



## Remote Sensing and GIS Technology in Bangladesh For Environmental Monitoring –A case Study

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**Abstract:** Bangladesh is one of the disasters prone country faces Cyclones, Floods, draught, Nor'westers/Tornadoes, Thunderstorm Earthquake etc. almost every year. Cyclones are the most devastating storm affecting Bangladesh, but there are other kinds of storm named Nor'westers and Tornadoes. Storms characterized by strong surface wind exceed 100 miles per hour known as tornados. They are formed suddenly, usually on land and are extremely localized. Thunderstorm and Tornado occur in pre-monsoon season frequently in Bangladesh which cause lot destruction to lives and properties and hampers sustainable development. Nor'westers come mainly from the north westerly direction (and hence the name) and are land based. They are a very common phenomenon in Bangladesh during late Chaitra and Baishak month and are known in Bengali as Kalbaishaki. The physical cause of this disaster is embodied in law of science and hence proper scientific research is necessary to deal with them. The Role of Remote Sensing and GIS technology in monitoring of such natural disasters like tornado has been described in this paper.

**Key Words:** Development, Environment, Monitoring, Natural Disaster, Remote Sensing, Sustainable

### Introduction

Being one of the disaster prone countries, Bangladesh faces thunderstorm and tornado activities every year. Storms characterized by strong surface wind exceeds 100 miles per hour are termed as tornados which occur frequently in Bangladesh. The maximum velocity that can occur in a tornado is estimated to be about 400 miles/hr. The pre-monsoon weather condition is favorable for formation of such events. They are formed suddenly, usually on land and are extremely localized. Their duration is very short and thus very difficult to locate them and make effective forecasts.

### Objective

The objective of the study can be summarized as follows :

- To monitor the natural disasters ( tornado);
- To observe its movement ;
- To study the impact of disaster;
- To find out its path of destruction & Track of Tornado that hit Bangladesh

### Methodology Used

Mainly the Remote Sensing Technology and real time Satellite data were used for this study. The images of Geo-Stationary Satellite FY-2D (China) and MTSAT (Japan) received at SPARRSO Ground Station were processed and analyzed every hourly using gmssoft and vimsat software/module. Data/Information from

internet source as well as the model for international weather monitoring was also used in this study. The special bulletin of weather posted to web site by Bangladesh Meteorological Department (BMD) were used to validate the space based data.

### Monitoring of Tornado'2013(Case Study)

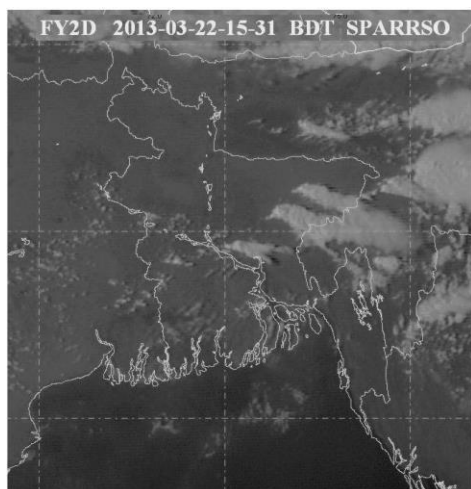
A strong Tornado passed over Bangladesh in 2013 which caused colossal losses to lives and properties. It played havoc in different areas of Brahmanbaria district on Friday, 22 March, 2013. It started at 5 pm and stayed for 10-15 min. The occurrence and movement has monitored using Remote Sensing and GIS Technology at SPARRSO. Fig-1 shows the formation of such events in FY-2D Satellite image. The cloud picture showed that the central and northeastern part of Bangladesh was overcast with clouds and a lot of convection had begun to grow which further developed. At least 3 strong convective cells bulging out of the southern periphery of the cloud masses with tornadoic strength. The anvil clouds spread and turned suddenly to northeast direction with strong winds damaging the environment and population of the localities where it occurred. Rains and hail accompanied the twisters, which lasted more than five minutes.

### Impact of Tornado, 2013

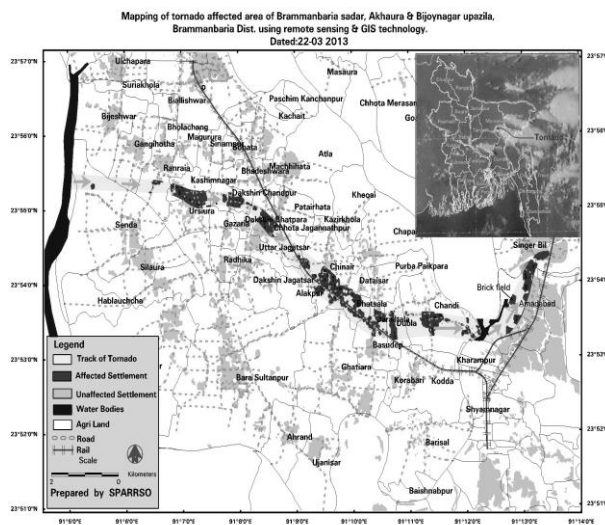
The tornado devastated innumerable thatched houses, uprooted thousands of trees, damaged crops, huge property and killed 50 cows in the affected areas. 21 people were killed and over 5 hundred injured as a

tornado lashed 21 villages of Sadar, Akhaura and Bijaynagar upazilas of Brahmanbaria Dist. Many electric poles were uprooted, leaving power supply snapped and standing crops on a vast tract of land also destroyed. Roofs were blown off like paper scraps, witnesses said. The most affected villages were Gaingahata, Chinair, Jibantula, Ujanishar, Gaingha, Urshiura, Shilaour, Senda, Sultanpur,

Bathsala, Pagachong, Chandpur, Ghatiara, Jaritula, Dobl, Chandi, Ramrail, Machihata, Patirhata, Paikpara, Merashani of 3 upazilas including Barahmanbaria Sadar. Cloud picture of tornado can be seen from satellite image in Fig-1 and the Track of tornado is shown in Map in Fig-2.



**Fig.1.** FY-2D Satellite image (22-03-2013)



**Fig.2:** Map showing of Track of Tornado

**Conclusion**

Tornados are formed suddenly and are extremely localized. They usually occurred on land and their duration is very short. Thus it is very difficult to monitor or locate them and make effective forecasts. Despite significant improvement in prediction and monitoring of such disasters on a wide of scale in last decade, much distraction and losses to lives and properties are going on. It is important to warn people much ahead of time about the occurrence of the weather calamities like Tornado to mitigate the losses due to them. The study and researches on such meteorological events thus is useful. Space technology can help in this regards. The monitoring and information provided by SPARRSO on time using remote sensing and GIS helped the Government and its related organizations to take necessary steps during the disaster and for post disaster management program in the respective areas for the sustainable development of the country.

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