<sup>15</sup>

It appeared that some discourses had accepted living in a state of safe uncertainty 'when the lack of certainty around future climate threats do not necessarily limit people to feel secure' (Mason, 1993; Ayeb-Karlsson et al., 2019b). It was highly uncertain when the next cyclone would strike and whether people would survive, but diverse strategies to achieve safety in the uncertainty streamed through the discourses. For example, leaning in and accepting God as the ultimate decision-maker appeared to be a way to ease female fear over what could happen, and male anxiety over failing to protect the lives of family members.

#### 4.4. Male lack of physical place – Female lack of social space

Several female discourses emphasised the importance of natural warning signals, although **The anxious** disagreed as people did not have time for intuition. It should, however, be noted that as the data was analysed separately for each study site there will be some overlaps and similarities in the results. Male **The realist** felt that people did not evacuate to the shelters due to their locations and lack of space. People were afraid that they would not reach the shelter in time, or that it would be full when they got there. Female **The believer** disagreed and said that the available space was disorganised.

Male discourses proposed that women (including unmarried) were safe in the shelters, while female **The believer** clarified that women's safety and survival depended on God. The Almighty Allah controlled all death and survival leading them to put their faith in God's hands. **The anxious** (female) disagreed with unmarried women evacuating. Terrible things could happen to them on the way to the shelter or once there – separating married and unmarried women. Only **The anxious** described their own immobility, while others referred to collective (im)mobility. Not only did they fear dying en route, but they also preferred to die at home than in the shelter.

<sup>13</sup> See supplementary material Q65 to Q79 for more examples.

<sup>14</sup> See supplementary material Q86 to Q94 for more examples.

<sup>15</sup> See supplementary material Q102 to Q109 for more examples.



The narratives circled around several levels of death anxiety, such as the fear of dying alone, on the way to, or in the shelter. The risk of the shelter collapsing due to cracks in the building posed another danger. Mistrust around the warnings of disaster volunteers and villagers of approaching cyclones were other reasons to stay behind.

#### 4.5. Allah the almighty decision-maker encourages home-based safety

Six discourses were identified in Gabtola where the selected un-rotated factors explain 54% of the study variance. 30 of the 62 participants were highly associated with the discourses. The discursive values here were strongly linked to religion and described self-experienced immobility rather than collective immobility.

**The religious** (female) clarified that life and death was essentially up to God. It was therefore irrelevant if a person remained at home or had made it to a shelter since their survival remained in God's hands (Fig. 5). If it were God's will for a person to be saved from the cyclone, then they would be saved within the four walls of the home. If God's will was instead for that person's time to have come, they would have to face death, whether in the shelter or at home. As only God knew the outcome it was better to remain at home than to seek shelter. In that way one could die with respect:

Q110: If God wants to save us, he will save us at home (147:37 +5).

Q111: [It is better to die at home] because I want to die with respect (172:37 +5).

The narrative of **The religious** strongly circulated around the Almighty Allah as the ultimate decision-maker and world creator. Allah knows everything, decides everything and nobody has the power to change the decisions or determine their own fate. Interestingly, this devotion and certainty around God's will eased fear and anxious feelings around the cyclone strikes – **The religious** were not afraid of dying at all:

Q112: Allah knows everything (173:6 +5).

Q113: Allah decides everything (173:28 +4).

Q114: No one can change God's decision. Allah knows everything (147:28 +4).

Q115: If Allah decides to save us, then nobody can lead us down the path of death (173:16 –4).

**The religious** made an important distinction between availability and safety in regards to the shelter space. The shelter is available for all, but lack of safety for women. This unsafety was narrated around religious devotions. Muslim women in particular were not safe due to the lack of religious privacy and obligations. Unmarried women faced problems in the shelter as they could not secure their privacy and young men would tease and harass them. It should be acknowledged that 'teasing' in a South Asian context is a euphemism referring to 'Eve-teasing', a term used to describe sexual harassment and molestation of women by men, often in public places and by strangers. As Eve refers to the biblical creation story, and refers to the temptress 'nature' of Eve it places responsibility on women while minimising the seriousness of the offense:

Q116: That women are not safe in the shelter is important in relation to religious privacy - especially for Muslims (182:4 +4).

Q117: Women with family members are safe in the shelter (147:4 –4).

Q118: Unmarried women face problems in the shelter. Young men sexually harass or 'tease' them and they cannot maintain their privacy (181:29 0).

Q119: I am a poor man, so if I have the right to be safe then why would not others have the same right (172:31-5).

Similarly to other female discourses, **The religious** believed that natural warning signals and traditional knowledge should be acknowledged. In terms of the existing technological early warning systems they saw no issues:

Q120: I believe and trust in what the elders tell me (135:40 +4).

Q121: I receive the warning each time and very quickly (135:18 –4).<sup>16</sup>

**The saviour** (male) felt strongly that their ultimate responsibility was to protect and save the lives of their family members – particularly women in the household. Female family members are their sole responsibility and should therefore never be left behind. Women should therefore be taken to the shelter with the children by **The saviour** before they evacuate themselves. Interestingly, it seemed that the option for women to wait out the cyclone at home had not even crossed their minds 'Where is she supposed to go if not to the shelter?', they asked. **The saviour** saw their saviour role as fundamental to their existence – any questions beyond the survival of their family were met with ambivalence as losing them meant losing their reason to live:

Q130: I cannot leave her in any situation at all. She is my responsibility (151:35 +5).

Q131: Where is she supposed to go? She is my responsibility (143:35 +4).

Q132: I took my family members to the shelter first. If they do not survive then what is the point living (152:12 +5).

<sup>16</sup> See supplementary material Q122 to Q129 for more examples.

**The saviour** also felt that the death of every single person depended on Allah, but there was an interesting distinction from the female discourse; God only saved those who attempted saving themselves. People must at least try to evacuate in order for God to save their lives:

Q133: The death of every single man depends on Allah (143:28 +4).

Q134: We believe in Allah, but Allah only helps those who helps themselves. So we have to at least try to survive (151:6 0).

**The saviour** saw a clear reason to evacuate. It would be foolish not to as it could end up costing them their lives. People were truthful when it came to cyclone warnings including from strangers – nobody would lie about such a thing. **The saviour** declined the existence of potential mistrust or suspicion expressed by others around ‘outsiders’ as being thieves who would try to steal belongings after people have evacuated:

Q135: This would be foolish. If we do not go, we will end up losing everything (151:20 –5).

Q136: This is foolishness, you will end up dying thinking like that (140:20 –4).

Q137: We are all truthful about these things, nobody would give false information about a cyclone strike (140:27 –5)<sup>17</sup>

**The rational** (male) felt that nobody wanted to leave their belongings behind. The Bengali word ‘*jinisprotro*’ was used for belongings referring to portable and non-portable things including possessions, items, and goods. The emotional effort made to force oneself to leave belongings behind was strongly captured in the narratives. Leaving family members behind however, was seen as unacceptable as women were every ‘man’s responsibility’:

Q150: Nobody wants to leave their belongings behind. They try their best to leave behind what they can in accordance to their very best efforts (166:25 +4).

Q151: There is no other way. I have to leave my house and go to the cyclone shelter (170:20 –5).

Q152: Nobody can leave their family behind, family is a man’s liability (167:35 +4).

**The rational** had strong reason to evacuate and always got the early warning messages in time. The discourse added an interesting aspect to the natural warning signals, by clarifying that they are important and should work, but due to climate change they cannot be relied upon anymore:

Q153: I always get the warning in time (166:23 –5).

Q154: Nowadays, the climate has changed so the natural signs are not really working anymore (170:40 –4).

**The rational** noted that lack of space in the shelters was a serious concern. One could never be certain that there would be space available once reaching the shelter. Space restrictions could potentially force people to continue their evacuation route to another shelter, or make them try to survive the cyclone on the stairs leading up to the shelter, resulting in plenty of death in the village. Finally, one could die on the way to the shelter, painting a picture of the immensely difficult life and death decisions people face during the cyclone strikes:

Q155: It is true that there is not enough space in the shelter. Plenty of death has occurred due to this reason (165:24 +4).

Q156: I never know whether I will reach the shelter safely. My neighbour died on his way there (156:3 0).<sup>18</sup>

**The housewife** (female) expressed strong feelings about wanting to wait out the cyclones at home. The home was described as their ‘everything’. This was where they wished to die, in the comfort of their own homes. Adding to this, they strongly disliked the crowds that gather in the public cyclone shelters. Their place was at home and nowhere else, **The housewife** emphasised:

Q168: I do not like crowds and gatherings. I want to stay in my house up until my death (179:26 +5).

Q169: My wish is to die at home (169:26 +4).

Q170: My home is everything. So I want to stay in my house (139:26 +4).

The religious discourse expressed similar fearlessness around death as other religious female groups. **The housewife** felt no fear, just as God had created them, He would one day bring them back. This belief aligned with being a good Muslim. One needed to believe, give in to, and trust, that they were not in control. God had a higher plan for them all and would ultimately decide who lived and died. This gave fundamental peace to **The housewife** that eliminated fear, stress and anxiety around the cyclone strikes and their outcomes:

Q171: I have to believe in this as a Muslim. That God decides who lives and dies (169:28 +5).

<sup>17</sup> See supplementary material Q138 to Q149 for more examples.

<sup>18</sup> See supplementary material Q157 to Q167 for more examples.

## Likelihood of future evacuation

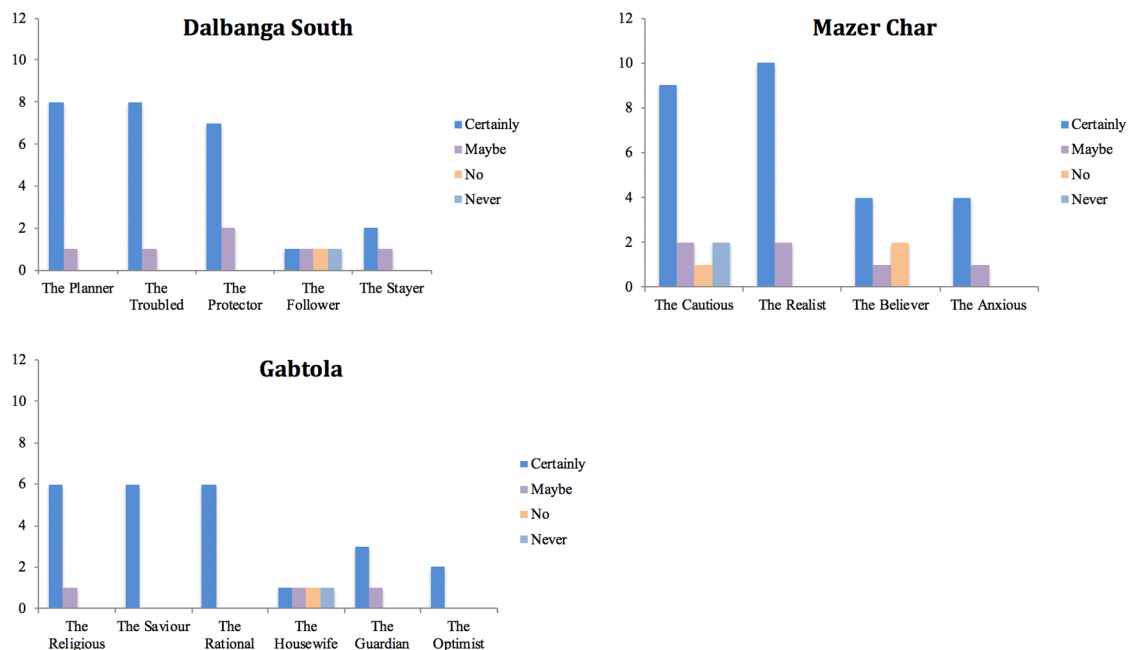


Fig. 6. The graph presents an overview of people's survey responses regarding the likelihood of evacuating during a cyclone strike in the future.

Q172: Only Allah can decide who lives and dies (139:28 +4).

Q173: I have no fear of death. Allah created us and one day he will take us away (179:16 -5).

*The housewife* strongly felt that there was no point in evacuating. One woman had lost her son and therefore did not want to go to the shelter. Another expressed disliking the chaos in the shelters. She did not want to go anywhere and would stay in her house until the day she died. A third woman described the extreme emotional distress she felt in the shelter by comparing it with suffocation. She felt as if she was gasping for air in the restricted space. *The housewife* also agreed that unmarried women should not evacuate to the shelters. They could not be stopped from going but should not be doing so:

Q174: I lost my son so I do not want to go to the shelter (139:20 +5).

Q175: I do not want to go anywhere. I do not like the chaos. I want to stay in my house up until the day I die (179:20 +4).

Q176: There is no space. I feel suffocated in there (180:19 +4).

Q177: Sometimes I think this is true, that unmarried women should not go to the shelter, but I suppose you cannot stop anyone from going (179:29 0).

*The housewife* made sure to clarify that their non-evacuation behaviour had nothing to do with early warning system failure or lack of warning messages. They got the warnings fine and everyone was allowed into the shelters:

Q178: We get the signal on time (180:18 -4).

Q179: Everyone is allowed in (169:31 -4).<sup>19</sup>

*The guardian* (male) gave detailed elaborations around the value and importance of disaster preparedness training and early warning systems. They expressed proudness around their preparedness knowledge, such as 'I know just how to prepare', and explained in detail why disaster training and early warning systems are important. 'The training helps us understand what to do and what not to do', they said, and 'warning messages are the most important thing to us as they tell us when to start preparing':

Q187: If we get training we will be better prepared (158:10 +5).

Q188: The training is very important as it helps us understand what to do, and what not to do. It gives us a complete overview of how to prepare (134:10 +4).

<sup>19</sup> See supplementary material Q180 to Q186 for more examples.

Q189: Early warning messages are the most important thing for us to be able to know when to start preparing (134:1 +5).

Q190: I know just how to prepare. The volunteers taught us about the flags (134:13 +4).

*The guardian* felt strongly that a man should never leave his family behind. One man even clarified that nobody can do that unless they did not understand the true value of a family. He knew this as his family was not present at that moment. Having a family and being able to protect them were described as core-elements of masculine social value:

Q191: No one can do this. I know the true value of family. My family is not here (157:12 +4).

Q192: Everyone must reach the shelter safely (157:15 +5).

Similar to other male discourses who felt a responsibility to safeguard the lives of their family, *The guardian* expressed stress and anxiety around the evacuation and cyclone strike. Anything could happen on the way to the shelter, and once there the shelter could collapse in the storm:

Q193: This is true. The shelter can break down anytime (163:36 +5).

Q194: Anything can happen to us on the way to the shelter. We do not have a clue (158:3 0).

*The guardian* also expressed strong feelings around statements relating to non-evacuation behaviour. One man simply shouted out '*This is wrong*'. People were not so malicious that they would find time to steal valuables that had been left behind during the cyclones. Everyone would be occupied with surviving the strike, they stated:

Q195: If one wants to live, he will have to go to the shelter (163:26 -5).

Q196: This is wrong – we will die if we do not go (158:20 -5).

Q197: When people are facing life and death situations, who would take their valuables (134:7 -4).<sup>20</sup>

Finally, mixed *The optimist*(mixed), a young group under the age of 34, believed that evacuation is a great lifesaver and that people must go to the shelters to stay safe and alive:

Q206: Evacuating is a great lifesaver (159:15 +5).

Q207: To keep ourselves safe we have to go to the shelters (138:15 +4).

These values ran through the storylines of *The optimist*. For example, the guidelines of the disaster preparedness volunteers must be followed as they have the most accurate weather information. *The optimist* also explained that disaster preparedness training was useful and helpful as people learned how to prepare for the cyclones:

Q208: We can learn many things on how important it is to prepare during a cyclone (138:10 +4).

Q209: The volunteers have the most updated information so I would follow his advice (138:34 +5).

Statements relating to non-evacuation behaviour were met with strong reactions. In response to the statement '**the shelter is not a place where I should be**' one man, for example, screamed out '*Who said such a thing?*' The man clarified that it was his place just as much as it was anyone else's. The shelter was where he would be. Interestingly, one woman identified with the statement referring to unmarried women staying behind and said that although she indeed is unmarried (outlining the strong social value of matrimony) she had a right to be safe. Additionally, *The optimist* felt that one could not just give up. One had to try evacuating to the shelter and hope for a positive outcome:

Q210: Even though I am an unmarried woman, I still have the right to be safe (138:29 -5).

Q211: Who said such a thing? It is my place and the shelter is where I will be (159:19 -4).

Q212: I have to at least try. I cannot give up that easy (138:37 -4).<sup>21</sup>

The discourses revealed valuable reasoning around gendered evacuation behaviours and the explanations people gave for moving or staying behind. It was clear that the social roles and socially expected behaviours were different for men and women. Interestingly, however, the same factors were often used to argue for both male mobility and female immobility. For example, religion and the efforts men and women made to adhere God's will were in clear contrast. These relational storylines are extremely valuable policy insights.

<sup>20</sup> See supplementary material Q198 to Q205 for more examples.

<sup>21</sup> See supplementary material Q213 to Q219 for more examples.

#### 4.6. God's will is for men to go but for women to stay

All six discourses in Gabtola felt strongly about God's desire and decision-making power. These religious narratives were mostly linked to life and death outcomes. An important distinction between female and male discourses was how God helped men who helped themselves, while God would save a woman no matter where she waited out the cyclone - an attitude that encouraged female non-evacuation behaviour. For a woman it is better to wait out the cyclone at home since it was safer, more comfortable and this was where she could die in dignity. When God decided that her time had come she would die regardless of whether she had stayed behind or evacuated to the shelter.

Another interesting element was how statements such as '**There is no point going to the shelter**', '**My place is at home**' and '**The shelter is not a place where I should be**' angered the male discourses. The 'foolishness' of these statements upset men, while the some women strongly agreed with them as they increased their security and safety. *The housewife* avoided going to the shelters as they felt unsafe due to crowds and chaos. One woman even felt as if she could not breathe or was suffocating in the space. This powerful feeling assured her that she should not be there. Another woman stopped going after she lost her son, confirming that she needed male family member's protection to be safe. The shelter was mainly described as an unsafe place for women by the female discourses. *The religious* linked the lack of safety back to religion as it was a serious problem for Muslims. Meanwhile, the female discourses made a distinction between the vulnerability of married and unmarried women. All discourses confirmed that everybody was allowed into the shelter, but the female discourses clarified that this did not mean that women were safe or should be there. Unmarried women in particular, did not belong in the shelters and should therefore refrain from evacuating. Nobody would try to stop them from going, but they would lack personal and religious privacy and risk facing sexual harassment and serious abuse.

### 5. Discussion

This Q-based Discourse Analysis demonstrated important empirical insights into the ways in which diverse gender roles have guided male and female behaviours during the cyclone strikes in Bangladesh. The findings revealed gendered subjective reasonings around why some should evacuate while others ought to stay behind (Fig. 6). The gendered power system affected women and men differently (not simply negative for women or positive for men). The system also aligned with other social roles in the way that age and marital status, for example, could influence someone's (im)mobility. Unmarried women did not have the same mobility options as married women.

The discourses described diverse layers of being 'trapped' that can be useful in the further conceptualisation of the term. To give an example, people commonly described feeling mentally and emotionally constrained in their decisions to move or evacuate to the shelter(s) despite such immobilising factors receiving limited attention within the 'trapped' populations literature. Psychological trauma (such as having witnessed someone die in a previous cyclones) could be immobilising, for example. Some women described preferring to wait out a cyclone at home after having lost family members. Men sometimes reported finding the very thought of evacuating unbearable after having 'failed' in their male responsibility to get their family safely to the shelter. These findings illustrate how gender roles affect societies (women and men) as social norms encourage female and male behaviours (O'Brien et al., 2007; Bradshaw, 2010; Arora-Jonsson, 2011).

The socially immobilising elements of women and men, unmarried and married or poor and rich, shed light on the conceptual wording of Trapped Populations. The analysis perfectly showcase the fact that references to a homogenous group of people or a population can be misleading. Semantically grouping people into overly coarse classifications (or framing 'populations' rather than an individuals 'trapped') can therefore create unnecessary generalisations and lead to confusion around how to most effectively apply the concept. Encouraging scholars to widen the use of the concept to include Trapped Individuals and Persons could address this conceptual weakness as one group or population is unlikely to be immobilised by the same factor.

Discourses, social norms, and subjective feelings around what was right and wrong were different for women and men. The reproduction of discourses and their meanings, values and norms in this study ended up constraining women's mobility more than men's. Male social behaviours and spaces were not always 'acceptable' for women. To give an example, no discourse (out of fifteen) narrated the possibility of a man being 'harmed' by another person in the shelter, while this was described (by men and women) as a risk for women in several discourses. Similarly, in contrast to the case for women, no discourse claimed that men could generate 'bad luck' when leaving the house or that they did not 'belong' in the shelter. The unequal effects upon women during the cyclone strikes differentiated in shape and form but the root cause of the gender vulnerability was social. Immobility (social and geographical) must therefore be analysed through a psychosocial lens (Blaikie et al., 1994; Cutter, 2017).

### 6. Conclusion

This gendered disaster immobility study makes a few important contributions to the existing literature body. Methodologically it illustrates an innovative way of applying Q-based Discourse Analysis within climate-induced (im)mobility resulting in rich empirical insights that revealed complex psychosocial layers. The study is also an important contribution to the scarce critical gender and disaster literature, and unique in the way that it interlinks gender, disasters and immobility. Finally, it offers a much needed contribution to the Trapped Populations literature; one that is urgently lacking both empirical insights and publications that conceptualise gender as a potential socially immobilising factor.

The analysis presented here has delicately illustrated involuntary and voluntary immobility as well as the grey areas in between these positions. Complex and shifting aspirations have been revealed, sometimes expressed by one and the same discourse or even

one and the same person. These are useful insights for the conceptualisation of Trapped Populations and as a means through which better incorporate climate-induced immobility within climate policy. The contribution is part of a growing body of critical literature that applies the concept empirically and which is key to building knowledge-based policy recommendations that protect vulnerable populations while preserving subjective agency, desire and dignity.

Gender has been shown to be immobilising or ‘trapping’ people in different ways during the cyclone strikes in Bangladesh. Women and men faced psychologically and emotionally paralysing effects from their expected gender roles. When the disaster strikes, not all people had the same ability to move. More empirical evidence on who, how and why people in different geographical and socio-cultural settings become immobile during disaster strikes is needed to create more robust policy frameworks. Trapped Populations clearly has the capacity to become a powerful climate policy tool that better protects vulnerable people worldwide to the impacts of global environmental changes in the future. However, to fully realise this potential the abstract notion of the populations in question must be more thoroughly explored and the nuanced composition and behaviour of diverse and homogenous groups of people adequately accommodated for.

### Declaration of Competing Interest

The author declares no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

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### Appendix A. Supplementary data

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### References

- Alam, K., Rahman, M.H., 2014. Women in natural disasters: a case study from southern coastal region of Bangladesh. *Int. J. Disaster Risk Reduct.* 8, 68–82. <https://doi.org/10.1016/j.ijdrr.2014.01.003>.
- Anbarci, N., Escaleras, M., Register, C.A., 2005. Earthquake fatalities: the interaction of nature and political economy. *J. Public Econ.* 89, 1907–1933. <https://doi.org/10.1016/j.jpubeco.2004.08.002>.
- Arora-Jonsson, S., 2011. Virtue and vulnerability: Discourses on women, gender and climate change. *Global Environ. Change* 21 (2), 744–751. <https://doi.org/10.1016/j.gloenvcha.2011.01.005>.
- Ahsan, M.N., Takeuchi, K., Vink, K., Warner, J., 2016. Factors affecting the evacuation decisions of coastal households during Cyclone Aila in Bangladesh. *Environ. Hazards* 15 (1), 16–42. <https://doi.org/10.1080/17477891.2015.1114912>.
- Ayeb-Karlsson, S., Kniveton, D., Cannon, T., 2020. Trapped in the prison of the mind: Notions of climate-induced (im)mobility decision-making and wellbeing from an urban informal settlement in Bangladesh. *Palgrave Commun.* 6 (62), 1–15. <https://doi.org/10.1057/s41599-020-0443-2>.
- Ayeb-Karlsson, S., Kniveton, D., Cannon, T., van der Geest, K., Ahmed, I., Derrington, E.M., Opondo, D., 2019a. I will not go, I cannot go: Cultural and social constraints to disaster preparedness in Asia, Africa and Oceania. *Disasters* 43, 752–770. <https://doi.org/10.1111/disa.12404>.
- Ayeb-Karlsson, S., Fox, G., Kniveton, D., 2019b. Embracing uncertainty: A discursive approach to understanding pathways for climate adaptation in Senegal. *Reg. Environ. Change* 19, 1585–1596. <https://doi.org/10.1007/s10113-019-01495-7>.
- Ayeb-Karlsson, S., Smith, C.D., Kniveton, D., 2018. A discursive review of the textual use of ‘trapped’ in environmental migration studies: The conceptual birth and troubled teenage years of trapped populations. *Ambio* 47, 557–573. <https://doi.org/10.1007/s13280-017-1007-6>.
- Ayeb-Karlsson, S., van der Geest, K., Ahmed, I., Huq, S., Warner, K., 2016. A people-centred perspective on climate change, environmental stress, and livelihood resilience in Bangladesh. *Sustain. Sci.* 11, 1–16. <https://doi.org/10.1007/s11625-016-0379-z>.
- Baldwin, A., 2016. Premediation and white affect: climate change and migration in critical perspective. *Trans. Instit. British Geograph.* 41, 78–90. <https://doi.org/10.1111/tran.12106>.
- Barry, J., Proops, J., 1999. Seeking sustainability discourses with Q methodology. *Ecol. Econ.* 28, 337–345. [https://doi.org/10.1016/S0921-8009\(98\)00053-6](https://doi.org/10.1016/S0921-8009(98)00053-6).
- Bhatta, G.D., Aggarwal, P.K., Poudel, S., Belgrave, D.A., 2015. Climate-induced migration in South Asia: Migration decisions and the gender dimensions of adverse climatic events. *J. Rural Commun. Dev.* 10 (4). <https://hdl.handle.net/10568/75788>.
- Black, R., Collyer, M. (2014) “Trapped” Populations: Limits on mobility at time of crisis. , in: Martin, S.F., Weerasinghe, S., Taylor, A. (Eds.), *Humanitarian Crises and Migration. Causes, Consequences and Response*. Routledge, London, pp. 287-305. ISBN: 9780203797860.
- Black, R., Arnell, N.W., Adger, W.N., Thomas, D., Geddes, A., 2013. Migration, immobility and displacement outcomes following extreme events. *Environ. Sci. Policy* 27, S32–S43. <https://doi.org/10.1016/j.envsci.2012.09.001>.
- Black, R., Bennett, S.R.G., Thomas, S.M., Beddington, J.R., 2011. Climate change: Migration as adaptation. *Nature* 478 (7370), 447–449. <https://doi.org/10.1038/478477a>.
- Blaikie, P., Cannon, T., Davis, I., Wisner, B., 1994. *At risk: natural hazards, people's vulnerability and disasters*, First ed. Routledge, London and New York.
- Blondin, S., 2020. Understanding involuntary immobility in the Bartang Valley of Tajikistan through the prism of motility. *Mobilities* 1–16. <https://doi.org/10.1080/17450101.2020.1746146>.
- Boyd, E., James, R.A., Jones, R.G., Young, H.R., Otto, F.E.L. (2017) A typology of loss and damage perspectives. *Nat. Climate Change* 7, v.10. doi: nclimate3389.

- Bradshaw, S., Fordham, M. (2013). Women, Girls and Disasters: A Review for DFID. DFID, London. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/236656/women-girls-disasters.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/236656/women-girls-disasters.pdf).
- Bradshaw, S. (2010) Women, poverty and disasters: exploring the links through Hurricane Mitch in Nicaragua. The international handbook of gender and poverty. Edward Elgar Publishing, Northampton.
- Brown, K., Adger, W.N., Devine-Wright, P., Anderies, J.M., Barr, S., Bousquet, F., Butler, C., Evans, L., Marshall, N., Quinn, T., 2019. Empathy, place and identity interactions for sustainability. *Global Environ. Change* 56, 11–17. <https://doi.org/10.1016/j.gloenvcha.2019.03.003>.
- Brown, S.R. (1980) Political subjectivity: Applications of Q methodology in political science. Yale University Press, Yale.
- Brown, S.R., 1996. Q Methodology and Qualitative Research. *Qual. Health Res.* 6, 561–567. <https://doi.org/10.1177/104973239600600408>.
- Brunkard, J., Namulanda, G., Ratard, R., 2008. Hurricane Katrina deaths, Louisiana, 2005. *Disaster Med. Public Health Prepared.* 2, 215–223. <https://doi.org/10.1097/DMP.0b013e31818aaf55>.
- Butler, J., 2011. *Gender trouble: Feminism and the subversion of identity*. Routledge, London and New York.
- Butler, J., 1997. *The psychic life of power: Theories in subjection*. Stanford University Press, CA.
- Cannon, T. (2000). Vulnerability analysis and disasters. In Parker, D.J. (Ed.) *Floods* (pp. 45–55). London and New York: Routledge. ISBN: 0415227437.
- Cannon, T., Müller-Mahn, D., 2010. Vulnerability, resilience and development discourses in context of climate change. *Nat. Hazards* 55 (3), 621–635. <https://doi.org/10.1007/s11069-010-9499-4>.
- Chowdhury, A.M.R., Bhuyia, A.U., Choudhury, A.Y., Sen, R., 1993. The Bangladesh cyclone of 1991: Why so many people died. *Disasters* 17 (4), 291–304. <https://doi.org/10.1111/j.1467-7717.1993.tb00503.x>.
- Conway, D., Nicholls, R.J., Brown, S., Tebboth, M.G.L., Adger, W.N., Ahmad, B., Wester, P., 2019. The need for bottom-up assessments of climate risks and adaptation in climate-sensitive regions. *Nat. Clim. Change*. <https://doi.org/10.1038/s41558-019-0502-0>.
- Cornwall, A., Harrison, E., Whitehead, A., 2007. Gender Myths and Feminist Fables: The Struggle for Interpretive Power in Gender and Development. *Dev. Change* 38 (1), 1–20. <https://doi.org/10.1111/j.1467-7660.2007.00400.x>.
- Cutter, S.L., 2017. The forgotten casualties redux: Women, children, and disaster risk. *Global Environ. Change* 42, 117–121. <https://doi.org/10.1016/j.gloenvcha.2016.12.010>.
- Cutter, S.L., 1995. The forgotten casualties: women, children, and environmental change. *Global Environ. Change* 5 (3), 181–194. [https://doi.org/10.1016/0959-3780\(95\)00046-Q](https://doi.org/10.1016/0959-3780(95)00046-Q).
- Doocy, S., Dick, A., Daniels, A., Kirsch, T. (2013) The Human Impact of Tropical Cyclones: a Historical Review of Events 1980–2009 and Systematic Literature Review. *PLOS Curr. Disasters*. Doi: 10.1371/currents.dis.2664354a5571512063ed29d25ffbce742013.
- Dryzek, J.S., 1994. Australian discourses of democracy. *Austral. J. Polit. Sci.* 29, 221–239. <https://doi.org/10.1080/00323269408402291>.
- Duenckmann, F., 2010. The village in the mind: Applying Q-methodology to re-constructing constructions of rurality. *J. Rural Stud.* 26 (3), 284–295. <https://doi.org/10.1016/j.jrurstud.2010.01.003>.
- Elliott, J.R., Pais, J., 2006. Race, class, and Hurricane Katrina: Social differences in human responses to disaster. *Soc. Sci. Res.* 35, 295–321. <https://doi.org/10.1016/j.ssresearch.2006.02.003>.
- Enarson, E., 1998. Through women's eyes: A gendered research agenda for disaster social science. *Disasters* 22, 157–173. <https://doi.org/10.1111/1467-7717.00083>.
- Fairclough, N., 2013. *Critical discourse analysis: The critical study of language*. Routledge, London.
- Farbotko, C., McMichael, C., 2019. Voluntary immobility and existential security in a changing climate in the Pacific. *Asia Pacific Viewpoint* 60, 148–162. <https://onlinelibrary.wiley.com/doi/abs/10.1111/apv.12231>.
- Foresight (2011) Migration and Global Environmental Change: Future Challenges and Opportunities, Final Project Report. The Government Office of Science, London.
- Fordham, M. (2012) Gender, sexuality and disaster., in: Wisner, B., Gaillard, J.C., Kelman, I. (Eds.), *Handbook of hazards and disaster risk reduction and management*. Routledge, London and New York, pp. 424–435. ISBN: 0415523257.
- Jepson, W., Brannstrom, C., Persons, N., 2012. “We Don't Take the Pledge”: Environmentalism and environmental skepticism at the epicenter of US wind energy development. *Geoforum* 43 (4), 851–863. <https://doi.org/10.1016/j.geoforum.2012.02.002>.
- Jonkman, S.N., Maaskant, B., Boyd, E., Levitan, M.L., 2009. Loss of life caused by the flooding of New Orleans after Hurricane Katrina: analysis of the relationship between flood characteristics and mortality. *Risk Anal.* 29, 676–698. <https://doi.org/10.1111/j.1539-6924.2008.01190.x>.
- Jordan, J.C., 2018. Deconstructing resilience: why gender and power matter in responding to climate stress in Bangladesh. *Clim. Dev.* 1–13. <https://doi.org/10.1080/17565529.2018.1442790>.
- Juran, L., Trivedi, J., 2015. Women, Gender Norms, and Natural Disasters in Bangladesh. *Geogr. Rev.* 105, 601–611. <https://doi.org/10.1111/j.1931-0846.2015.12089.x>.
- Kelman, I., 2019. Axioms and actions for preventing disasters. *Progr. Disaster Sci.* 2, 100008. <https://doi.org/10.1016/j.pdisas.2019.100008>.
- Logan, J.R., Issar, S., Xu, Z., 2016. Trapped in Place? Segmented Resilience to Hurricanes in the Gulf Coast, 1970–2005. *Demography* 53, 1511–1534. <https://doi.org/10.1007/s13524-016-0496-4>.
- López-i-Gelats, F., Tàbara, J.D., Bartolomé, J., 2009. The rural in dispute: Discourses of rurality in the Pyrenees. *Geoforum* 40 (4), 602–612. <https://doi.org/10.1016/j.geoforum.2009.04.008>.
- Mason, B., 1993. Towards positions of Safe Uncertainty. *Human Systems: J. Syst. Consult. Manage.* 4 (3–4), 189–200.
- McCaughey, J.W., Daly, P., Munder, I., Mahdi, S., Patt, A., 2018. Socio-economic consequences of post-disaster reconstruction in hazard-exposed areas. *Nat. Sustainability* 1, 38–43. <https://doi.org/10.1038/s41893-017-0002-z>.
- Morales, M.C., Harris, L.M., 2014. Using subjectivity and emotion to reconsider participatory natural resource management. *World Dev.* 64, 703–712. <https://doi.org/10.1016/j.worlddev.2014.06.032>.
- Morinière, L.C.E., Hamza, M., 2012. Environment and mobility: a view from four discourses. *Ambio* 41, 795–807. <https://doi.org/10.1007/s13280-012-0333-y>.
- Nadiruzzaman, M., Wrathall, D., 2015. Participatory exclusion–Cyclone Sidr and its aftermath. *Geoforum* 64, 196–204. <https://doi.org/10.1016/j.geoforum.2015.06.026>.
- Nawrotzki, R.J., DeWaard, J., 2018. Putting trapped populations into place: climate change and inter-district migration flows in Zambia. *Reg. Environ. Change* 18, 533–546. <https://doi.org/10.1007/s10113-017-1224-3>.
- Niemeyer, S., Petts, J., Hobson, K., 2005. Rapid climate change and society: assessing responses and thresholds. *Risk Anal.* 25, 1443–1456. <https://doi.org/10.1111/j.1539-6924.2005.00691.x>.
- Neumayer, E., Plümper, T., 2007. The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. *Ann. Assoc. Am. Geogr.* 97, 551–566. <https://doi.org/10.1111/j.1467-8306.2007.00563.x>.
- Oakes, R., 2019. Culture, climate change and mobility decisions in Pacific Small Island Developing States. *Popul. Environ.* 40 (4), 480–503. <https://doi.org/10.1007/s11111-019-00321-w>.
- O'Brien, K., Eriksen, S., Nygaard, L.P., Schjolden, A.N.E., 2007. Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy* 7 (1), 73–88. <https://doi.org/10.1080/14693062.2007.9685639>.
- Ockwell, D.G., 2008. 'Opening up' policy to reflexive appraisal: a role for Q Methodology? A case study of fire management in Cape York, Australia. *Policy Sci.* 41 (4), 263–292. <https://doi.org/10.1007/s11077-008-9066-y>.
- Penning-Roswell, E.C., Sultana, P., Thompson, P.M. (2013) The 'last resort'? Population movement in response to climate-related hazards in Bangladesh. *Environmental Science & Policy* 27, Supplement 1, S44–S59. <http://dx.doi.org/10.1016/j.envsci.2012.03.009>.
- Rashid, S.F., Michaud, S., 2000. Female adolescents and their sexuality: Notions of honour, shame, purity and pollution during the floods. *Disasters* 24, 54–70. <https://doi.org/10.1111/1467-7717.00131>.
- Rhodes, J., Chan, C., Paxson, C., Rouse, C.E., Waters, M., Fussell, E., 2010. The impact of Hurricane Katrina on the mental and physical health of low-income parents in New Orleans. *Am. J. Orthopsychiatry* 80, 237–247. <https://doi.org/10.1111/j.1939-0025.2010.01027.x>.
- Rivers, J., 1982. Women and children last: an essay on sex discrimination in disasters. *Disasters* 6, 256–267. <https://doi.org/10.1111/j.1467-7717.1982.tb00548.x>.

- Robbins, P., Krueger, R., 2000. Beyond bias? The promise and limits of Q Method in human geography. *The Professional Geographer* 52 (4), 636–648. <https://doi.org/10.1111/0033-0124.00252>.
- Stainton-Rogers, W. (1997). Q Methodology, Textuality, and Tectonics. In Special Issue: Using Q as a form of discourse analysis. *Operant Subjectivity* 21(1/2): 1-18. doi:10.15133/j.os.1998.003.
- Sneegas, G., 2020. Making the case for critical Q Methodology. *The Professional Geographer* 72 (1), 78–87. <https://doi.org/10.1080/00330124.2019.1598271>.
- Stein, R.M., Dueñas-Osorio, L., Subramanian, D., 2010. Who evacuates when hurricanes approach? The role of risk, information, and location. *Soc. Sci. Quart.* 91, 816–834. <https://doi.org/10.1111/j.1540-6237.2010.00721.x>.
- Stenner, P., 2008. Introduction: Between method and ology. *Operant Subjectivity* 32, 1–5. <https://doi.org/10.15133/j.os.2008.004>.
- Stephens, N.M., Fryberg, S.A., Markus, H.R., Hamedani, M.G., 2013. Who explains Hurricane Katrina and the Chilean Earthquake as an act of God? The experience of extreme hardship predicts religious meaning-making. *J. Cross Cult. Psychol.* 44, 606–619. <https://doi.org/10.1177/0022022112454330>.
- Stephenson, W., 1986. Protoconcurus: The Concourse Theory of Communication (Conclusion). *Operant Subjectivity* 9, 73–96. <https://doi.org/10.15133/j.os.1985.003>.
- Stephenson, W., 1935. Technique of factor analysis. *Nature* 136. <https://doi.org/10.1038/136297b0>.
- Sultana, F., 2007. Water, water everywhere, but not a drop to drink: Pani politics (water politics) in rural Bangladesh. *Int. Feminist J. Polit.* 9, 494–502. <https://doi.org/10.1080/14616740701607994>.
- Swim, J.K., Vescio, T.K., Dahl, J.L., Zawadzki, S.J., 2018. Gendered discourse about climate change policies. *Global Environ. Change* 48, 216–225. <https://doi.org/10.1016/j.gloenvcha.2017.12.005>.
- Tebboth, M.G.L., Conway, D., Adger, W.N., 2019. Mobility endowment and entitlements mediate resilience in rural livelihood systems. *Global Environ. Change* 54, 172–183. <https://doi.org/10.1016/j.gloenvcha.2018.12.002>.
- Thiede, B.C., Brown, D.L., 2013. Hurricane Katrina: Who stayed and why? *Popul. Res. Policy Rev.* 32, 803–824. <https://doi.org/10.1007/s11113-013-9302-9>.
- Thornton, F., McNamara, K.E., Farbotko, C., Dun, O., Ransan-Cooper, H., Chevalier, E., Lkhagvasuren, P., 2019. Human mobility and environmental change: a survey of perceptions and policy direction. *Popul. Environ.* 40, 239–256. <https://doi.org/10.1007/s11111-018-0309-3>.
- Tschakert, P., Ellis, N.R., Anderson, C., Kelly, A., Obeng, J., 2019. One thousand ways to experience loss: A systematic analysis of climate-related intangible harm from around the world. *Global Environ. Change* 55, 58–72. <https://doi.org/10.1016/j.gloenvcha.2018.11.006>.
- UNFCCC, (2015) Adoption of the Paris Agreement. Draft decision-/CP.21. United Nations Office at Geneva, Geneva.
- UNFCCC (2013) Non-economic losses in the context of the work programme on loss and damage. UNFCCC, Bonn.
- Wahlström, M., 2015. New Sendai Framework Strengthens focus on reducing disaster risk. *Int. J. Disaster Risk Sci.* 6, 200. <https://doi.org/10.1007/s13753-015-0057-2>.
- Watts, S., Stenner, P. (2012) *Doing Q methodological research: Theory, method and interpretation*. Sage, Los Angeles, London, New Delhi, Singapore and Washington DC. ISBN: 9781849204156.
- Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Boykoff, M., Montgomery, H., 2019. The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. *The Lancet*. [https://doi.org/10.1016/S0140-6736\(19\)32596-6](https://doi.org/10.1016/S0140-6736(19)32596-6).
- Watts, N., Amann, M., Ayeb-Karlsson, S., Belesova, K., Bouley, T., Boykoff, M., Costello, A., 2018. The Lancet Countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *The Lancet* 391, 581–630. [https://doi.org/10.1016/S0140-6736\(17\)32464-9](https://doi.org/10.1016/S0140-6736(17)32464-9).
- Wodak, R., 2011. Complex texts: analysing understanding, explaining and interpreting meanings. *Discourse Studies* 623–633. <https://doi.org/10.1177/1461445611412745>.
- Wolf, J., Brown, K., Conway, D., 2009. Ecological citizenship and climate change: perceptions and practice. *Environ. Polit.* 18, 503–521. <https://doi.org/10.1080/09644010903007377>.
- Zickgraf, C., 2019. Keeping People in Place: Political Factors of (Im) mobility and Climate Change. *Soc. Sci.* 8 (8), 228. <https://doi.org/10.3390/socsci8080228>.