Case Study: The Brahmanbaria Tornado-2013

Introduction

Severe local storms including tornadoes frequently occur in Bangladesh in the pre-monsoon season from March to May and kills and injures several thousands peoples in a year. Therefore, severe local storm is one of the most important natural hazards in Bangladesh (Hayashi and Yamane 2010, Yamane *et al.* 2010). The affected area of the severe local storm and the damaged region is concentrated in the very small region. Therefore, the meteorological data such as pressure and wind cannot be obtained because the weather observatories are not distributed in a fine spatial resolution. Fujita (1971) introduced the estimating scale of severe local storms, especially tornadoes, applying the tornado damages in the past of reports of NOAA, USA. This scale was made up on the basis of relationship between the wind speed and the damage in the tornadoes. This Fujita scale is utilized for the estimation of the intensity of the tornadoes in USA and other counties. According to Fujita scale the Brahmanbaria Tornado falls under F0.

The Brahmanbaria tornado 2013 was a deadly tornado that took place in the Brahmanbaria District of Bangladesh on March 22, 2013. The tornado struck 20 villages with a diameter of 8 km traveling at a speed of 70 km per hour; killed 31 people and injured approximately 500 when the tornado moved through the villages of Ramrail, Basudeb, Chinair, Sultanpur union of Sadar Upazila and North Akhaura union of Akhaura upazila in Brahmanbaria district on last Friday at 17:30 LST (The BD News24.com, The Daily Star Bangladesh, The Zeenews, The ABC News).

The worst damage occurred in the Bijoynagar and Akhaura Upazila. Thousands of trees and utility poles were toppled down and thousands of people were left homeless. The tornado disrupted both train and road communication which interrupted rescue operations. Part of the prison house of the district had been collapsed resulting in a death of a guard. Many crops, mostly paddy, were damaged as well. (The New Age, The Anchorage, Daily News, The BBC and The CNN)

Many houses and standing crops on a huge swathe of land were badly damaged by the tornado. Many people of tornado-ravaged villages took shelter in the school buildings. According to a local lawmaker, Mr. Rabiul Moktadir Chowdhury, 1000 families were affected by the Friday afternoon twister, which also pulled out around 3,500 trees besides damaging crops.

The major affected villages are: Patirhata, Urshiura, Chandi, Chinair, Kodda, Radhika, Bashudev, Badshala in Sadar upazila; Azampur in Akhaura and Merashine in Bijoynagar upazila. Among them, the worst affected villages are Urshiura, Jarurtola, Patiarhata, Sultanpur, Jibontola, Chinair, Machirhata, Chaldpur and Paghachang.

The pictures of severe local storm of March 22, 2013: Affected area: 23°38.74N-24°16.16N, 90°43.36E-91°19.77E

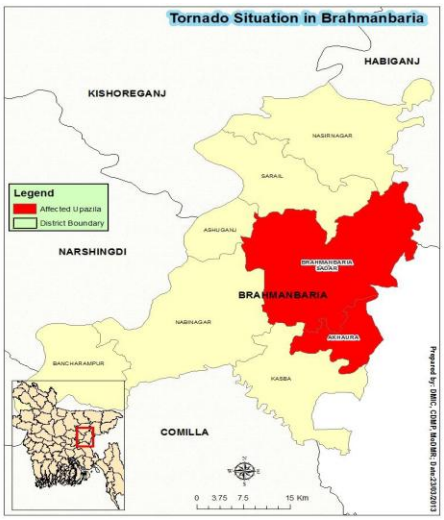

Fig. 1 Tornado affected Brahmanbaria Fig. 2 Damaged structures and houses

Fig. 3 An injured mother with her child in a local hospital

Fig. 4 Uprooted Trees

Fig.5 Broken tree due to devastating the storm

Table 1 Detailed information about the damage

District	Affected Upazila Nos.	Affected Unions Nos.	Affected Families Nos.	Total Death Nos.	Total Injured Nos.	Affected households Nos.	Affected Crops Acres	Cattle (Death) Nos.
Brahmanbaria	3	6	1667	31	388	2552	1285	299

Other Damages:

- Electric transmission lines and poles were disrupted and the whole Brahmanbaria city was seriously affected.
- Besides the Katcha houses, 175 meter boundary wall of the district prison collapsed.
- Women ward, kitchen, security wall and partition including main gate of the prison collapsed.
- Road Communication, especially Sylhet-Chittagong Highway collapsed due to fall down and uprooting of numerous trees.

Immediate Action Taken

Since the occurrences of tornadoes are unpredictable therefore, prior awareness and preparedness practices are absolutely little or nil. However, an immediate rescue operation carried with the help of Police, Fire Brigade, Paramilitary, Red Crescent RCE Volunteers, Paramedics, Roads and Highways, Public Welfare Department and local people.

Two medical teams from Comilla cantonment were engaged for rendering medical services to the victims. Injured persons were admitted and taken treatment from Brahmanbaria Hospital and other local hospitals and clinics. The Disaster Management Information Centre, Ministry of Disaster Management and Relief has allocated each families of the dead to receive BDT 20,000,

BDT 5,000 for the injured and two bundles of corrugated iron sheet along with BDT 6,000 to rebuild damaged houses. Moreover, 300 tents were supplied to the affected area to build temporary shelter. Two emergency pick-up motorized vans with two officers from the Department of Disaster Management have been deployed to help and carrying relief goods within the affected villages.

Dry food distribution among affected people have been arranged by UP chairman and local leaders. Two medical teams from Comilla cantonment were engaged for rendering medical services to the victims. The Rural Electrification Samity restored the electric lines and poles were replaced within three days.

Conclusion:

In Bangladesh, tornadoes are confused with cyclones in the literature. Many tornadoes occur and damage structures, lives and livelihoods every year. Some of the tornadoes struck with hails and lightening and damage life and properties. The coastal zone and the central low-lying areas are more vulnerable to tornadoes as the inland water-bodies contain less water and become very hot and local depressions cause the severe cyclones. The typical and traditional houses in the rural area in Bangladesh are made with straw roofs and bamboo walls. Recently, the house with tin board roof and walls are prevailing. This house is keeping good for the water proof condition during heavy rainfall in the monsoon season. However, when the high wind blows in the severe local storm in the pre-monsoon season, those tin boards are flown away immediately and become dangerous knives to cut and kill a body. Many persons were injured by these flying tin boards in that severe storm. Therefore, structural improvement may reduce the damages. However, natural and traditional defense mechanisms especially plantations with bamboos, Palmyra palm, areca nut and coconuts etc. are the important plants those break the wind speed, protect and reduce the damage.

References

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ESD Learning

With the climate change effect the frequencies of tornadoes are increasing. Since meteorological predictions of tornadoes are difficult then early preparedness is not possible. Therefore, natural and traditional defense mechanisms must be established. Plantations with strong wind breaking plants especially the bamboos, Palmyra palms, coconuts and areca nuts etc. should be established in tornado prone regions.

Proper windbreaks should be raised with recommended distances so that the wind can pass through and reduce the wind speed. Preference should be given with the strong plants those have high elasticity and strong root anchorage.

Shallow-rooted trees like, Mahogany (*Swietenia macrophyla* King, *Swietenia mahagoni* (L.) Jacq, Rain tree (*Albizzia saman* F.Muell.), and Raj-korai (*Alibizzia richardiana* King & Prain) etc. should not be planted in the tornado prone zones.

During the establishment of plantations, recommended safe distances should be maintained from the building structures, transmission lines, roads and highways, bridges, sewerage and water supply lines etc.

Immediate rescue operation with all out efforts can minimize life and property loss.