

## MAY 1994 CYCLONE OF BANGLADESH

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### 1. INTRODUCTION

Bangladesh is a disaster-prone country. Disasters like floods, cyclonic storms, tidal surges, droughts, tornadoes, river bank erosion, earthquakes occur frequently and regularly. Floods and windstorms are more frequent and disastrous. The peculiar geographic location and other morphological characteristics have made Bangladesh vulnerable to such disasters.

Recently a devastating cyclone with maximum wind speed of 250 km per hour hit the Cox's Bazar coastal area of Bangladesh on May 02, 1994 evening. Fortunately human casualties were less (about 150) this time and compared to other past cyclones as follows (1, 2):

1970- Between 300,000 to 500,000

1985- 11,000

1991- 138,000

The physical property and infrastructure damages were very severe and preliminary estimate is in the tune of Taka 800 crores (US\$200 million-@ Tk. 40 to a dollar). The sectors and infrastructure damages include agriculture crops, forests, shrimp fields, salt beds, power, telegraphs & telephones, embankments, roads, bridges, etc.

Additionally human suffering was enormous and a lot of people lost everything- all belongings and life sustaining resources. Their lives and livelihood are at stake to restart again. Both government and non government organizations are actively taking part in the relief and rehabilitation activities in the area.

### 2. CAUSES AND MECHANISM OF CYCLONES

To understand the mechanism and physics of the cyclone in the Bay of Bengal, a brief of the morphological characteristics of Bangladesh is needed. Bangladesh is a disaster-prone country with a high density of population (about 800 persons per square kilometer) having an area of 144,000 sq km and a population of about 110 million. The physiography, morphology and other conditions have made her vulnerable to disasters like floods, droughts, windstorms (cyclones/storm surges/tornadoes) and others, which occur regularly and frequently.

Major factors responsible for disasters in Bangladesh are flat topography, rapid run-off and drainage congestion, low relief of the floods plains, low river gradients, heavy monsoon rainfall, enormous discharge of sediments, funnel shaped and shallow Bay of Bengal, etc. (3, 4).

These factors act in complicated ways to bring about geomorphological changes in the Bangladesh coastal area. Based on the available information of the morphological conditions and hydrological features, the coast of Bangladesh covering about 710 km could be divided into three broad regions: Eastern Region, Central Region and Western Region—which have special characteristics—made them more vulnerable to disasters particularly to cyclones and associated storm surges causing huge loss of human lives, physical properties and infrastructural facilities.

The eastern region is "Pacific Type coast" which is parallel to the folded mountains range and is at higher elevation compared to other areas. The southern part of the city of Cox's Bazar is not densely populated. The higher elevation, less density of population and lower storm surges

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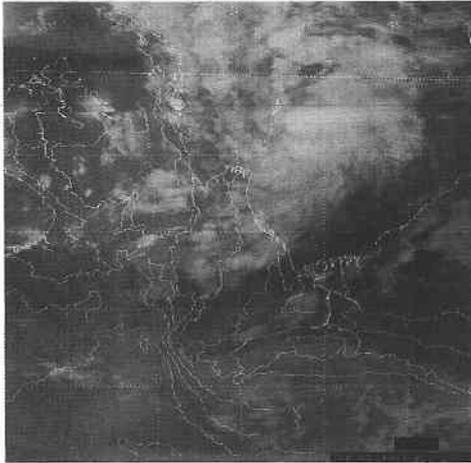


Fig. 1 April 30, 1994-1430 Z.

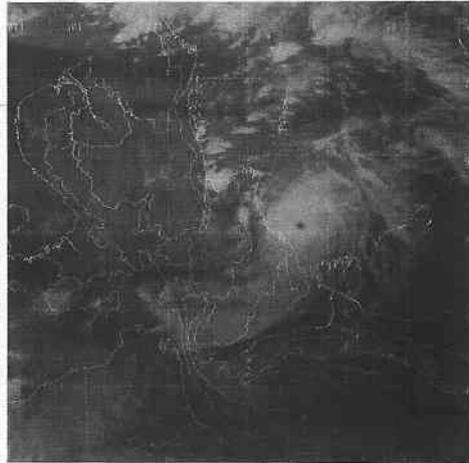


Fig. 4 May 2, 1994-1030 Z.

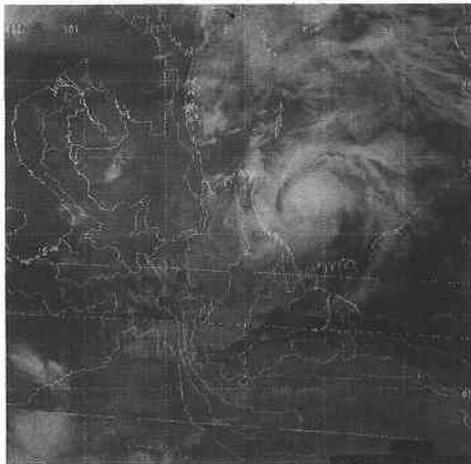


Fig. 2 May 1, 1994-1830 Z.

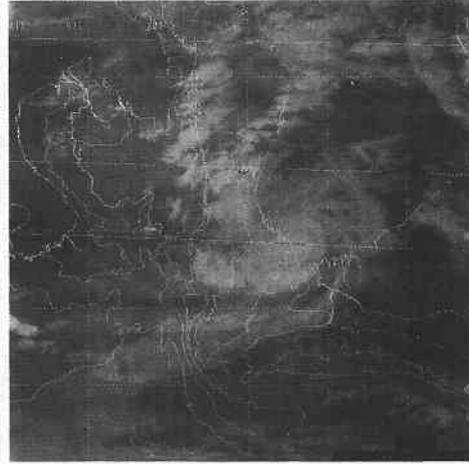


Fig. 5 May 2, 1994-1830 Z.

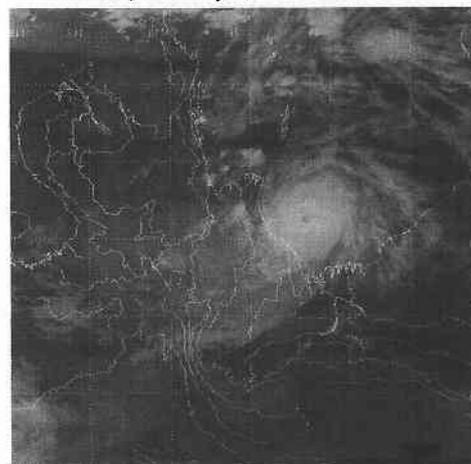


Fig. 3 May 1, 1994-0030 Z.

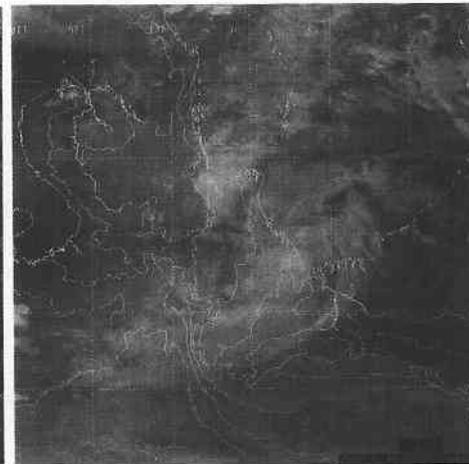


Fig. 6 May 2, 1994-2230 Z.

(low-tide condition) may be attributed for the less casualties. Government actions, community preparedness, timely warning and evacuation also help reducing death, The central region is more dynamic-accretion and erosion

occurred regularly. Most of the low areas and low-lying islands are located here. This coast is "Atlantic Type" which is transverse to the continental margin. Any cyclone hitting this area has caused huge loss of lives and properties as

happened in 1876, 1970 and other years, synchronizing with the high tide conditions. The western region has mangrove forest- the Sundarbans, which act as a barrier for cyclone and cause less destruction. Depending on the area of landfall casualties may vary, of course other factors also play an important role.

**3. DEVELOPMENT OF THE 1994 CYCLONE**

Few satellite imagery taken by Bangladesh Space Research and Remoto Sensing Organization (SPARRSO) who supply the satellite information/data/picture with interpretation to the Bangladesh Meteorological Department (BMD)- the focal point for forecasting and warning through its Storm Warning Center. Additionally BMD collect synoptic meteorological data from field stations, radar imagery and other sources of network of WMO/regional stations. BMD

disseminates the warning through various mass-media and local administration.

A series of high resolution satellite imagery/pictures taken from the Japanese Geostationary Meteorological Satellite (GMS) by SPARRSO depicts the gradual development of the Cyclone from April 30 to May 2, 1994.

Figure 1 shows the mass of cloud in the sea area but its periphery touches the coast in a scattered way while in Fig. 2 the mass of cloud is becoming compact. In Fig. 3 the clouds are more compact showing the eye of the cyclone. The cyclonic formation is complete with its eye visible in the center of the cyclone in Fig. 4. The Cyclone crosses the coast in Fig. 5. The cyclonic effects are dissipating and clouds are being scattered in Fig. 6. Figure 7 shows the tracks and landfall position of the cyclones of 1970, 1991 and 1994. Figures 8 (A, B and C) indicate the trail of devastation after 1994 cyclone.

**4. DISASTERS AND PEOPLE'S COPING CAPABILITY**

From time immemorial the people of this country have

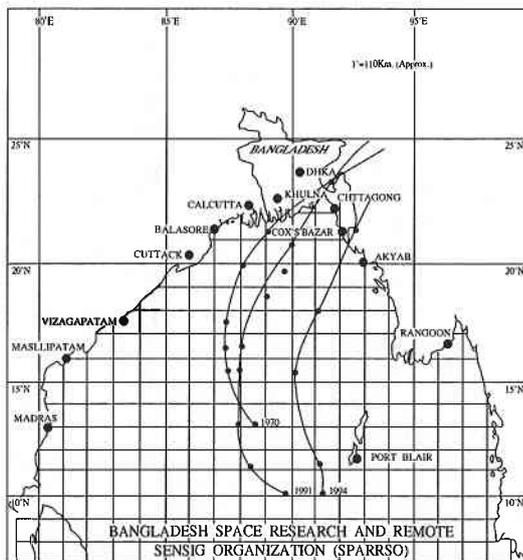


Fig. 7 Tracks of the Cyclones of 1970, 1991 and 1994.



Fig. 8 Trail of Devastation after 1994 Cyclone.

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faced disasters and they have developed coping capacity of indigenous nature. This local capability and community involvement needs to be strengthened. More emphasis should be given to the traditional survival strategies and community preparedness and coping capabilities. The Cyclone Preparedness Programme (CPP) has 27,027 trained volunteers who render valuable services at pre-during-post disasters periods.

## 5. CONCLUSION

It may be mentioned that timely warning, evacuation of people to cyclone shelters and adequate preparedness and community participation through volunteers have helped reducing death. Burmese Refugees (Rohingyas) suffered most because of their helpless conditions and living in tent houses (5). Loss of properties could not be avoided because they are located in the disaster-prone areas.

It is suggested that attempts should be made to the creation of jobs opportunities and working conditions in non-vulnerable areas so that people could avoid living in vulnerable areas. This is a gigantic task for a country like Bangladesh as such international cooperation is needed.

Govt. of Bangladesh has massive coastal afforestation programme which should be continued and strengthened. Adequate number of multi-purpose cyclone shelters should be built throughout the coastal areas.

Finally it may be further mentioned that Government of Bangladesh has recently created Disaster Management Bureau (DMB) under the administrative control of the Ministry of Disaster Management and Relief (Previously

Ministry of Relief and Rehabilitation). DMB could play a vital role as a focal point and coordinating body by taking appropriate steps for disasters mitigation and modernizing the existing disasters codes (Flood-1984, Cyclone 1985, Droughts 1980 and Famine Manual 1967).

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## References

- 1) Choudhury, A. M.: Cyclones in Bangladesh, The New Nations, Dhaka, May 6, 1994.
- 2) SPARRSO REPORT on Supercyclone of 1991.
- 3) Pramanik, M. A. H.: Floods and Cyclones Disasters in Bangladesh, SEISAN-KENKYU, VOL. 45, No. 3, March 1993, pp 177-184.
- 4) Pramanik, M. A. H.: Impacts of Disasters on Environment and Development- International Cooperation, INCEDE Report 3, August 1993. p. 45.
- 5) Local Daily New papers/Weekly Magazines (in Bengali and English), Radio, TV, etc.