3.3.2 Bangladesh

Bangladesh

Cyclone Prediction and Forecasting, Weather Warning System and Dissemination Methods: The Bangladesh Perspective

Bangladesh is a deltaic land about 144,000 km^2 in area. The Himalayas are to the north and the Bay of Bengal to the south. Due to the concave shape of the Bangladesh coast and its peculiar geographic location, the weather system is complicated across the country. A tropical cyclone is a warm-core low-pressure system around which the air circulates in an anti-clockwise direction in the Northern Hemisphere. It consists of a rotating mass of warm and humid air, normally between 300 and 1500 km in diameter. The strongest winds, which may approach 200 knots, blow around the eye of a tropical cyclone, a central region of light winds and lightly clouded sky ranging from a few kilometers to over 100 km in diameter.

Prediction of cyclonic storm in the Bay of Bengal and issuance of timely warning is the task of the Storm Warning Centre (National Weather Forecasting Centre) Dhaka. The cyclone information issued by the Storm Warning Centre (SWC) requires detection and monitoring of cyclones from formation until landfall and forecasting the cyclone's future track. Modern technology has provided the means for early detection and constant tracking.

The cyclone warning system is well known in Bangladesh. Warnings include the following information.

a) Position of storm centre.
b) Direction and rate of movement.
c) Area likely to be affected specifying upazillas (administrative unit in Bangladesh) of the district if possible.
d) Approximate time of commencement of gale winds (speed more than 32 km/h or 52 km/h).
e) Maximum wind speed expected.
f) Approximate height of storm surge/tide and areas likely to be affected.

In order to produce a tropical cyclone warning, predictions of the following are required:

- Tropical cyclone location and motion
- Tropical cyclone wind field.
- Storm surge

Debsarma (STP Model 1994 & STEEPER Model 1998) developed one regression model and one steering-cum-persistence model for the track prediction of cyclones, which operates well in the Storm Warning Centre of Bangladesh Meteorological Department (BMD). It has been found that the upper air steering method plays an important role in the track prediction cyclones in the Bay of Bengal. For this purpose, a 200-hPa or 150-hPa level chart is carefully analyzed to obtain the circulation pattern and the movement of a cyclone is guided by the anti-cyclonic flow pattern at 200-hPa or 150-hPa level.

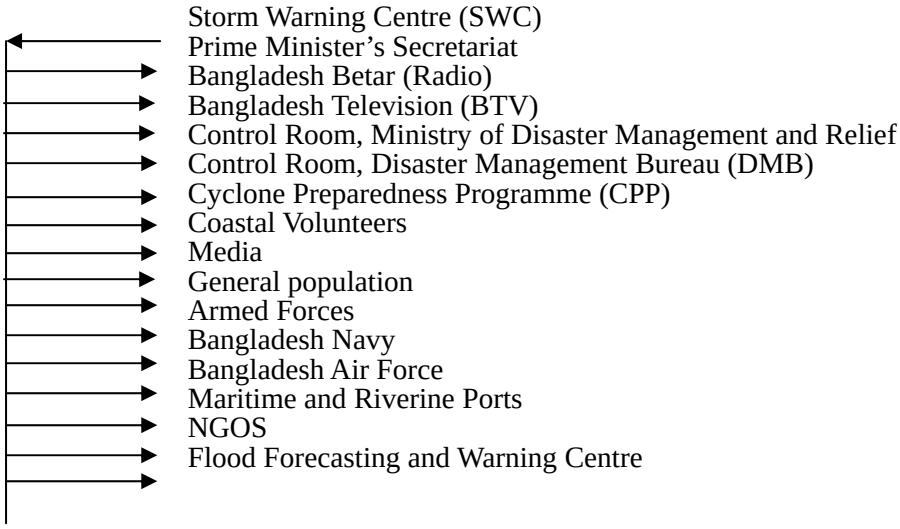
As per the Standing Order of the Government, Cyclone Warning messages are issued as follows:

a) Warning Stage: 24 hours in advance.
b) Danger Stage: Minimum 18 hours in advance.
c) Great Danger Stage: Minimum 10 hours in advance.

Characteristics of Tropical Disturbances in the Bay of Bengal

Stages of Disturbances	Radius of Disturbances	Maximum sustained wind
Low pressure are or low	-	Less than or equal to 31 km/h (17 Kts)
Well marked low	-	32 km/h - 39 km/h (18 Kts - 21 Kts)
Depression	44 km (24 NM)	40 km/h - 50 km/h (22 Kts - 27 Kts)
Deep Depression	48 km (26 NM)	51 km/h - 60 km/h (28 Kts - 33 Kts)
Cyclonic Storm	54 km (30 NM)	61 km/h - 88 km/h (34 Kts - 47 Kts)
Severe Cyclonic Storm	64 km (35 NM)	89 km/h - 117 km/h (48 Kts – 63 Kts)
Severe Cyclonic Storm with a Core of Hurricane wind	74 km (40 NM)	118 km/h-219 km/h (64 Kts–118 Kts)
Super Cyclone	84 km (45 NM)	220 km/h or more (119 Kts or more)

There is a standing order for cyclones to be disseminated to all concerned Ministries, Divisions, Departments, and nongovernmental agencies and also to press the public to be ready to discharge their duties in a speedy and systematic manner to handle the situation efficiently. More frequent contact is maintained between BMD and Betar (radio), and television transmission hours are extended as and whenDanger Signals or Great Danger Signals are hoisted. The warning message dissemination system of SWC, the national weather forecasting centre, is as follows:



Only 5% of cyclones form in the Bay of Bengal, but loss of lives and property is about 85% of the global total. The cyclone of 1970 took the lives of 300,000 people but the cyclone of the same intensity of 1991 killed 138,000 people, and the cyclones of 1997 and 1998 resulted in only 127 and 6-7 deaths respectively. This is a definite development in saving lives and property.

Weather forecasting is difficult and will remain a challenging task. The BMD in collaboration with the CPP and other organizations related to disaster management will hopefully be in a position to handle natural disasters more efficiently and easily in the near future.

- **Background**
  Bangladesh is the most disaster prone area of the world. Most of its disasters are cyclones. It sometimes occupies the news headlines because of its extreme weather events.

- **Objective**
  Prediction of cyclonic storms in the Bay of Bengal and issuance of timely warnings are the main objectives of the Storm Warning Centre (National Weather Forecasting Centre) Dhaka.

- **Activities Undertaken**
  Cyclone prediction, forecasting and provision of weather warning signals.

- **Major Achievement**
  The cyclone of 1970 took the lives of 300,000 people but the cyclone of the same intensity of 1991 killed 138,000 people, while the cyclones of 1997 and 1998 resulted in only 127 and 6-7 deaths respectively.

- **Contact Details**
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