

Level of Concern about Natural Disasters among Adults in Bakshiganj Upazila, Bangladesh

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Abstract

This study examined the concern level of 390 respondents regarding each of the 10 major disasters: flood, waterlogging, riverbank erosion, driving rain, drought, nor'westerly, sand heat, cold waves, tornado/cyclone, lateral water pressure. The mean level of concern and the standard deviation were provided to underscore some of the large variations in concern that were found in the data on which the study was based. The disasters which received the highest mean scores were driving rain, tornado/cyclone, drought, and flood, with scores of 3.85, 3.84, 3.73, and 3.69, respectively. Sand heat ($M = 3.42$) and waterlogging ($M = 3.40$) were not a matter of concern, as very little was known by the general population about the dangers of these types of events. The trends that were evident when looking at the data were visualized in three ways: bar charts, heat map, and radar plot. The paper concluded that disaster communication plans in Bangladesh need to be developed based on high-concern disasters requiring instant attention and low-concern disasters that need better awareness. Learnings from these lessons can contribute to policymakers in the creation of specific preparedness plans and to bolster community resiliency for the future.

Keywords

Natural, Disaster, Level, Concern, Bangladesh

1. Introduction

Geographically, being in the delta region, low elevation, a complex river system, geological conditions, high population density, and socio-economic status make Bangladesh tremendously vulnerable to natural disasters, particularly those originating from the delta country. Floods, cyclones, riverbank erosion, drought, and

storms are recurrent hazards to the coastal and riverine communities, which are predominantly endangered (Das et al., 2024; Hossain et al., 2023; Hossain et al., 2021; Nawaz & Shah, 2011). Storm surges and coastal floods are further exacerbated due to the funnel-shaped northern Bay of Bengal, which further complicates the impacts of disasters (Adithyan et al., 2026; Qiu et al., 2025; Rohini et al., 2023). These hazards are likely to increase in strength and frequency with climate change, placing mounting pressure on infrastructure, livelihoods, and sustainability in vulnerable areas (Banu & Fazal, 2025; Charak et al., 2024; Karmokar et al., 2019; Kaspersen & Kaspersen, 2012; McBean & Ajibade, 2009; Mirza, 2003). Thus, it is vital to move from a response to a disaster to a proactive and preventive approach to risk reduction to fortify community resilience (Choudhury & Haque, 2024; Zaman et al., 2022; Whittaker et al., 2020; Vallance & Carlton, 2015; O'Brien et al., 2012). Communities might have fluctuating community concern with specific hazards due to the discrepancy effects of a natural disaster on different areas. In order to fill this knowledge gap, this study examines Bangladeshi people's concern about natural disasters, having collected survey data from 390 people in Bangladesh. Past experiences shape an individual's perceptions of a problem before it becomes a concern, and perceptions of how the problem would affect them individually are often a major factor in determining their concern (Gershon et al., 2016; Roessler, 1999; Stern et al., 1995; Wandersman & Hallman, 1993). But there may be a low level of support for policy among those who are not concerned about climate change (Whitmarsh, 2008; Weber, 2006; Inglehart, 1995). As recommended by the Construal Level theory, psychological distance towards climate change declines the sense of perseverance, whilst highlighting local climate change impacts increases engagement and mitigation action (Askari et al., 2025; van Valkengoed et al., 2023; Wang et al., 2021; Chu & Yang, 2020; Maiella et al., 2020; Jones et al., 2017; van der Linden et al., 2015; Haden et al., 2012). The effects of psychological distance, personal relevance, scientific doubt, and social distance on public response to environmental threats are complex (Tang & Chooi, 2022; Brügger, 2019; Singh et al., 2017; Bunyan et al., 2016; McDonald et al., 2015; Carmi & Kimhi, 2015). To investigate the level of concern regarding natural disasters in Bangladesh, this study followed the following question.

RQ: What were the levels of concern about natural disasters among adults in Bakshiganj Upazila, Bangladesh?

Retort of the above query of this study contribute to understanding the level of concern about natural disasters among adults in Bakshiganj Upazila, Bangladesh.

2. Literature Review

2.1. Past Experience and Concern of Disaster

The academic evidence shows a multifaceted connection between disaster exposure and risk perception and sometimes the “risk perception paradox”, where people can incongruously undervalue their future vulnerability after a disaster. This is often clarified by the accessibility heuristic, which argues that someone adjusts

their mental likelihood approximation according to the ease with which he or she can remember recent events (Brown et al., 2018; Pachur et al., 2012; Harvey, 1998; Folkes, 1988). However, other pragmatic studies have shown that personal experience with a natural hazard event, particularly an evacuation, can expressively increase perceived risk for several natural hazards (Marciano et al., 2024; Stancu et al., 2020; Baker & Cormier, 2015; Fahy et al., 2012; Brezina, 2008). However, the newer studies suggest that the potential for future vulnerability and community-level exposure may be more operational than individual evacuation history to assess risk (Askari et al., 2025; Cong et al., 2023; Bukvic et al., 2018; Tanner & Árvai, 2018; deFur et al., 2007). In addition, institutional trust can affect the impact of previous exposure, since households with low trust in the institutional emergency management processes may be more likely to experience risk concerns even if they do not have a personal experience of the hazard (Ward et al., 2026; Gittinger, 2024; Wachinger et al., 2013). Furthermore, researchers have suggested that past experience has an optimistic impact on future preparedness only when the disaster is relevant to the preparedness (Seddig et al., 2026; Becker et al., 2017; Guo & Li, 2016; Donahue et al., 2014). Indeed, some studies have found that past disasters have urged households to take steps toward structural mitigation or to build up their stores of essential supplies, while others have shown that the degree of disaster losses can paradoxically lead to an upsurge in risk tolerance and not mitigation (Bilen et al., 2026; Rivera, 2020).

2.2. Socioeconomic Conditions and Concern of Disaster

However, the capacity of populations to deal with environmental risks is inadequate due to their economic status, which influences individual preparedness and the community's structural ability to protect itself (Noy & Yonson, 2018; Daramola et al., 2016; Smit & Wandel, 2006; Phillips et al., 2005; Tobin, 1999). In addition to instant material resources, this gap is exacerbated by a malicious cycle in which disaster-induced losses further weaken the financial strength of disadvantaged households, making them vulnerable to disaster in a cruel circle (Irshad, 2024; Hallegatte et al., 2020; Apodaca, 2017; Rentschler, 2013; Collins, 2009). Moreover, the lack of firm needs in vulnerable groups is emphasized by traditional estimation methods that often fail to consider their specific needs, leading to inadequate emergency relief allocation (Kalkman, 2026; Radianti, 2026; Bangalore et al., 2017; Kamel, 2012). Furthermore, institutional failures are often replicated in the planning of disaster mitigation strategies, which are often created on an expected level of preparedness and literacy that demoted groups do not have (Wissner et al., 2025; Lillywhite & Wolbring, 2022; Thomas et al., 2019; Sudmeier-Rieux et al., 2014; Jones & Boyd, 2011).

2.3. Geographical Exposure and Concern of Disaster

Empirical evidence shows that people living in high-risk areas, recognized by hazard mapping, tend to be more aware of climate change than those who live in more

stable areas (Allen et al., 2021; Räsänen et al., 2019; Miranda Sara et al., 2016; Lujala et al., 2014; Jabareen, 2013). But this connection has been challenged by several longitudinal studies that have found that objective physical vulnerability does not necessarily associate with vulnerability insights or policy support (Dobbin et al., 2023; Saleh Safi et al., 2012; Brody et al., 2008; Lindell & Hwang, 2008). This “risk perception paradox” is often observed and leads to an unpredictable perception of the future probability of a disaster when people are exposed to extreme climatic events directly (Scovell et al., 2022; Bechtel & Mannino, 2021; Salman & Li, 2018; Zaalberg et al., 2009; Grothmann & Reusswig, 2006).

2.4. Research Gap

While important research has considered public concern towards natural disasters, there is not a large body of quantitative research that has addressed the question using ethnographic qualitative enquiry with a single type of disaster, mainly flood, earthquake and cyclone. While the present study has assisted in advancing knowledge about the cultural, religious and socioeconomic dimensions of risk perception, this work has not yet led to the development of a common and comparable index of risk concern for a wide range of locally relevant risks. Thus, there remains a lack of quantitative data concerning the relative importance and priorities communities assign to various environmental threats and the many perceptions of threats that have received relatively little study, but may be recurring and poorly understood, such as nor’westerly, cold wave, river bank erosion, driving rain, sand heat and lateral water pressure. There is little research that has followed a quantitative survey approach to measure the level of concern, expressed in intensity. In this study it has been tried to address the above gaps by employing a five-point Likert scale to obtain the interval level mean scores and standard deviation value regarding the level of concern towards 10 disasters.

3. Materials and Methods

3.1. Study Area

The study area was Bakshiganj Upazila of Jamalpur District in Bangladesh. The area was chosen because it is situated in a district where disasters regularly occur due to its geographical vulnerability, socioeconomic features, and as an appropriate setting for studying community concern about natural disasters.

3.2. Sampling Procedure and Sample Size

The study was conducted in 12 purposively selected wards from three unions of Bakshiganj Upazila, Jamalpur District, where the wards were selected on their relevance to the study objective. The sampling frame was developed with the help of the information of population and family information collected from relevant government offices, Union Parishad offices, and the Upazila Statistics Office. The household was the sampling unit, and one eligible household member from each sampled household was chosen. The household members aged 21 - 70 years who were phys-

ically and mentally capable of answering and were willing to participate were eligible. 390 questionnaires were completed. The approximate population size of 120,000, 95% level of confidence, and 5% margin of error were used to determine the required sample size. Repeat visits to households that did not respond were used to reduce nonresponse. If an individual selected respondent declined or could not be reached, another eligible household head was randomly selected from the population using the same sampling method. In the end, there were 390 completed questionnaires that were valid for analysis.

3.3. Questionnaire Development

A questionnaire comprising ten items that measured the level of concern of the respondents about the selected disasters was used. The items were each presented as a statement, “To what extent are you concerned about...?” All participants were asked to answer all ten items on a five-point scale (Extremely Concerned = 5, Concerned to a Greater Extent = 4, Moderately Concerned = 3, Somewhat Concerned = 2, and Not Concerned = 1). Thus, higher scores showed greater concern. A pilot test was conducted on the questionnaire before the final survey. Selected items based on pilot feedback, unclear/vague wording, response options, item order, etc., were modified to increase clarity, comprehensibility, and relevance of items.

3.4. Data Collection, Analysis, and Visualization

A structured survey questionnaire was used for data collection. The questionnaires were checked daily to reduce the amount of missing information and to ensure that the data collection was accurate. The surveys were conducted from June 2020 to June 2021 in the study area. All the data were analyzed using SPSS to calculate the mean and standard deviation. The data were pre-processed for missing data, outliers, and inconsistencies prior to statistical analysis. Mean scores of concern for each disaster were compared using bar charts, and a heat map and a radar chart (or spider chart) were drawn to show the multidimensional pattern of overall concerns. A radar chart was generated by averaging the concern score for each disaster in the chart. Perceived concern was greater with increasing distance from the centre. This visualization highlighted the comparative importance of each disaster and assisted in detecting the most important climate risks in the study area quickly.

3.5. Ethical Considerations

Informed consent was obtained verbally from all respondents before data collection. Respondents were told that they were contributing to an unpaid study in which they may have withdrawn at any time without penalty.

4. Results and Analysis

4.1. Mean Concern Levels

The mean concern scores varied across the ten natural disasters examined, with

driving rain ($M = 3.85$), tornado/cyclone ($M = 3.84$), drought ($M = 3.73$), and flood ($M = 3.69$) having a high level of concern. The moderate concern group comprised nor'westerly ($M = 3.63$), cold wave ($M = 3.55$), and river bank erosion ($M = 3.50$), all with scores above the center of the scale, while the low scores were for sand heat ($M = 3.42$), water logging ($M = 3.40$), and lateral water pressure ($M = 3.18$), and none were below the center of the scale. The bar chart (Figure 1) shows that driving rain ($M = 3.85$), tornado/cyclone ($M = 3.84$), drought ($M = 3.73$), and flood ($M = 3.69$) received a high level of concern. The low level of concern was given to lateral water pressure ($M = 3.18$). This figure presents a representation of these mean scores and shows that although important dissimilarities exist in concern across disasters, the overall pattern of scores falls in the moderately concerned to highly concerned range of the five-point scale, which indicates a high level of awareness of the risk associated with disasters among the people in the study area.

4.2. Standard Deviation Patterns

The standard deviations of the ten disasters ranged from 1.06 to 1.36, indicating moderate variation in the level of concern among respondents but not significant dissimilarities. A comparatively low difference ($SD = 1.06$) was observed for tornado/cyclone, suggesting that the majority of the respondents perceive high risk in a similar way, which could be explained by the high frequency and damage pattern of this incidence being familiar in the study area. Lateral water pressure, on the other hand, showed the highest variation ($SD = 1.36$), meaning that general awareness and exposure to this disaster had the highest variation among the respondents (Figure 2). Moderate variability was found in the remaining disasters, indicating a general trend of greater disaster concern throughout the sample.

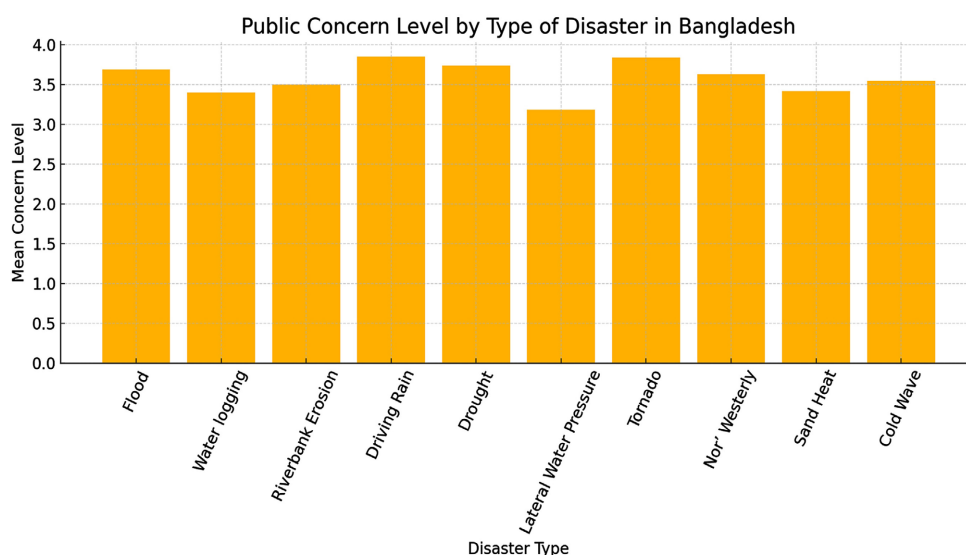


Figure 1. Mean concern level by disaster type.

4.3. Variation in Concern (Standard Deviation)

The level of concern regarding tornado/cyclone had the lowest level of variation ($SD = 1.06$), indicating that there was a high level of consensus with regard to the importance of the concern. The highest inconsistency ($SD = 1.36$) was observed for lateral water pressure, indicating either less awareness or a mix of perceptions. **Figure 2** shows the reflection of differences in concern between all types of disaster.

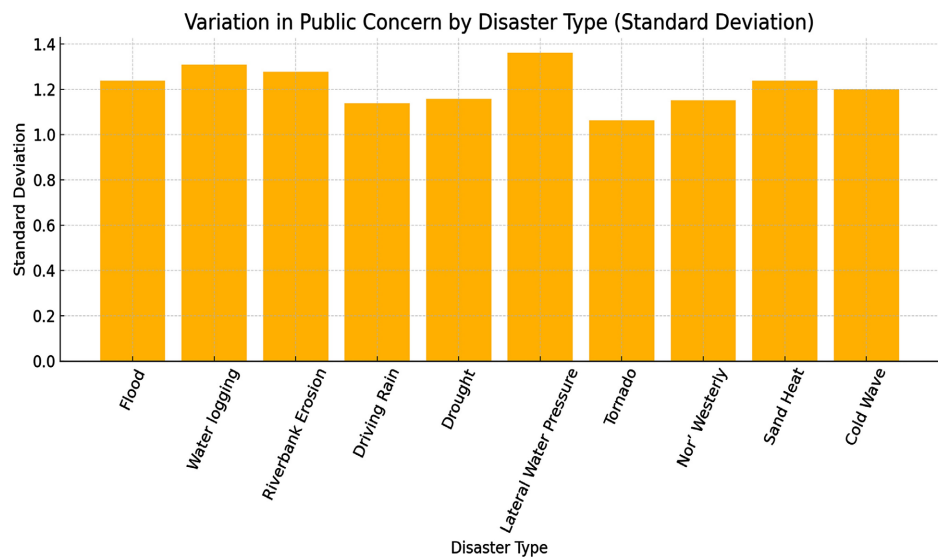


Figure 2. Standard deviation of concern levels.

4.4. Heat Map of Concern and Variability

A heat map was created to display the mean concern and the standard deviation by disaster. A heat map can be helpful in discovering patterns in multivariate data sets. The lighter colors in the top row indicate areas of higher concern and the darker, lower colors, areas of lower agreement (**Figure 3**).

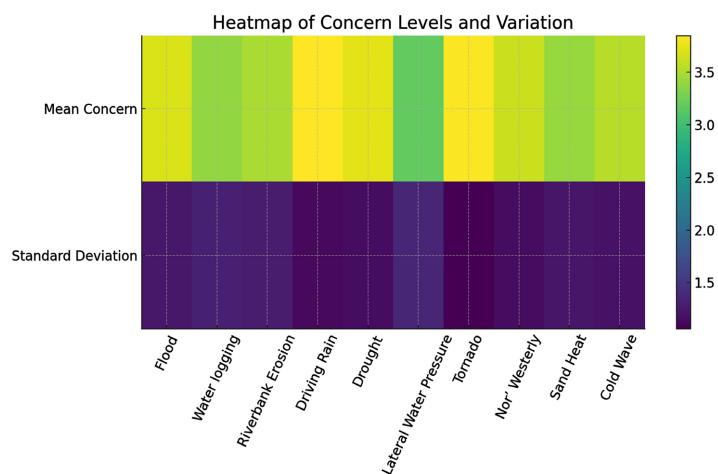


Figure 3. Heat map of concern & standard deviation.

4.5. Radar Chart of Overall Concern

The following radar chart reinforces previous observations, where driving rain, tornado/cyclone, flood, and drought were the most critical disasters (**Figure 4**).

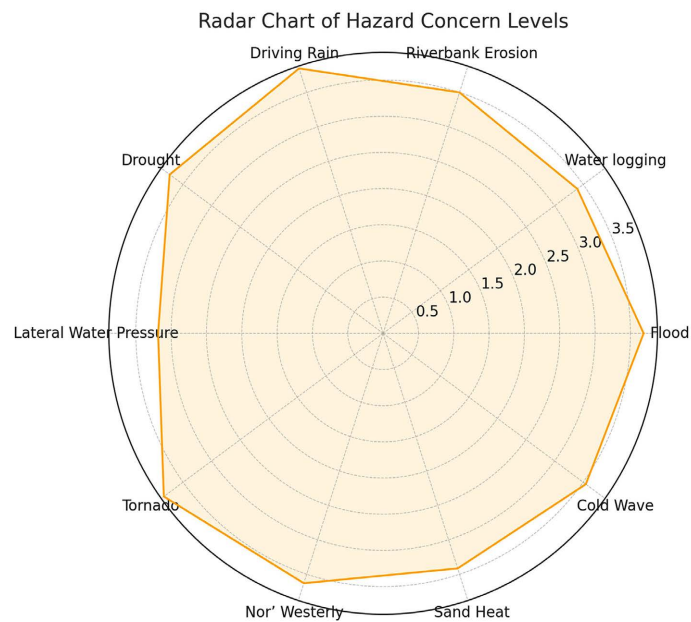


Figure 4. Radar chart of disaster concern levels.

5. Discussion

5.1. Ranking of Concern

The results indicate that driving rain, tornado/cyclone, flood, and drought were the disasters that were considered the most serious. The public was well aware of these disasters, as they repeatedly occur and have a trend to be sudden. In many parts of Bangladesh, for instance, floods are effectively an annual event, and their devastating potential is well known. The high concern score for tornado/cyclone and driving rain was because of their sudden onset, which usually gives little warning and can result in serious injuries and property damage. Moreover, this prioritization is consistent with the wider academic discussion about the need to move beyond single-hazard assessments to a combined, multi-hazard approach to effectively tackle the multi-hazard nature of the country's risk landscape (Sarker & Adnan, 2024; Šakić Trogrlić et al., 2024; Hochrainer-Stigler et al., 2023). Current empirical studies support the use of individual hazard assessment, but there is a lack of studies examining concurrent risk perception for different types of disasters, including drought, earthquake, and flood (Mallick et al., 2022; Di Baldassarre et al., 2021; Shreve et al., 2016). Moreover, the literature emphasized that connecting risk perception of households with experts' views is a precondition for applying coherent disaster mitigation strategies that are context-specific (Jommi, 2025; Doshi & Garschagen, 2024; Salam et al., 2021). This synthesis is supported by research that highlights the importance of local knowledge gaps in disaster mecha-

nisms, which often stifle the successful application of effective climate change adaptation policies (Etongo et al., 2025; Akter et al., 2024; Islam et al., 2020).

5.2. Patterns in Public Concern

Lateral water pressure, sand heat, and waterlogging were lesser concerns in terms of disasters, however. One reason could be a lack of awareness of the public. Technical terms like lateral water pressure might not always be linked to the first thought of danger, although they do have importance in regard to structural safety. A less talked-about phenomenon that can also seem less intimidating than flood or storm is sand heat. This gap in perceived threat matches the empirical evidence that the individual relevance of heat-related cues is far less than that of high-impact events such as flooding (Li & Howe, 2023; Sacchi et al., 2022; Sambrook et al., 2021). The fluctuating nature of public concerns is further underlined by the fact that the impact of floods and media attention tends to focus on events that are noticeable and therefore received by the public, while other climate-related stressors, such as overheating, are less noticeable and less likely to be perceived by the public (Wang et al., 2024; Murtagh et al., 2019; Bohensky & Leitch, 2014). The psychological distance of climate change is further enlarged when it is perceived as remote and abstract, meaning that instinctual emotional responses often required to catalyze individual mitigation actions and policy advocacy are not triggered (Fritz et al., 2024; Weber, 2015; Spence et al., 2011). Moreover, this psychological distancing is compounded by the perception of risk being distant from one's social networks or future self, which can lead to a feeling of being destitute and unable to act jointly (Souza et al., 2020; Ward, 2017; Bunyan et al., 2016).

This lack of personal engagement is reinforced by psychological research which proposes that climate change is seen as a distant danger both in time and space and so does not elicit the "gut feeling" necessary to build sustainable behavioral change (Jones et al., 2017; van der Linden et al., 2015; Spence et al., 2011). These perceptions essentially make the phenomenon abstract, because public concern decreases if it is perceived as a problem that is distant in space or time (Wang et al., 2019; Brügger, 2019; Singh et al., 2017; Bunyan et al., 2016).

6. Conclusion

The survey data from 390 respondents suggests that there was a wide range of concern for disasters, with driving rain, tornado/cyclone, drought, and flood being of a high level of concern. Because they may occur at a troublesome time and have a great impact on their lives, these disasters are often seen as being very dangerous. Disasters such as nor'westerly, cold wave, and river bank erosion were observed to be of moderate concern. Communities were broadly cognizant of these risks, had previously endured them, and had come up with strategies to deal with impacts. Concern about lateral water pressure on the sides, heat of sand, and waterlogging was very low, which might be due to less awareness or knowledge of such disasters. The results found from this study support previous studies that

highlight the role of previous disaster experience, environmental indicators, and disaster consciousness in influencing disaster risk perceptions. The high level of concern for the disasters that are commonplace highlights the need to increase community-based early warning systems and increase preparedness capacity for these disasters. On the other hand, the low level of concern about the less publicized or technical disasters indicates that awareness campaigns and better communication by disaster management agencies are needed. Moreover, this study helps in understanding an overview of the public concern about various natural disasters in Bangladesh. The results of this study can help policymakers in crafting more effective risk communication programs, better preparedness plans, and better disaster management plans, especially in adapting to local needs in the region. Assessing public concern in the context of the rising severity and frequency of disaster events in the context of climate change is essential to help limit disaster vulnerability and build the long-term resilience of communities.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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