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# Systematic Review of Disaster Risk Reduction in Bangladesh

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#### ABSTRACT

**Introduction:** The most pressing threat to our earth in the 21st century is climate change. Various natural events and anthropogenic influences contribute to the appearance of numerous hazard. There is an increase in climate related hazards across all regions, posing different threats to the ecosystem and human. Moreover, the location of Bangladesh at the Northern end of the Bay of Bangal, is frequently impacted by four tropical cyclones annually. Temperature, sea wave patterns, and sea level are noticeable alter and change globally will become more frequently and intense. Consequences of these change, desertification, drought, cyclones, floods, sea level rise, earthquake, landslide are increase in every year **Research Methodology:** these study followed the convenient sampling for selection of report.study topic, hazard type including event name. PRISMA 2020 flow diagram for the study selection process. extracted data from eligible study. we used descriptive statistics to summarized the collected data. **Result:** the first step in general warning system is forecasting among local communities. The awareness and judgement of communities to environmental threats are the baseline condition for disaster preparedness. Structural measures are a product of understanding the impact of diasaters and identifying the physical remedies to counteract such impact to reduce risks. **Conclusion:** The sendai framework for diasater risk reduction seeks to advance the local, national, regional and global efforts to prevent new risks, reduce existing risks, and increase resilience and replacing the Hyogo framework for action in 2015.

Keywords: Disaster, anthropogenic influences, ecosystem

# **INTRODUCTION**

There is an increase in climate related hazards across all regions, posing different threats to the ecosystem and human. Temperature, sea wave patterns, and sea level are noticeable alter and change globally will become more frequently and intense. Consequences of these change, desertification, drought, cyclones, floods, sea level rise, earthquake, landslide are increase in every year (Tasnuva A., et al, 2024). Moreover, the location of Bangladesh at the Northern end of the Bay of Bangal, is frequently impacted by four tropical cyclones annually. There is highly significant loss of property are damage caused by tropical cyclone. Some factors that increase the storm surge in Bangladesh are the long continental shelf situated adjacent to the coastal line, shallow bathymetry in the north Bay of Bengal, northward converging shape of the Bay, complex coastal layout including offshore islands, high sediment accretion rates high astronomical tide and long tide range

between east and west coasts, and high river discharge volume caused by the combined flow of Ganges-Brahmaputra-Meghna through lower Meghna, particularly the river runoff during torrential rain.it often produces landslide, flooding and post episodic event sanitation crises. Bangladesh is a disaster-prone country exposing to various disaster like cyclone, flooding earthquakes, landslides and droughts and highly vulnerable to climate change. In 1991, a category 4 tropical cyclone named Gorki resulted in 147000 deaths. In 2007, another category 4 tropical cyclones named Sidr resulted in 4500 deaths. The total number of deaths is still highest compare to other hazards. The number of deaths from landslides have been increasing during the period 2016. Rangamati, Chittagong and Bandarban are located south eastern part of Bangladesh where landslides has been one of the most damaging natural hazards due to low hill, soft rocks, clay and shale. Chittagong landslide in 2007 and Rangamati landslide in 2017 jointly resulted in 208 deaths. (Alam E. & Ray-Bennett N.S., 2021).

**Relevant conflicts of interest/financial disclosures**: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



#### **RESEARCH OBJECTIVES:**

1. To find out the risk factors and vulnerability for various disaster in Bangladesh.

2. To determine the disaster risk management capacity in community level.

3. To promote resiliency in different level for decreasing damage effects.

4. To improve the effectiveness of disaster risk governance in Bangladesh.

#### LITERATURE REVIEWS:

Hasan M. M. and Islam M. N., 2024, conducted a study titled effectiveness of flood early warning for the Jamuna char-dwellers at Sirajgang districts in Bangladesh. The research dictates that the climate change induced uncertainties in Bangladesh which is crisscrossed by many rivers that faces the perennial threat of devastating floods and damage the infrastructure, disruption of livelihood and food security. Consequently, the need for effective flood early waning system to minimize impact of flooding and enhancing community resilience. These study al so showed that natural disasters is increase tenfold in 2015-2020 compared to 2009-2014 and flood alone accounted for 56.4% of total loss and damage of tk 179198.8 crore. In 2015-2020, 71.81% of households didn't receive an early warning for flooding. These study concluded that the necessity of building community trust by involving involving them in the planning and management of flood warning systems for more effective risk reduction. Another research conducted by Riaz R., and Sultana N., 2025, proposes an indicator-based approach for assessing location specific variations in landslide resiliency to minimize risk by building a resilient society in Rangamati Hill District. The research constructed based on four dimension of resilience such as social, economic capital, physical and environmental system the study recommended that to achieving the four-priority action of the sendai framework for disaster risk reduction (2015-2030). Hasan I., et al., 2024, conducted research about cyclone shelter suitability assessment using analytical hierarchy in the coastal region of Bangladesh. The study identify and map feasible cyclone shelter suitability by utilizing GIS, AHP, Hotspot analysis, and remote sensing technique. There are seven variables associated with cyclone hazard such as elevation, slope, distance, from roads and rivers, population density, land use, cover and proximity to healthcare facilities to identify the safest and cyclone shelter areas. These study address a critical gap in cyclone shelter planning, offering valuable insights for residents and decision makers to mitigate cyclone risks not only in the Barguna.

#### **MATERIALS AND METHODS:**



Figure2: Documents selection and exclusion diagram.

**1. Design**: these studies followed the convenient sampling for selection of report.

**2. Search strategy:** study topic, hazard type including event name.

**3. Screening and selection process**: PRISMA 2020 flow diagram for the study selection process

**4. Data extraction**: extracted data from eligible study.

**5. Data analysis:** we used descriptive statistics to summarized the collected data.

# **Results and Discussion:**

# 1. Early warning systems:

the first step in general warning system is forecasting among local communities. It includes direct observation of disaster characteristics, speed and sound of water. So, its need to predict the landslides is based on the assessment of unusual earth cracks and understanding the impact of heavy rainfall pattern in the risk zones. Besides these, animal behavior, general weather condition and occurrence of hazard is need to continuous assess. Some communities uses local technologies to disseminate information or trigger alarms such as in Indonesia, they uses bamboo slit drums and mosque loudspeakers but in Afghanistan, they uses indigenous loudspeakers with community drums. Some literatures also demonstrate with integrate traditional forecasting system from television meteorological forecasts such as radio forecasts serve as conformation. Moreover, alarms, news, warning signs provides good information to the risk population exposed to hazards for them to be received, be prepared and constantly take action.

# 2. Risk knowledge and perception:

The awareness and judgement of communities to environmental threats are the baseline condition for disaster preparedness. Risk and perception are developed within vulnerable communities about their environment and teach them what these hazards can bring, why and how they occur and to cope with them. Its need to know local environment behaviour and accumulation knowledge about past hazard experience. The region where rainfall most, risk areas for landslides and flood prone due to weak geology and water table condition. These knowledge leads to development of context dependent knowledge system helpful for communities to prepare for disaster quickly. Past knowledge about hazards are also sources of risk knowledge and perception among communities.

# 3. Anticipatory measures: mitigation and preparedness:

	1 2	8 1
<b>Risk communities</b>	Mitigation	Action plan
Hazards knowledges	Forcasting strategies	Early action, rescuse, preparedness.
Landslides	Planting and reserves trees	Forest reserves
flood	Creating a network of	Embankment, pumping out,
	ponds	compartmentalization, safe water supply.
cyclone	Planning, evaluation	Modern shelter, good fund, recovery, cpp,
		ews.
Earthquake	Planing, fostering, selecting	Engineering management, infrastructure
	zones.	resiliency.

 Table 1: anticipatory disaster mitigation plan

# 4. Structural measures:

Structural measures are a product of understanding the impact of disasters and identifying the physical remedies to counteract such impact to reduce risks. According to UNDRR, it means any physical construction to avoid possible hazards and application of engineering technology to achieve hazard resistance and resilience system. These includes, raising house either on piles, stilts, platforms or plinths, on higher grounds, or elevating room levels through earth filling. Agricultural yields are optimized through the intervention of micro dams- a hydro-agricultural innovation by the communities that can retain water and impede drought for a few weeks. Besides these, a post disaster reconstruction initiative relied on traditional character and form of structures but strengthened them with formal engineering interventions. Moreover, cyclone shelter suitability needs in Bangladesh with modern facilities based on hotspot analysis.

#### 5. Likelihood based adaptation:

Disaster threaten both communities and their livelihoods. The most common agricultural practices across counties in response to different hazards such as crop selection. Introducing new or diversifying crop options to optimize yield, improving irrigation and water management system, altering cropping patterns and structure. Communities release water in the fish farms set up surrounding nets to prevent water and fish overflow for aquaculture-based adaption strategies in response to flooding.

#### 6. Global DRR framework:

The sendai franework for diasater risk reduction seeks to advance the local, national, regional and global efforts to prevent new risks, reduce existing risks, and increase resilience and replacing the Hyogo framework for action in 2015. Moreover, by progressing Sendai framework and analysing the priority areas of action are capture in the current understanding of LIK in the DRR body of the knowledge. These priorities areas with extracted themes help to realize the implementation, monitoring, of the global framework of DRR.



Figure3: Themes within the Sendai framework.

# **CONCLUSION:**

Recognition, resiliency, vulnerability and capacity are the pillar of disaster reduction. Early responses to disasters entail integration of local and scientific knowledge. These study focus that there is an increasing number of initiatives in the fields of DRR. moreover, researchers need to engage with local communities to integrate their knowledge with DRR preparedness. Theses study also produced a magnitude of outcomes and formal evaluation process appears much lacking in the academic literature. Critical examination and interdisciplinary research team with appropriate expertise as well as funding



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models that support the progress in the areas of DRR interest for boarder benefits. Inherent adaptive capacity of the community such as social memory can also be considered during local knowledge integration. These study results are directly applicable to regional risk management policies, providing actionable decision policy and strategic planning process. Future research also integrate climate change projections to ensure suitable shelter locations remain safe and effective in facing DRR

# REFERENCE

- Tasnuva A., et al., (2024); Developing a disaster risk index for costal communities in southwest Bangladesh: Shifting from data driven methods to holistic approachess, Ecological Indicators 166(2024), 112381. www.elsevier.com/locate/ecolind.
- Fakhruddin B., et al., (2022); Understanding hazards: Probabilistic cyclone modelling for disaster risk to Eastern Coast in Bangladesh, Progress in Disaster Science, 13(2022)100216.
- 3. Alam E. & Ray-Bennett N.S., (2021); Disaster risk governance for district level landslide risk management in Bangladesh, International journal of Disaster Risk Reduction, 59(2021)102220.
- Vasileiou k., et al., (2022), integrating local and scientific knowledge in disaster risk reduction: A systematic review of motivation, process and outcomes. International journal of Disaster Risk Reduction, 81 (2022) 103255.
- 5. Abebe Y. A., et al., (2023); flood impact on healthcare facilities and disaster preparedness-a systematic review, journal pre-proof.
- 6. Monsalve L. F., et al., (2024); relationship between participation and community resiliency in the disaster risk process: Asystematic review, international journal of disaster risk reduction, 111(2024) 104751.
- Hadlos A., et al., (2022); where does local and indigenous knowledge in disaster risk reduction go from here? A systematic literature review, International journal of disaster risk reduction, 79 92022) 103160.
- Hasan I., et al., (2024); Geo-spatial based cyclone shelter suitability assessment using analytical hierarchy process in the coastal region of Bangladesh, Helion, 10(2024) e39831.

 Riaz R., and Sultana N., (2025)., location specific heterogeneity in landslide resiliency index: A houdehold-based comperative study in Rangamati Hill Districts, Bangladesh.

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