

Role of Academic Institutions regarding Application of Remote Sensing Data for Water Management: Bangladesh Perspective

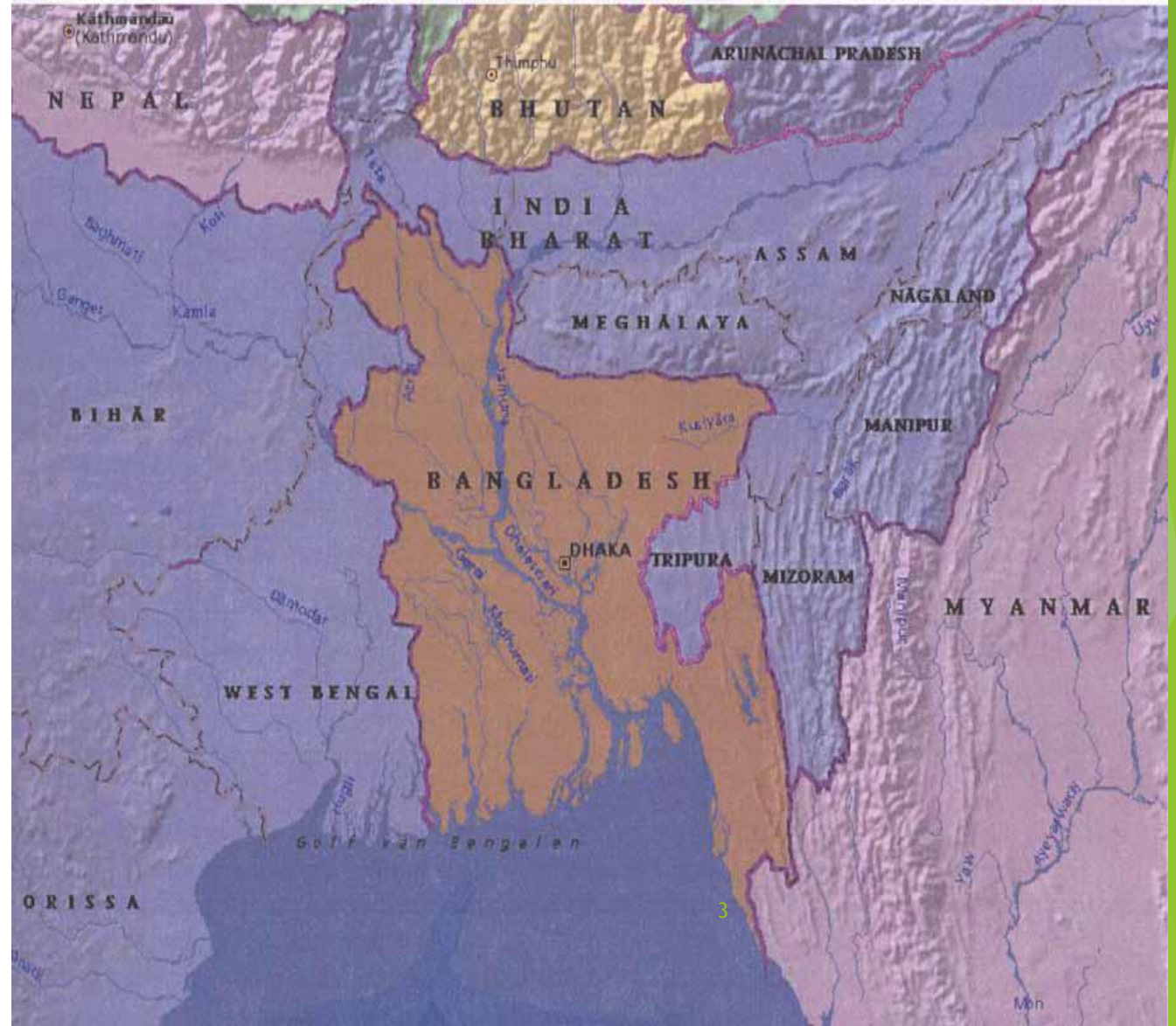
Dr. Parvez Ahmed, Associate Professor of Law,
Green University of Bangladesh
parvez.law@green.edu.bd

Objectives

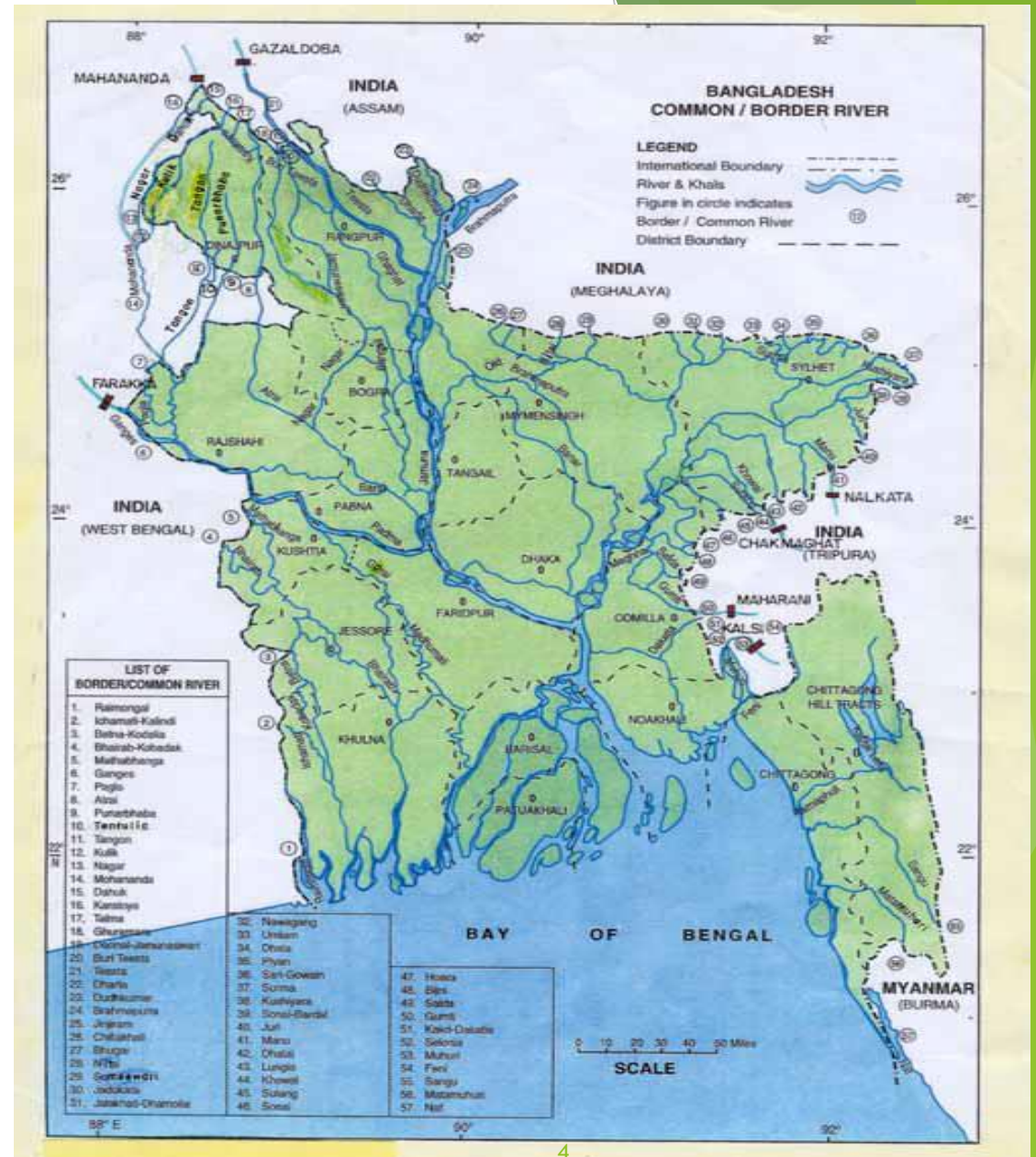
- To justify the necessity of space technology for water management in Bangladesh;
- To check the strengths of academic institutions (universities) in case of application of space technology
- To identify the challenges with regard to study and research on space activity and finally
- to recommend some way out.

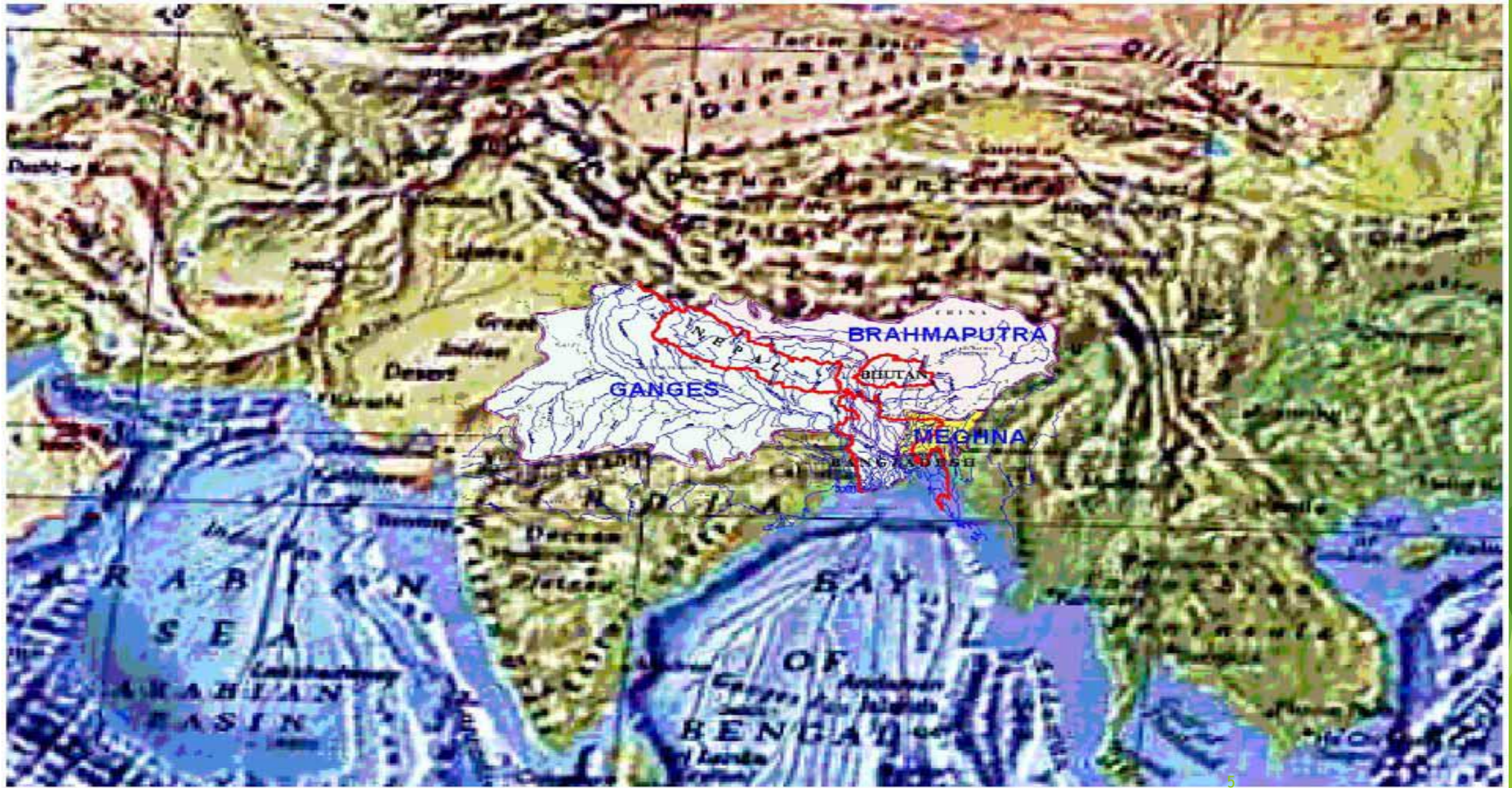
Geographical Location of Bangladesh

Bangladesh is a small country in the South Asian region surrounded by India on the west, north, and north-east; Myanmar on the south-east and the Bay of Bengal on the south. Most of Bangladesh has been built up by the alluvial deposit of the Ganges, the Brahmaputra, and the Meghna (GBM). The annual rainfall measured from 1250 mm to 5000 mm. The country is densely populated and the present population exceeds 160 million.

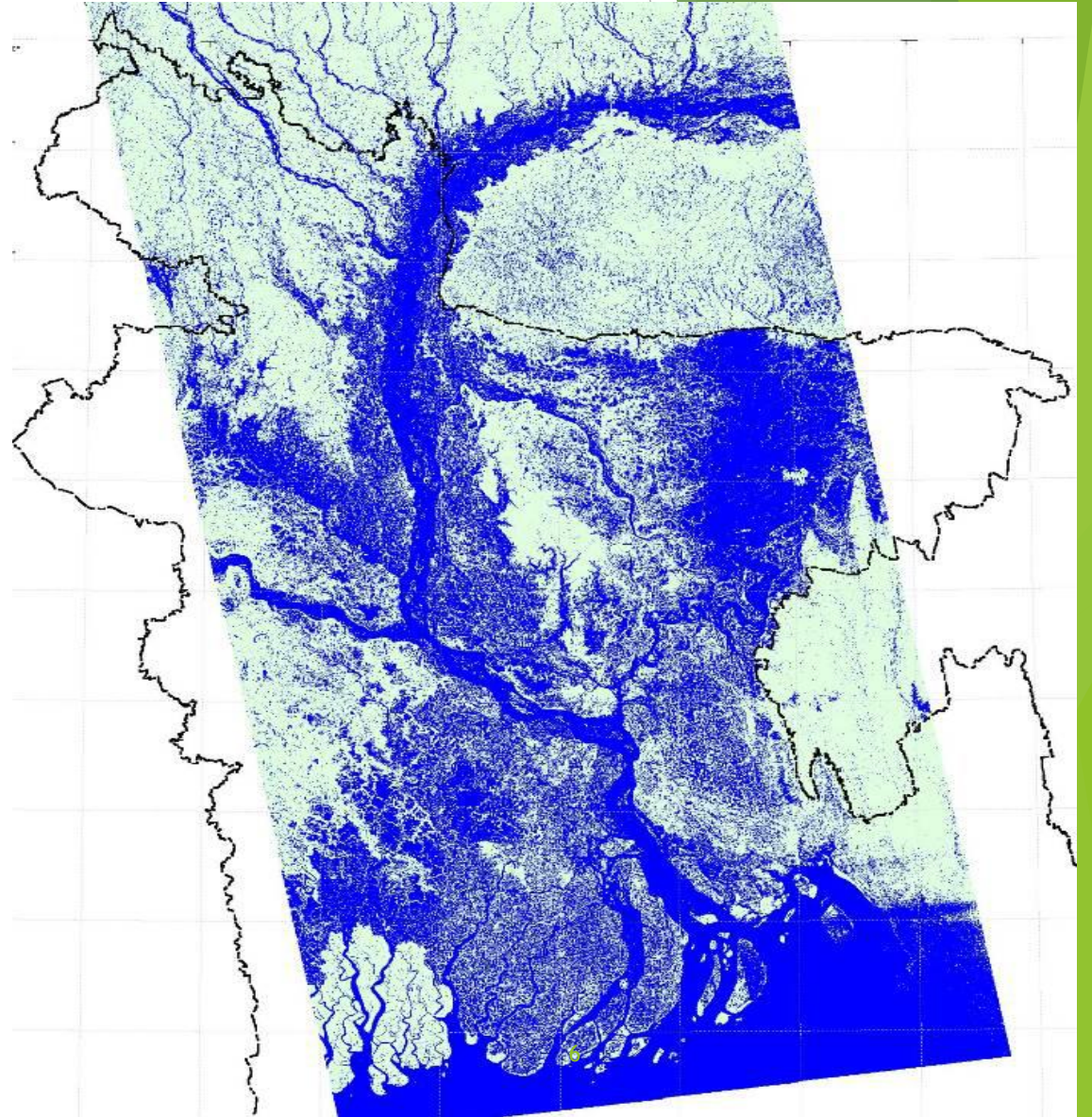


The very geographical location of Bangladesh makes it the lowest riparian country. 57 Trans-boundary rivers of which 54 come from India and 3 from Myanmar. Those rivers receive runoff from a catchment of 1.72 million sq. km, around 12 times its land area.





Being the lowest riparian, the country has no control over the huge cross boundary flows of about 140,000 cumec (4,944,058 cusec) carried into Bangladesh by these rivers during monsoon. As a result, flood occurs in Bangladesh regularly. At least 22% of total land is flooded every year and in case of severe flood, 66% area of the country inundated.



River Bank Erosion

Due to a fine sedimentary environment of the river course, the substantial bank erosion rate is as high as 1.0km/yr.



Furthermore, the country is suffered by other natural disasters i.e.

- ▶ cyclone,
- ▶ tidal waves,
- ▶ salinity on coastal areas,
- ▶ draught in dry season etc.

The natural disasters especially caused by water depict a horrendous picture and every year millions of people of the country are losing their lands and homes and they lead awful lives.

Actions taken by Bangladesh Government

The Government of Bangladesh broadly takes two measures for Flood and Erosion Disaster Management in particular and Water Management in general. These are Structural Measures and non-structural Measures. The structural measures include

- ▶ Construction of Flood Embankment,
- ▶ Channel Improvement,
- ▶ River Training,
- ▶ Coastal Embankment etc.

In case of non-structural measures, the Government relies on

- ▶ Flood Forecasting & Warning System
- ▶ Erosion Prediction System
- ▶ Environmental Monitoring Network
- ▶ Watershed Management
- ▶ Planning & Development Policy

Non-structural Measures, Space Technology and its necessity

The non-structural measures for Water Management chiefly depend on Space technology. Proper water management by the application of remote sensing data can deter the sufferings of people substantially.

It is here that science (from satellite data downwards) can play a significant role, by providing early warnings and help us to better understand weather variability resulting from climate change.

Space Technology and its necessity

Even farmers, fishermen, small-scale private entrepreneurs - all will benefit. The initial focus should be on weather forecasting and event predictions, whether it is to understand that a disaster is approaching or to provide very specific rainfall prediction.

Tracking of the monsoon rainfall is very important for agricultural activities in Bangladesh, as many crops are rain fed. Accurate rainfall prediction, when and how much, will help farmers to increase productivity.

Preparation of Academic Institutions with regard to Study and Research on Space Activity

In Bangladesh, there are 40 public funded universities and more than 80 private universities. Amongst them there are 14 public and 10 private Science and Technology universities.

These universities offer degree programmes in Architectures, Computer Science and Engineering, Textile, Civil, Electrical and Electronic Engineering, Geography, Oceanography etc.

In general, the academic institutions of Bangladesh cover broad areas of science and technology, Business and Social Science, Arts and Humanities etc.

But as far as the curricula of Space technology are concerned, the scenario is very meager. This research does not find any academic degree programme, curricula and research activity at university level which are specifically designed for understanding and application of the space technology.

Though Space technology applications in Bangladesh started in 1968 through the establishment of APT Ground Station. Then the country initiated Earth Resources Technology Satellite (ERTS) Programme for surveying natural resources, environment and disaster monitoring and management purposes.

Due to the success of the activities, Bangladesh Landsat Programme (BLP) was taken. Now Bangladesh Space Research and Remote Sensing Organization (SPARRSO) is monitoring water resources, flood, draught, water logging situation, river bank erosion etc. in the country using satellite-based remote sensing and GIS/GNSS technology. In March 2018, Bangladesh is going to launch its 1st Geostationary Satellite which will provide significant data for disaster management

In spite of development in space technology, the country is miserably lagging behind to produce quality graduates and researchers in this sector. Universities are not getting enough fund to do research in the field of space activity.

Moreover, transferring the space data for water management and preparing them for common people require technical research and continuous training. The governmental organization, SPARRSO is entrusted to conduct training and collaborate with academic institution. Regrettably, no functional academic collaboration has been found as of today.

NOGs and telecommunication industries of Bangladesh can play a vital role in disseminating water forecast and reports to all stakeholders. Academic institutions can initiate joint action plans with these industries to send information about flood, draught and other disaster to the affected people but minimum collaboration have been found here as well.

Recommendations:

We need data analysis based on users' needs and reports that are in non-scientific language. The academic institutions have to engage themselves with intensive research and collaborations in all aspects of water management. Operational problems can be solved by improved cooperation between academic institutions, governmental agencies and NGOs.

Furthermore, the universities and other engineering institutions need to-

1. Initiate new academic programmes on space research
2. develop the curricula,
3. conduct research,
4. facilitate collaboration with GOs and NGOs, and
5. arrange sufficient training for the students in remote sensing application in the field of Water management.

Recommendations:

- ▶ Apart from that, in terms of broader application of the hydrological data, good interdisciplinary cooperation is the key. Other stakeholders could make far more use of this technology, especially in collaborative projects.
- ▶ Present end users of space technology are mainly governmental organisations whereas data assimilation techniques - using a variety of sources of information - can add more users to the chain. Optimizing the information chain for water and climate could surely add value for everyday end users like farmers, fishermen etc.
- ▶ The strength of the NGOs and others who work for the development of the common people should be given proper importance.

References:

1. Emaduddin Ahmad, **Water Resources Management Challenges in Bangladesh**, Institute of Water Modelling, 2008
2. Md. Abu Bokkor Siddik, **Water Management challenges in Bangladesh**, BWDB, Bangladesh
3. SPARRSO websites- <http://www.sparrso.gov.bd/>
4. University Grants Commission, Bangladesh <http://www.ugc.gov.bd/en>
5. Michael van der Valk, “The Space Technology Comes Down to Earth” *Deltas in Times of Climate Change*’2010 www.deltatimes.org
6. Dr. Mr. Abdul Ghani, **Water management for agricultural development** <http://www.thedailystar.net/supplements/25th-anniversary-special-part-4/water-management-agricultural-development-211999>

Questions?



