



CONDITION ANALYSIS OF THE EXISTING CYCLONE SHELTER OF DISASTER-PRONE AREA IN BANGLADESH

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Abstract

Bangladesh is low-lying, mainly riverine country located in South Asia, is crises crossed with the divisional and sub divisional branch of Ganges (Padma), Brahmaputra (Jamuna), and Meghna Rivers. The Bay of Bengal is prone to storms and Bangladesh is often hit by severe weather during the monsoon season, from the middle to the end of the year. Present day Bangladesh, due to its unique geographic location, suffers from devastating tropical cyclones frequently and experiencing the climate change. These papers represent the present condition of the Cyclone Shelter of disaster-prone area in two sub division in Bangladesh (specially Barguna and Bhola). At first the feasibilities of the cyclone shelters are discussed and then find out the common problems. This study finds out the technical assessment for both Architectural and Structural issues as well as the recommendation of future study.

Introduction

Bangladesh has the coastline of 580 km (360 mi) on the northern littoral of the Bay of Bengal. There are around 2,500 cyclone shelters and multipurpose cyclone shelters along the 710 km long coast of Bangladesh. They have gradually been constructed since the devastating cyclone of 1970 to provide a safe haven facility for the coastal population. Constructed by various agencies the shelters are heterogeneous in many aspects; i.e. Funding conditions, location, design, footprint, construction material and technique, and construction process, etc. Until now, spatial distribution of cyclone shelters; structural strength analysis; catchment area; and management issues have dictated design of the shelters.





The coastal zone policy, The Bangladesh Climate Change Strategy and Action Plan, adopted by the Government of Bangladesh in 2009, seek to guide activities and programs related to climate change in Bangladesh. The project was prioritized in the Government's 2010 strategic programme for climate Resilience, prepared under the pilot Program for climate Resilience named Climate Resilient Infrastructure Mainstreaming Project. The intervention is planned to develop climate resilient structures, including Cyclone shelter, rehabilitation of existing cyclone shelter and improving of critical road connectivity.

Faruk et al. (2017) presented a simple random sampling method was used to select the case study shelters. An assessment protocol was developed to evaluate each case study shelter for their inclusiveness. Initial findings show that design of the cyclone shelters failed to address requirements of disabled and older population group; gender discrimination; and specific requirement of the local farmers. Tropical cyclones are devastating hazards causing losses via high winds, intense rainfall, terrestrial flooding and storm surges (Peduzzi et al., 2012). Effects vary depending on the locations of origin and landfall (Lal et al., 2012).

This study represented the critical condition of the cyclone shelter and the connecting road facilities of the shelter.

Accessibility of Cyclone Shelters

The Coastal belt of Bangladesh has been formed by the process of sedimentation, that's why most of the low-lying areas are subjected to the process of inundation even under the normal condition of tides. Due to the triangular shape of the Bay of Bengal region, a tidal surge accompanied by a stormy event make the situation more distressing. Figure 1 shows the Location of Cyclone shelter in Bangladesh.



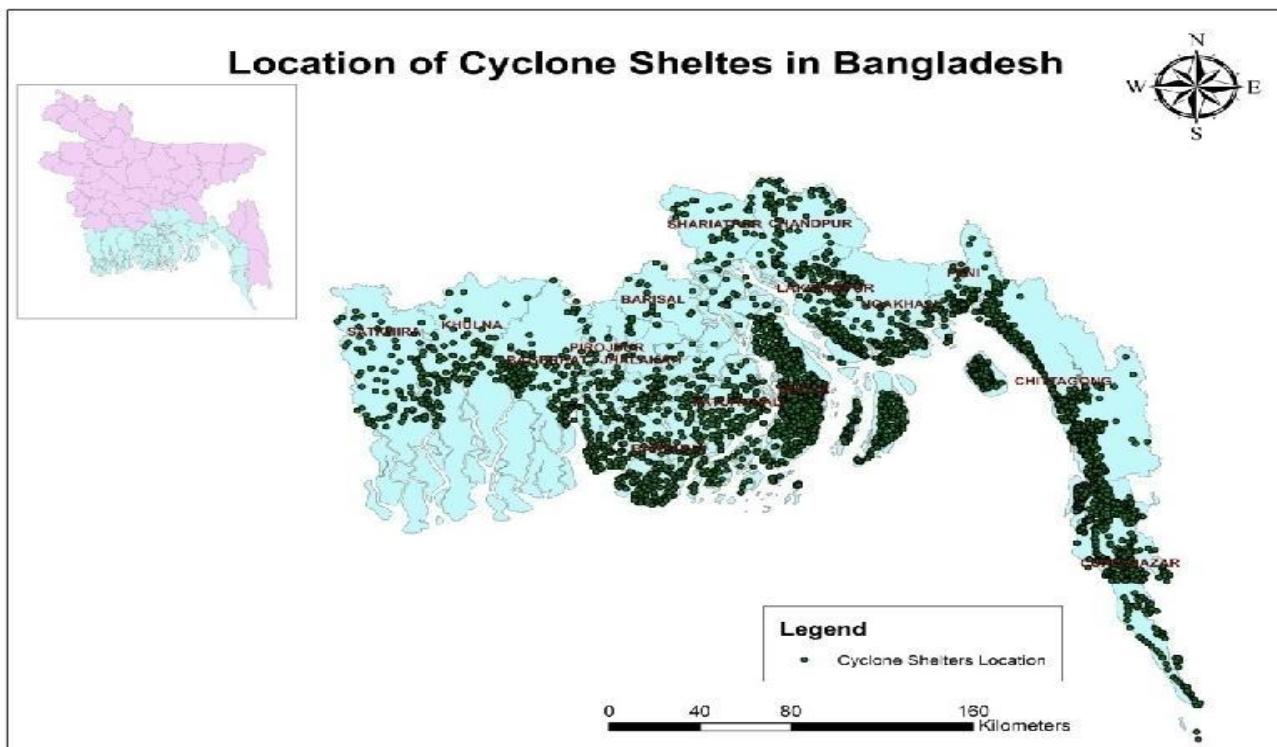


Figure 1 : Location of Cyclone shelter in Bangladesh (after Chowdhury. al., ICERIE 2017)

The study has been carried out mainly in the coastal regions of Bangladesh and the location of cyclone shelters is shown in figure 1 (Source: Ministry of Disaster Management and Relief, Government of Bangladesh). According to Integrated Coastal Zone Management Plan, nineteen districts of Bangladesh located near the Bay of Bengal area has been defined as the coastal areas.

Barguna and Bhola is the most vulnerable coastal region of Bangladesh. The Barguna District is bounded with important rivers include the Paira River, Bishkhali River, Khakdon River, Baleshwar River and Haringhata River. The total area of the river is 160 km² which is 22% of the total area of the district. Moreover, there are 300 natural canals in the district. Bhola is a delta island. There are two rivers in this district which are Meghna and Tetulia. Meghna is in east and north side of the district and Tetulia is in the west side. Bay of Bengal is in the south of Bhola district. Every year Barguna and Bhola are affected with cyclone. From the fig 1, it is clear that most of the cyclone shelters are located in that coastal region. Cyclone shelters have protected human lives and livestock in the coastal region of Bangladesh during past cyclones. In the cyclone Sidr, 15 percent of the affected population took refuge in shelters (GoB, 2008).



Currently there are 3791 usable cyclone shelters with elevated space for livestock and overhead water storage, making them potentially more effective. Most of the cyclone shelters were made after the devastating cyclone of 1991. Most of the cyclone shelters, built during the period from 1991 to 2007, were constructed by the Local Government Engineering Department (LGED). Almost all the cyclone shelters are used for different purposes like education centre, community centre, health centre, office building etc. during non-emergency period. After cyclone Sidr, World Bank constructed some cyclone shelters in the coastal districts.

The existing cyclone shelter which are needed for rehabilitation as well as the new proposed cyclone shelters are included in this paper. Table 1 and Table 2 shows the Cyclone shelter of Barguna and Bhola district.

Table 1. Cyclone shelter of Barguna district

Name of the cyclone shelter	Sub District
Mitthalobongola GPS	Barguna Sadar
Hazar bigha	Barguna Sadar
Bistabak	Barguna Sadar
Tafalbari	Patharghata
Moddo bainchotki aziz sikdar	Patharghata
Horidra	Patharghata
Ruhuta	Patharghata
Padma	Patharghata

Table 2. Cyclone shelter of Bhola district

Name of the cyclone shelter	Sub District
Meajanpara	Char Fassion
Ayeshabag	Char Fassion
Mukharbanda	Char Fassion
Char Jamuna	Char Fassion
G.M. Bazar	Lalmohon
South Char Vuta	Lalmohon
South Chachra	Tajumuddin
Borhangong	Borhanuddin
Howla	Doulotkhan
Shukdev	Doulotkhan





Existing condition of the cyclone shelter

The existing conditions of the cyclone shelter and its connecting roads is presented in this section. The physical condition of most of the cyclone shelter is goods. The drainage condition and the connecting road is not sufficient in most cases. The roof of the most of the cyclone shelter are flat as usual residential building. The flat roof has caused many types of problem like the slope of the roof has not maintained properly. For this reason, water get clogging at different places of the roof. That creates damage at the patent stone of the roof and the ceiling gets efflorescence. For the salinity of the coastal zone that efflorescence decays the clear cover of the slab and most of the cyclone shelter have experienced water falling from the roof during calamities that hamper the basic needs of the shelter.

The most important criteria of the cyclone shelter that it is easily accessible from every direction of the cyclone shelter and the boundary wall is the forbidden criteria of the shelter. It is very afflicted things that the connecting road is not properly casted and there are lots of problems like less widening, not paved, the corner of the roads is breached in many places because of polder. These problems make human life miserable during cyclone and most of people fall in danger in the road.

Conclusion

This study presented the existing conditions of the cyclone shelter and its connecting roads. The condition of most of the cyclone shelter is goods. The drainage condition and the connecting road is not sufficient in most cases. This should be renovated for the future stages of the maintenance program of the cyclone shelter.

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