

BEYOND DOLLARS: RETHINKING FLOOD IMPACT ASSESSMENT IN VULNERABLE COMMUNITIES OF BANGLADESH

Abstract

Bangladesh is ranked as the seventh most disaster-prone country globally by the United Nations due to extreme risks from climate change. The country's low-lying topography makes it highly vulnerable to flooding, further exacerbated by sea level rise, putting its growing population at constant risk. While many studies focus on the physical toll—such as injuries, illnesses, and deaths—caused by flooding, there is limited research on its psychological impacts and access to healthcare.

This study seeks to fill that gap by evaluating economic and health factors using current literature, Demographic and Health Surveys (DHS), and Bangladesh Statistical Data. It introduces a novel qualitative method for quantifying the costs of these frequent disasters. The goal is to provide a deeper understanding of the advantages and drawbacks of holistic, multi-sector assessments. While the webbing approach effectively captures the dynamic interplay between factors, it is crucial to examine each factor independently to avoid uninformed decisions that could have unintended consequences. This approach must also include sufficient detail to ensure that critical aspects, potentially more important than those in previous assessments, are not overlooked. By building an interconnected framework, risk assessments of hazards can be carried out more effectively, enabling the implementation of better preventative measures.

Introduction

Like much of the world, Bangladesh is rapidly urbanizing. The population living in urban areas has increased from 5% to 27% in the last 40 years, yet almost half the urban areas in Bangladesh consist of informal settlements (e.g. Karail slum) [[1], [2]. Nevertheless, agriculture still plays an important part in Bangladesh's economy. Nevertheless, agriculture plays an important part in Bangladesh's economy, 38% of the population employed in agriculture in 2019 (world bank 2024), 58% of which were women[3]. Many women reported increased level of abuse and difficulty finding amenities,[4] even in cities. The lack of access to healthcare during this crucial time when families are afflicted by respiratory conditions or diseases such as cholera connects directly to the economic status of these individuals [[5]. Many of whom work in informal positions, such as rickshaw drivers [[6]. Small and Medium Enterprises (SMEs) struggle to recover after the frequent disasters resulting in the cutting down of staff and community efforts [[7].

A key point of understanding health in a Newly Emerging Economy (NEE) like Bangladesh lies in the state of the economy. It is vital to understand the dynamic between the different factors which contribute to flood risk, economic factors and health factors. It is also important to note that, due to the rapidly developing nature of NEEs, it is often difficult to gauge whether long term difficulties were overshadowed by economic growth, often having a snowballing effect on the health and education industry too.

Health

To maintain a broad scope of research, diseases will be categorized into two main groups: cutaneous (skin-related) and non-cutaneous diseases. This classification allows for a comprehensive examination of health impacts, encompassing both visible, skin-related conditions often exacerbated by environmental factors like flooding, as well as other systemic illnesses that may be less apparent but equally critical. This approach ensures a more thorough understanding of the diverse health outcomes linked to climate-induced hazards.

Flood-related skin diseases can be categorised into these four sections according to a paper published in the International Journal of Dermatology: inflammatory skin diseases, skin infections, traumatic skin diseases, and other miscellaneous skin diseases. Often, irritation occurs on hands and feet which leads secondary infection from bacteria or fungus from the defect of the skin barrier. Insect bites, such as those from Mosquitos, Fire ants and Centipedes also cause irritation[8]A worldwide study shows that the number of cases of Dengue and Mosquitos increases by 0.0098% and 0.080% respectively[9]. Other studies resulted stated that the short-term (<1 month) number of Dengue cases

would decrease while the subsequent 1-4 months the number of cases would increase [10]. This trend could be explained by the change in policy [11], which made it no longer mandatory to tell hospitals about cases of Dengue and so there are only records of more serious cases which take longer to develop. Cutaneous diseases are often prevalent after floods but are overshadowed by overwhelming cases of Diarrhoea and respiratory tract diseases. There were records of Diarrheal Epidemics in Dhaka after the three major consecutive floods in 1988, 1998 and 2004. [12]

In 1988, Diarrhoea was the most common illness making up 34.7% of all afflictions [13]. However certain studies conclude that flood period epidemic fatalities and non-flood associated periods were similar [14]. In this study, epidemic is defined as 'the first of 3 consecutive days during which patient visits per day exceeded the 90th percentile of visits per day for the year before and the year after the year of flooding'. In total 20,395 patients were surveyed for the three different flood periods, yet the in-hospital case-fatality rates were very similar to non-flood periods. The largest difference was regarding severe dehydration, where 17% more patients were affected during the flood period. Most patients were afflicted due to *V. cholerae*. Therefore, by comparing the other Cholera Epidemics from 1985 to 1991, a better understanding can be gained. In September 1991, the government epidemic surveillance reported 214,856 cases from northern Bangladesh. In this study, it is also clear to see that despite the huge number of people affected by Cholera during flooding periods, non-flooding periods fatality numbers were similar, even less than previous year in 1988. Interestingly, this study notes that a high proportion of the patients (59%) were in rural areas and 80% were treated at home. 9% even had no access to healthcare while 68% were treated by unqualified practitioners [15].

Table 1: No. cases show the number of reported cases of Cholera in the given year while no. fatalities is the number of deaths from Cholerae in said year. Years with an asterisk are years which there were flooding. Number of cases are significantly higher in years of flooding.

Year	No. cases	No. fatalities	No. examined cases
1985	47,150	4,101	4,983
1986	53,046	3,997	3,432
1987*	303,391	4,726	3,692
1988*	988,391	3,676	13,879
1989	43,535	1,783	-
1990	48,916	1,309	-

In the July 2004, over 17,000 patients [16] were seen throughout the whole duration whereas across two-year duration of flooding from 1987 to 1988 17,565 patients were examined. This is an indicator of two possible causes: increased urbanisation meaning that people are closer to healthcare facilities and improved education regarding hygiene and disease prevention could have reduced the number of initial cases.

Using census data from 2004 and 2007 [17], [18], there was an increase in children who received treatment for diarrhoea. Previously, in 2004, one in six children had been taken to a medical professional but in 2007 20% had received treatment from a health facility or provider while three in four children oral rehydration solution packets and 81% received oral rehydration therapy. Other medication was also given leaving only nine percent that received no treatment.

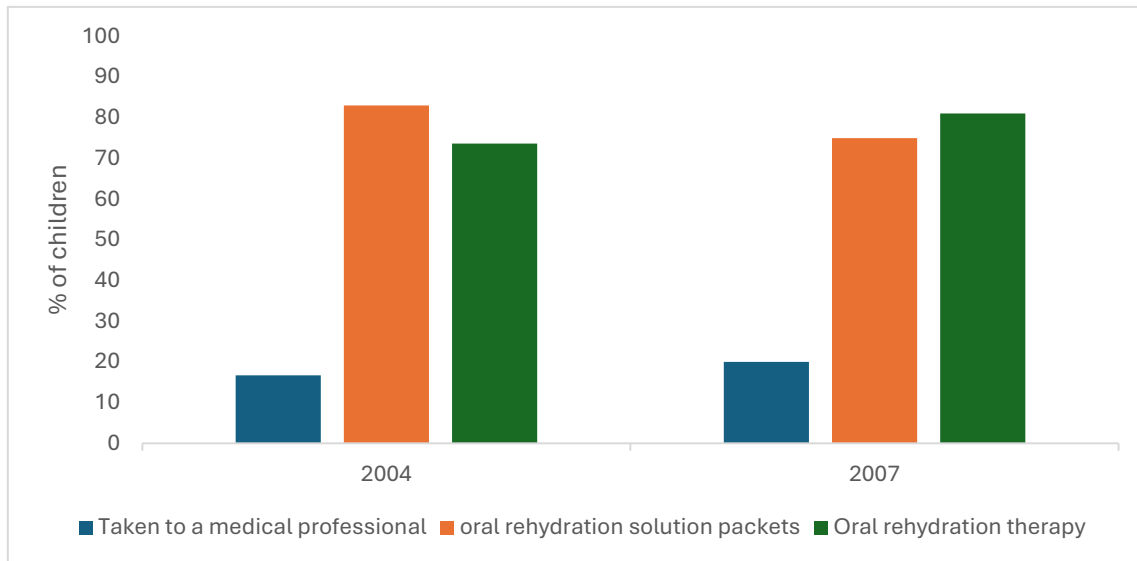


Figure 1: Table shows a comparison of the percentage of children that received a specific treatment for diarrhoea. An increase in commercialisation in ORS is shown in 2004. Oral rehydration was unchanged from the 1999-2000 to the 2004 survey (DHS survey 1999-2000, 2004, 2007)

In the 2007 census, 5% of children under five had symptoms of acute respiratory infection (ARI) in the two weeks prior to the survey. In the 2004 census, ARI was identified by 'cough with either rapid or difficult breathing to chest indrawing, and 1 in 5 children under 5 were found to have ARI. ARI is another very common non-cutaneous disease which becomes prevalent after flooding. In 1998, 46.8% conditions were respiratory, second only to fevers (63.6%) [[19]. Whereas, in 1988, 17.4% of all illnesses were respiratory tract infections [[13].

The temporal resolution of health care development allows a trend of progression. An improvement in education and hygiene could be a possible reason for this trend, but also shows that more groundwork is required to make basic amenities, such as clean water and health care, more available with increased level of rural-urban migration.

Flooding and its impact on motherhood

The impact of disasters on children and mothers is often a key indicator of a community's vulnerability, as they are typically among the most at-risk populations. Women, especially pregnant and nursing mothers, face heightened challenges during and after disasters due to disrupted healthcare, lack of nutrition, and increased caregiving responsibilities. Similarly, children are more susceptible to malnutrition, disease, and psychological trauma. By assessing how disasters affect these vulnerable groups, we can gain valuable insights into the overall resilience and risk levels of a community, highlighting areas where intervention is most needed to reduce harm and improve recovery efforts.

In the 2022 DHS report, two-thirds of women reported that they have at least one problem in accessing healthcare.[20] Getting money for treatment was the largest reason for inaccessibility to healthcare. Overpricing of healthcare, especially delivery, has led to an immense surge in the number of C-sections taking place. An article stated that has been a 51% increase in unnecessary C-sections [21]. A study done in 2014 hypothesised that caesarean section rates in South Asian countries may be driven in part by the private sector [22] .73% of deliveries in the private sector were caesarean section. This is further backed by the economic incentive that 95% of C-sections delivered in private facilities cost 10,000 takas more than 74% of C-sections delivered in public facilities[20]. Furthermore, only 12% of women expressed control over their health care decision making [23], suggesting a link between women empowerment and self-autonomy when it comes to access to healthcare.

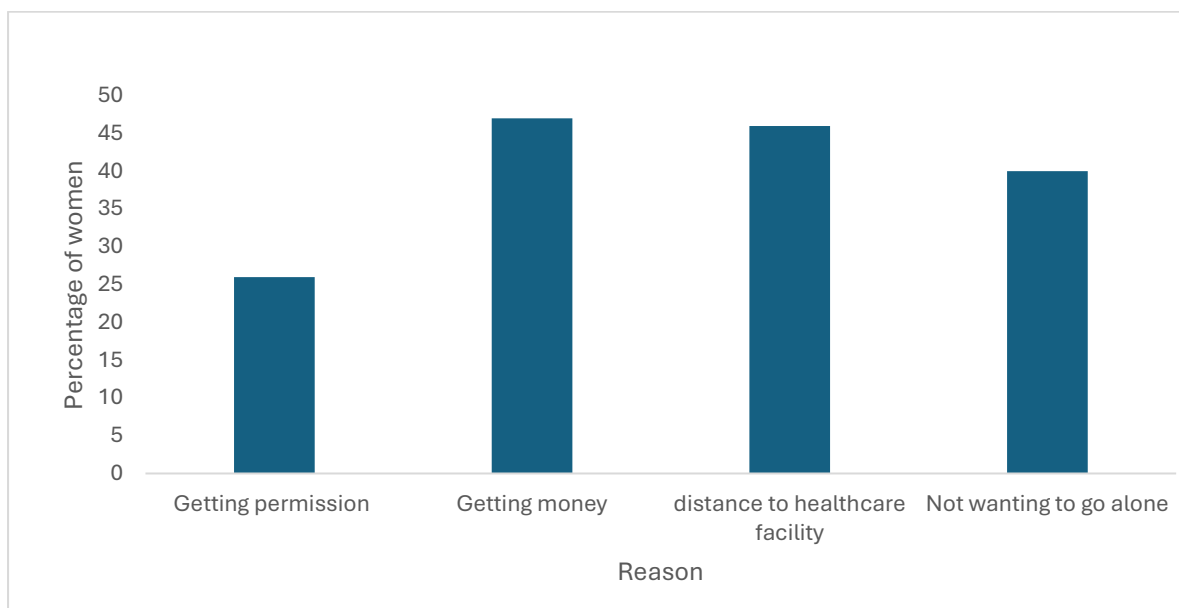


Figure 2: Chart showing the percentage of women who stated that one or more of these reasons were hindering their access to healthcare. Data is from DHS 2022 report.

A qualitative study about the impacts of flooding on feeding practices of infants and young children in Dhaka's slums found 48.9% of children of all children to have stunted growth. Despite 100% of children under 1 having been breastfed, the exclusive breastfeeding rates for under 6 months old were low at 28.5%. Only 34.8% of mothers were literate and 31.6% of fathers were rickshaw-pullers. 81.9% of the households were food insecure and many factors including living conditions, sanitation and water were of poor quality. Many children are fed with alternatives such as *suji* or other milk alternatives that are not appropriate since mothers are underweight and do not have enough breastmilk [24].

While many women have difficulty accessing healthcare on a general basis, a study done in 2022 [24] suggests that generally flooding itself is not resulting in lower usage of maternal healthcare but the socioeconomic components of the flood-prone areas mean the women are less likely to access healthcare [26]. This includes factors such as infrastructure and education, often leading to an inability to push for reform.

Mental health

Mental health is an important and often neglected component of overall health and wellbeing. More papers covering Post Traumatic Stress Disorder (PTSD), and psychological impacts of natural disasters are conducted in Higher Income Countries, like Australia. Whereas most studies on the mental repercussions of flooding in Bangladesh are more recent or very briefly mentioned within papers about physical illnesses. It is crucial to understand, that much of the research available also reflects the demands and needs of the country as it developed. When looking at earlier census' many metrics for evaluation were fundamentals like statistics regarding diseases, health care access and the economic market. In comparison, the 2022 census includes statistics regarding women empowerment, mental health and compares trends in education[25]. Hence, providing a possible explanation as to the gap in the research field. Most research regarding mental health were to understand how flooding impacted children [26].Despite post-traumatic stress symptoms appearing in the first few months after the flood events, it is common for symptoms to decline over the first year or longer and more often many children adapt to their circumstances without initially developing any psychopathology. A systematic mapping of long-term physical and psychological health impact of

flooding found only 16% of studies were regarding psychological diseases even in high income countries [27].

Flooding affects people of all ages, as well as their behavioural patterns. Some research suggests that PTSD symptoms may not decline over time as quickly as previously thought but majority of people affected by flooding show resilience and find support with people close to them [28]. This study included a mixture of high income and newly emerging economies, but Bangladesh was not part of this study.

While there has been more emphasis on mental health in recent years, it is still important to continue to include mental health in more papers and metrics, even in high income countries.

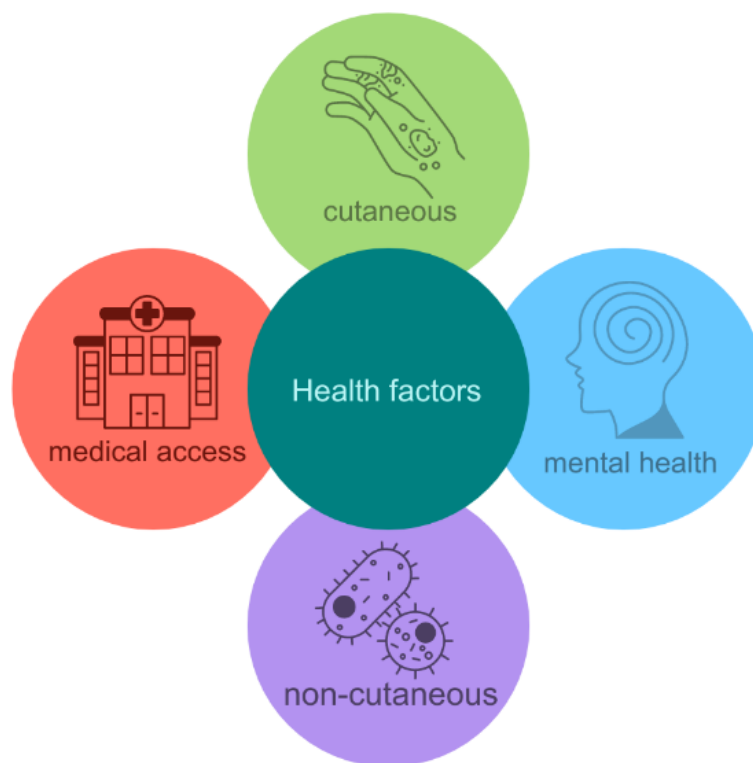


Figure 3: Summary of main health categories discussed in this study.

Economic

Despite rapidly improvements to the economy in Bangladesh, the distribution of employment has remained relatively the same throughout the years, with only a slight decrease in the percentage of people employed in agriculture in the last decade.

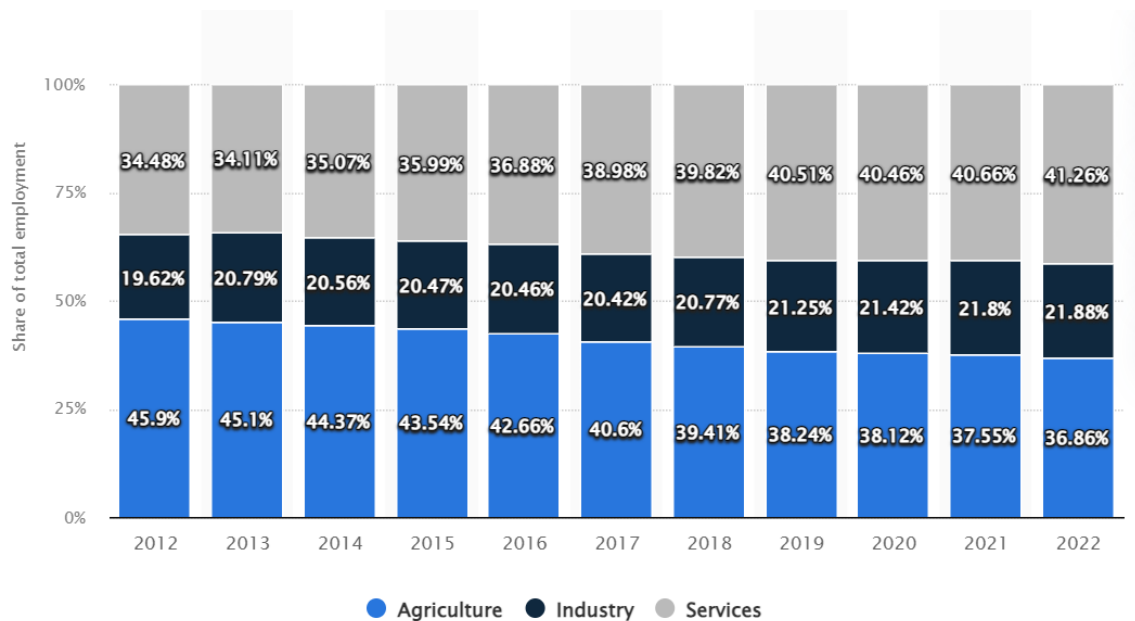


Figure 4: shows percentage of people employed in Agriculture, Industry and Services over a decade (World Bank 2024)

Agriculture still makes up about 11.5% of the GDP [29]. Flooding causes increased food insecurity and puts the livelihoods of farmers at risk. Rice is a staple food in Bangladesh, exemplified by the colloquialism 'rice and fish make a Bengali'. Yet rice is extremely susceptible to changes in climate and the overall production is estimated to reduce by 7.4% every year over 2005-2050 [30]. One of the biggest factors for rural-urban migration amongst farmers is seasonal flooding, abnormal rainfall, heatwaves, droughts and river erosion exacerbated by climate change. Farmers come to cities anticipating jobs and higher wages [31]. The international Organization of Migration reports that 70% of the 3.5million people in slums arrive due to environmental hardship. A study shows that Climate refugees are treated as second class citizens in Dhaka city, with difficulty finding the necessities [32].

In 2023, Bangladesh ranked third as the largest clothing exporter and ranked first as the largest cotton importer. Due to flooding, cotton supplies were disrupted and imported cotton stand find it difficult to make it through the floods in trucks and trains [33]. Many of whom work in the bad conditions of the factories are migrant workers. They generally less informed about the industry and so tend to end up in worse working conditions than locals but are also paid more because of it. As the garments industry continues to boom, more people are willing to travel from further, and relocate, to get a job [34].

SME makes up 70-80% of Non-agricultural jobs and are widely recognised as a driver of economic change. Every 2 in 3 jobs in the private sector is employed in SMEs [35] and account for 25% of the GDP [36]. Since the smaller scaler businesses, especially informal businesses, operate on confidence rather a formal set of requirements like in large corporation, those from more disadvantaged communities are more likely to be accepted for a position[37].

Entrepreneurial self-efficacy has been at the centre of entrepreneurial literature for quite some time because entrepreneurs are change makers. Understanding what makes some people better at generating ideas and the change required would be hugely beneficial in an increasingly globalised

world. Entrepreneurial Marketing process (EMP) could be defined as ‘the proactive identification and exploitation of opportunities for acquiring and retaining profitable customers through innovative approaches to risk management, resource leveraging, and value creation’ [38]. It is suggested that communities with high EMP is most resilient to natural disasters and can ‘renew, revitalize and reinvigorate the community’[39].

However, SMEs are considered a highly vulnerable sector in Bangladesh’s economy [40]. Many businesses halt to a stop or declare bankruptcy after natural disasters. Smaller, weaker organisation are much less likely to survive, and some business owners find the psychological stress too overwhelming to reopen business[41], [42].

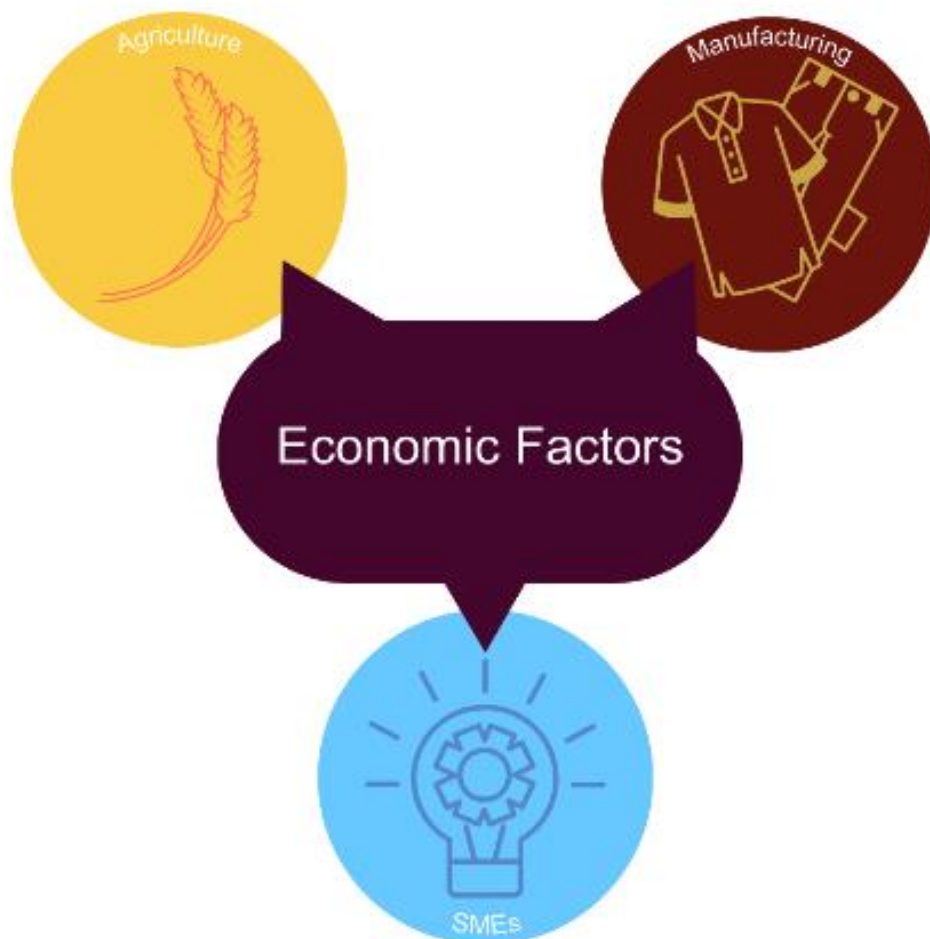


Figure 5: Summary of economic factors discussed in this study. These factors are used to illustrate the web assessment method later

New indicator

Having stated many health and economic factors that impact vulnerable communities during flooding, this paper will propose a different way of assessing the issues. Thus far, each factor has been categorised as either a health indicator or an economic indicator, and the linear format of presenting this information makes them seem separate. Yet, intuitively, we know that health and economics are intrinsically linked. Hence why we see people, on average, in higher income countries with better qualities of life, which in turn benefits the economy. [43]

One way of typically understanding disasters, like flooding, is through a hazard-vulnerability-risk assessment. The issue with this assessment is, however, that it does not focus on the dynamics between different risks or hazards. Those responsible for managing these risks, like stakeholders, also recognise the need for a multi-risk, multi-hazard, framework [44], [45].

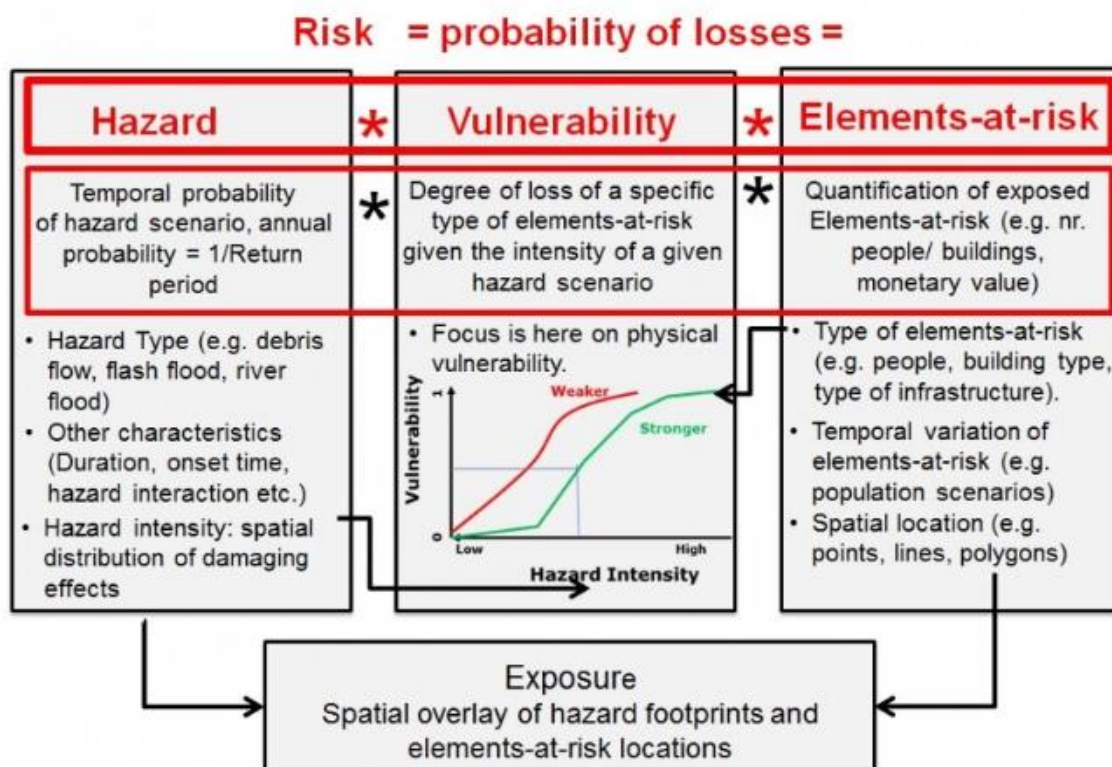


Figure 6: a diagram showing how risk is calculated and what each factor that contributes to it means along with examples. (C. J. Van Westen, 2017)

A more appropriate framework would be more akin to a web rather than a table. Multi-sector analysis, like this paper, will serve to supplement and further explain webs. By integrating the health (figure 3) and economic (figure 5) factors, a more holistic basis can be provided to which other, smaller branches can be continued from (figure 7).

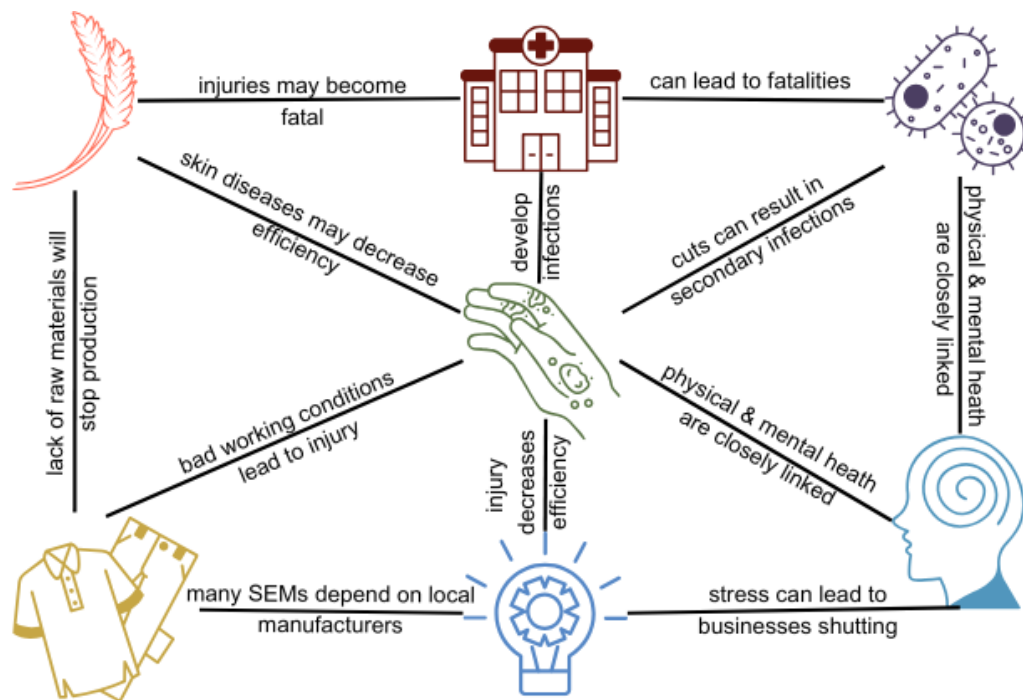


Figure 7: A simplified web analysis diagram containing the factors discussed in this paper. The web contains one point that impacts factor A to factor B but there are multiple factors. Hence, why the text is required to supplement the web.

An individual explanation of factors is useful to understand the web. For example, for the links with the garments industry and surrounding web, without a steady supply of cotton the garments industry grinds to a halt. Alternatively, many people are migrating to the city to work at garments factors and support the lives of their families. Yet, conditions in factors are poor and many get injured, and some even die[46]. Without a good, affordable health system to support them, even minor injuries can become dangerous, for example by developing infections. Not only is the physical health of these garments' workers put under immense strain, the lack of security in their employment proves to be extremely stressful[47]. Yet many street vendors and SMEs businesses depend on the garments made in these factories to make a livelihood. The relationship between businesses and factories is of mutual interest and supports both business owners and in turn their employees.

It is clear that there are many other factors impacting the garments industry, as well .e.g., international pressure to have better working conditions, ethical concerns around child labour, etc.. A major challenge with a multi-sector analysis, is that understanding the dynamics between each factor can include multiple different factors, which first need to be studied. For example, to understand the relationship between how the psychological state of businesses owners impacts their ability to keep businesses open, the psychological harm of flooding and factors for businesses being shut must be studied separately so as not to have a vague, generalised web which connects factors together without studying other potential reasons for the potential risk. Understanding and overcoming this complexity represents a barrier to the application of such an approach to flood risk assessment.

The multi-sector analysis also introduces a bias. If the researcher believes that the psychological stress is the largest factor to business failure, without further study into the other reasons, the web could potentially mislead those viewing it, and those that plan to work toward solving the wider issue. Therefore, it is important that the web is not viewed on its own without significant evidence upholding it.

Conclusion

In conclusion, this paper highlights the need for a more holistic, multi-sector approach to flood impact assessment in vulnerable communities of Bangladesh. The current focus on singular metrics, such as direct health outcomes or economic losses, often oversimplifies the complex, interdependent nature of flood impacts. While the proposed web analysis method seeks to better represent the dynamic relationships between health, economic, and social factors, further research is essential to validate its effectiveness. Future studies must delve deeper into the specific mechanisms linking different sectors, such as the intersection of psychological stress, SME resilience, and public health infrastructure.

The psychological effects of flooding, particularly on vulnerable populations, remain an underexplored area in the existing body of research. More comprehensive studies are needed to capture the long-term mental health consequences of recurrent flooding and its ripple effects on community well-being. Furthermore, as SMEs play a crucial role in Bangladesh's economy, understanding how their recovery post-flooding is influenced by both economic and non-economic factors, including community support and governmental policy, warrants more attention.

Political factors, although not mentioned in this paper, are also crucial in assessing community vulnerability. Previously, diplomatic tensions with India arose when water released from an Indian dam caused severe flooding in Bangladesh, and the recent political upheaval of the Bangladeshi government has brought about significant changes in the country's framework.

Finally, while this paper lays a foundation for a multi-sector framework, future research should also explore the limitations and potential biases inherent in such models. By addressing these gaps, more informed policies can be developed that not only mitigate flood risks, but also enhance the resilience of Bangladesh's most vulnerable communities in a sustainable and equitable manner.

Bibliograph

- [1] 'World Development Indicators | DataBank'. Accessed: Sep. 15, 2024. [Online]. Available: <https://databank.worldbank.org/reports.aspx?source=2&series=EN.POP.SLUM.UR.ZS&country=BGD>
- [2] 'Urban and rural population projected to 2050, World, 10,000 BCE to 2050'. Accessed: Sep. 15, 2024. [Online]. Available: <https://ourworldindata.org/grapher/urban-and-rural-population-2050>
- [3] 'ILO Regional Office for Asia and the Pacific |', doi: 10.1787/5k9h3630320v-en.
- [4] H. Orderud, J. Härkönen, C. T. Hårsaker, and M. Bogren, 'Floods and maternal healthcare utilisation in Bangladesh', *Popul Environ*, vol. 44, no. 3–4, pp. 193–225, 2022.
- [5] A. Yusof, A. K. Siddique, A. H. Baqui, A. Eusof, and K. Zaman, '1988 Floods in Bangladesh: Pattern of Illness and Causes of Death', *J Diarrhoeal Dis Res*, vol. 9, no. 4, pp. 310–314, 1991.
- [6] H. Akther and M. M. Ahmad, 'Livelihood under stress: The case of urban poor during and post-flood in Dhaka, Bangladesh', *Geogr J*, vol. 187, no. 3, pp. 186–199, 2021.
- [7] Md. B. A. Sharif and Md. B. A. Sharif, 'The Impact of Natural Disasters on Small and Medium Enterprises (SME) in Bangladesh', *OALib*, vol. 08, no. 06, pp. 1–15, Jun. 2021, doi: 10.4236/oalib.1107480.
- [8] T. Tempark, S. Lueangarun, S. Chatproedprai, and S. Wananukul, 'Flood-related skin diseases: a literature review', *Int J Dermatol*, vol. 52, no. 10, pp. 1168–1176, 2013.
- [9] Q. Liu, J. Yuan, W. Yan, W. Liang, M. Liu, and J. Liu, 'Association of natural flood disasters with infectious diseases in 168 countries and territories from 1990 to 2019: A worldwide observational study', *Glob Transit*, vol. 5, pp. 149–159, 2023.
- [10] J. E. Coalson *et al.*, 'Erratum: "The Complex Epidemiologic Relationship between Flooding Events and Human Outbreaks of Mosquito-Borne Diseases: A Scoping Review"', *Environ Health Perspect*, vol. 129, no. 12, p. 129001, 2021, doi: 10.1289/EHP10706.
- [11] A. J. Kurien, J. Roy, and K. Das, 'Flood dermatoses: A literature review', *IP Indian Journal of Clinical and Experimental Dermatology*, vol. 8, no. 4, pp. 217–222, 2022.
- [12] B. S. Schwartz *et al.*, 'Diarrheal Epidemics in Dhaka, Bangladesh, During Three Consecutive Floods: 1988, 1998, and 2004', *Am J Trop Med Hyg*, vol. 74, no. 6, pp. 1067–1073, Jun. 2006.
- [13] A. Yusof, A. K. Siddique, A. H. Baqui, A. Eusof, and K. Zaman, '1988 Floods in Bangladesh: Pattern of Illness and Causes of Death', *J Diarrhoeal Dis Res*, vol. 9, no. 4, pp. 310–314, 1991.
- [14] B. S. Schwartz *et al.*, 'Diarrheal Epidemics in Dhaka, Bangladesh, During Three Consecutive Floods: 1988, 1998, and 2004', *Am J Trop Med Hyg*, vol. 74, no. 6, pp. 1067–1073, Jun. 2006.
- [15] A. K. Siddique *et al.*, 'Cholera Epidemics in Bangladesh: 1985-1991', *J Diarrhoeal Dis Res*, vol. 10, no. 2, pp. 79–86, 1992, Accessed: Sep. 24, 2024. [Online]. Available: <https://www.jstor.org/stable/23498147?seq=3>
- [16] F. Qadri *et al.*, 'Enterotoxigenic Escherichia coli and Vibrio cholerae diarrhea, Bangladesh, 2004', *Emerg Infect Dis*, vol. 11, no. 7, pp. 1104–1107, 2005.
- [17] N. I. of P. R. and T.- NIPORT/Bangladesh, M. and Associates/Bangladesh, and O. R. C. Macro, 'Bangladesh Demographic and Health Survey 2004', NIPORT, Mitra and Associates, and ORC

- Macro, Dhaka, Bangladesh, 2005. Accessed: Oct. 12, 2024. [Online]. Available: <https://dhsprogram.com/publications/publication-fr165-dhs-final-reports.cfm>
- [18] N. I. of P. R. and T.- NIPORT/Bangladesh, M. and Associates/Bangladesh, and M. International, 'Bangladesh Demographic and Health Survey 2007', NIPORT, Mitra and Associates, and Macro International, Dhaka, Bangladesh, 2009. [Online]. Available: <http://dhsprogram.com/pubs/pdf/FR207/FR207.pdf>
- [19] O. Kunii, S. Nakamura, R. Abdur, and S. Wakai, 'The impact on health and risk factors of the diarrhoea epidemics in the 1998 Bangladesh floods', *Public health (London)*, vol. 116, no. 2, pp. 68–74, 2002.
- [20] National Institute of Population Research and Training [Bangladesh], Ministry of Health and Family Welfare [Bangladesh], Medical Education and Family Welfare Division [Bangladesh], and The DHS Program [USA], 'Bangladesh Demographic and Health Survey 2022 Final Report', 2024. [Online]. Available: www.niport.gov.bd
- [21] Save the Children, 'BANGLADESH: 51% increase in “unnecessary” C-sections in two years'. Accessed: Sep. 26, 2024. [Online]. Available: <https://www.savethechildren.org.uk/news/media-centre/press-releases/fifty-one-percent-increase-in-csections-in-bangladesh#:~:text=BANGLADESH%3A%2051%25%20increase%20in%20%E2%80%9C,C%2Dsections%20in%20two%20years&text=Dhaka%2C%20Bangladesh%20%E2%80%93%20Bangladesh%20is%20facing,from%20Save%20the%20Children%20reveal>.
- [22] M. Neuman *et al.*, 'Prevalence and determinants of caesarean section in private and public health facilities in underserved South Asian communities: cross-sectional analysis of data from Bangladesh, India and Nepal', *BMJ Open*, vol. 4, p. 5982, 2014, doi: 10.1136/bmjopen-2014.
- [23] A. Mainuddin *et al.*, 'Women Women Women Women E E E Empowerment and mpowerment and mpowerment and mpowerment and I I I Its ts ts ts R R R Relation with elation with elation with elation with H H H Health ealth ealth ealth S S S Seeking eeking eeking eeking B B B Behavior in Bangladesh ehavior in Bangladesh ehavior in Bangladesh ehavior in Bangladesh', *Journal of Family and Reproductive Health jfrh.tums.ac.ir*, vol. 9, no. 2, 2015, Accessed: Sep. 25, 2024. [Online]. Available: www.mycosbazar.info
- [24] S. M. Goudet, P. L. Griffiths, B. A. Bogin, and N. Selim, 'Impact of flooding on feeding practices of infants and young children in Dhaka, Bangladesh Slums: what are the coping strategies?', *Matern Child Nutr*, vol. 7, no. 2, pp. 198–214, 2011.
- [25] 'Bangladesh Demographic and Health Survey 2022 Final Report', 2024. [Online]. Available: www.niport.gov.bd
- [26] B. Pfefferbaum, A. K. Jacobs, N. Griffin, and J. B. Houston, 'Children's Disaster Reactions: the Influence of Exposure and Personal Characteristics', *Curr Psychiatry Rep*, vol. 17, no. 7, p. 56, 2015.
- [27] S. Zhong *et al.*, 'The long-term physical and psychological health impacts of flooding: A systematic mapping', *Sci Total Environ*, vol. 626, pp. 165–194, 2018.
- [28] C. Stanke, V. Murray, R. Amlôt, J. Nurse, and R. Williams, 'The effects of flooding on mental health: Outcomes and recommendations from a review of the literature', *PLoS Curr*, vol. 4, p. e4f9f1fa9c3cae-, 2012.
- [29] Ministry of Finance, 'Bangladesh Economic Review 2022', 2023.
- [30] W. H. Yu, *Climate change risks and food security in Bangladesh*. London: Earthscan, 2010.

- [31] A. Al-Maruf, A. K. M. Kanak Pervez, P. K. Sarker, M. S. Rahman, and J. Ruiz-Menjivar, 'Exploring the Factors of Farmers' Rural–Urban Migration Decisions in Bangladesh', *Agriculture (Switzerland)*, vol. 12, no. 5, May 2022, doi: 10.3390/agriculture12050722.
- [32] Z. Arman, 'Exploring Social Exclusion of Climate Refugees of Dhaka City', *Stamford Journal of Media, Communication and Culture*, vol. 3, pp. 32–41, Oct. 2013.
- [33] R. Paul and A. Choubey, 'Bangladesh garment industry short on cotton as floods worsen protest backlog', Reuters. Accessed: Oct. 12, 2024. [Online]. Available: Bangladesh garment industry short on cotton as floods worsen protest backlog
- [34] L. Boudreau, R. Heath, and T. H. McCormick, 'Migrants, experience, and working conditions in Bangladeshi garment factories', *J Econ Behav Organ*, vol. 219, pp. 196–213, Mar. 2024, doi: 10.1016/j.jebo.2023.02.013.
- [35] LightCastle partners, 'Impact on Bangladesh's SME Landscape'.
- [36] 'World Bank SME Finance'. Accessed: Oct. 08, 2024. [Online]. Available: <https://www.worldbank.org/en/topic/smefinance>
- [37] J. Kok *et al.*, *Do SMEs create more and better jobs?* 2012. doi: 10.13140/2.1.3308.1282.
- [38] M. H. Morris, M. Schindehutte, and R. W. LaForge, 'Entrepreneurial Marketing: A Construct for Integrating Emerging Entrepreneurship and Marketing Perspectives', *Journal of Marketing Theory and Practice*, vol. 10, no. 4, pp. 1–19, Oct. 2002, doi: 10.1080/10696679.2002.11501922.
- [39] M. P. Miles, G. K. Lewis, A. Hall-Phillips, S. C. Morrish, A. Gilmore, and C. J. Kasouf, 'The influence of entrepreneurial marketing processes and entrepreneurial self-efficacy on community vulnerability, risk, and resilience', *Journal of Strategic Marketing*, vol. 24, no. 1, pp. 34–46, Jan. 2016, doi: 10.1080/0965254X.2015.1035038.
- [40] A. Haque and S. Jahan, 'Impact of flood disasters in Bangladesh: A multi-sector regional analysis', *International Journal of Disaster Risk Reduction*, vol. 13, pp. 266–275, Sep. 2015, doi: 10.1016/j.ijdr.2015.07.001.
- [41] N. Kuruppu, J. Murta, P. Mukheibir, J. Chong, and T. Brennan, 'Understanding the adaptive capacity of Australian small-to-medium enterprises to climate change and variability Final Report'.
- [42] D. J. Alesch, J. N. Holly, E. Mittler, and R. Nagy, 'Organizations at Risk: What Happens When Small Businesses and Not-for-Profits Encounter Natural Disasters Small Organizations Natural Hazards Project First Year Technical Report University of Wisconsin-Green Bay Center for Organizational Studies'. [Online]. Available: www.riskinstitute.org
- [43] A. Awan, F. Mansab, and F. Bashir, 'Economic Freedom and Quality of Life in Asia: Fresh Econometric Evidence', *Pakistan Journal of Humanities and Social Sciences*, vol. 10, no. 3, pp. 1051–1067, Sep. 2022, doi: 10.52131/pjhss.2022.1003.0268.
- [44] R. Šakić Trogrlić *et al.*, 'Challenges in assessing and managing multi-hazard risks: A European stakeholders perspective', *Environ Sci Policy*, vol. 157, Jul. 2024, doi: 10.1016/j.envsci.2024.103774.
- [45] P. J. Ward *et al.*, 'Invited perspectives: A research agenda towards disaster risk management pathways in multi-(hazard-)risk assessment', *Natural Hazards and Earth System Sciences*, vol. 22, no. 4, pp. 1487–1497, Apr. 2022, doi: 10.5194/nhess-22-1487-2022.

- [46] Amnesty International, 'PRESS RELEASE Bangladesh: Garment Workers Must Receive Rights-Based Compensation and Justice Immediately', 2024. [Online]. Available: <https://www.amnestyusa.org/press-releases/bangladesh-garment-workers-must-receive-rights-based-compensation-and-justice-immediately/#:~:>t
- [47] M. Waseem Bari, J. Jovanovic, S. A. Useche, M. Atikur Rahaman, and G. Mai, 'Occupational stress and health risk of employees working in the garments sector of Bangladesh: An empirical study'.