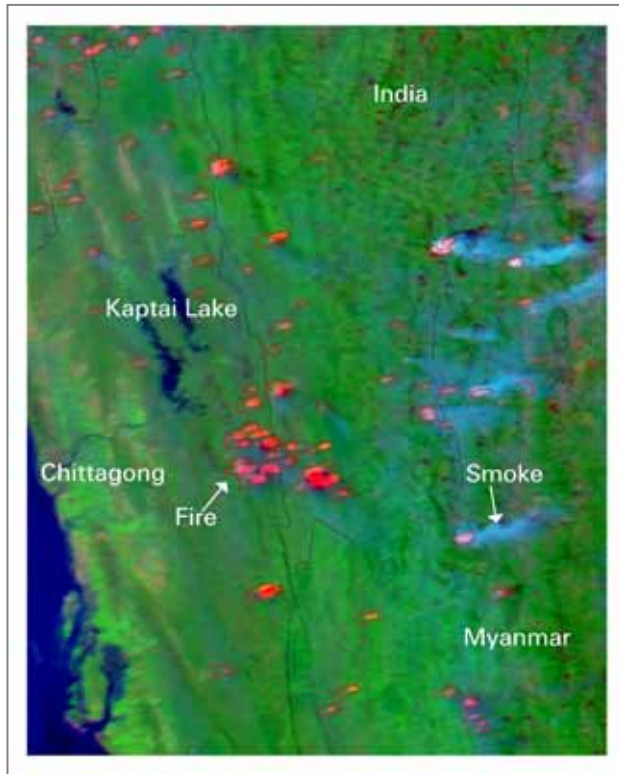


Research / Mapping Activities

**Satellite Detection of Fires in the South-eastern Bangladesh**



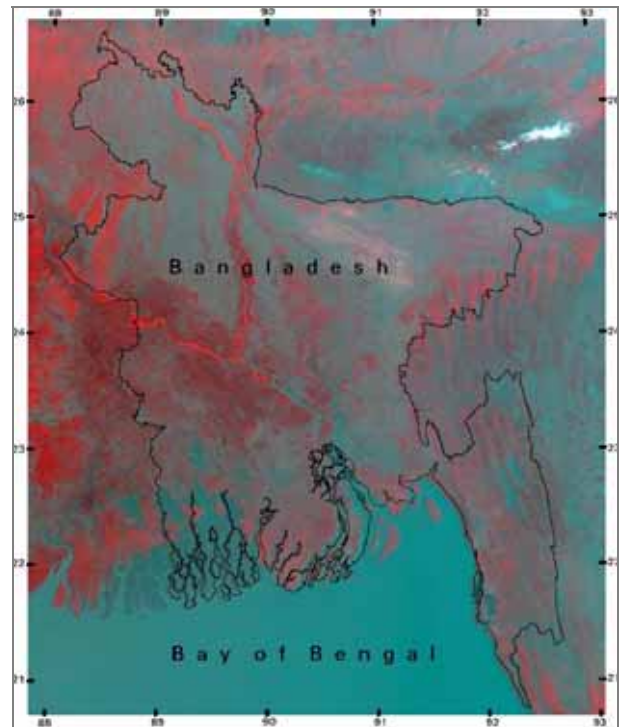
*Fig. 1: Fire detection on the Aqua Modis Image*

Slash and burn cultivation is a common practice in the south-eastern hilly region of Bangladesh. The tribal people living in that tropical forest region usually depend on shifting cultivation for their livelihood. They cut the forest, herbs and shrubs in the hills, burn and plant agricultural crops before the onset of monsoon rain. Therefore, during February and March numerous small pockets of fire are very common in that area.

Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite is a very

useful tool to detect those fires. The satellite became operational in June, 2002. The image of March 21, 2006 shows several pockets of fire distributed over Rangamati (Bangladesh), India and Myanmar (Fig. 1). Heat signatures are visible as red and smokes as light blue haze. Areas outlined in red show where the MODIS sensor detected actively burning fires. Thick smoke hangs over some parts of the region. The image gives an overview of the number, dimension and movement of the individual fires, including the movement of smoke plumes.

**Detection of Heat Waves using NOAA-AVHRR Data**



*Fig. 2: NOAA - AVHRR image of the thermal channels (3,4,5) on the 26 March 2006*

March 2006 was the driest month in Bangladesh over the last fifty years. The month received on average 94% less rainfall than the average monthly precipitation. Consequently, it became

warm. The 26<sup>th</sup> March 2006 shows the hot region over Bangladesh on the NOAA-AVHRR image and was indicated by the brown colour showing temperature above 38°C. Maximum temperature was recorded at Jessore (41°C). 2-6°C higher temperature above the normal level was recorded during 25-26<sup>th</sup> March 2006. Thermal channels (between 10.5-12.5 microns) indicated the higher surface temperatures in the urban regions in comparison with the rural areas. The reason might be that the areas are usually covered by vegetation (Boro rice) during this time. Night-time observations revealed a relatively little difference in surface temperatures between urban and rural regions, which suggests that large areas are covered by impermeable surface such as presence of pavements and roofs, which contribute to the higher minimum temperatures observed in urban areas compared to rural regions.

**Estimation of Carbon Release from Tropical Deforestation using High-resolution Satellite Data**

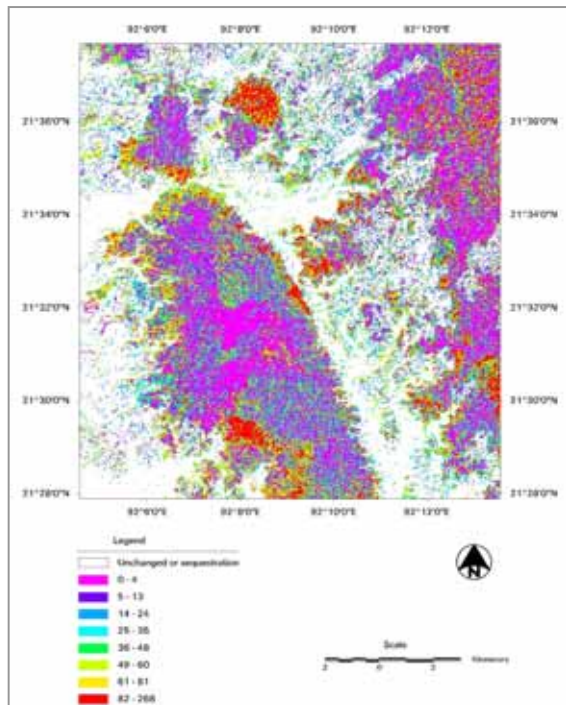


Fig. 3: Carbon release map of Southern Chittagong

Recent global climate change is the consequence of many human activities; deforestation in the tropics is one of them. A research estimated the amount of carbon flux due to forest cover change by combining satellite image information and terrestrial field-based inventory data. The study area is located at a tropical forest region of south-eastern Bangladesh. Landsat TM image of 1992 and ETM+ image of 2001 and terrestrial sample based inventory data were used in the study. Figure 3 shows the amount and distribution of carbon release during the study period in Southern Chittagong. The result is quite useful to understand the terrestrial carbon dynamics and global climate change.

**Space-borne Monitoring of Cold Wave and Fog in January 2006**

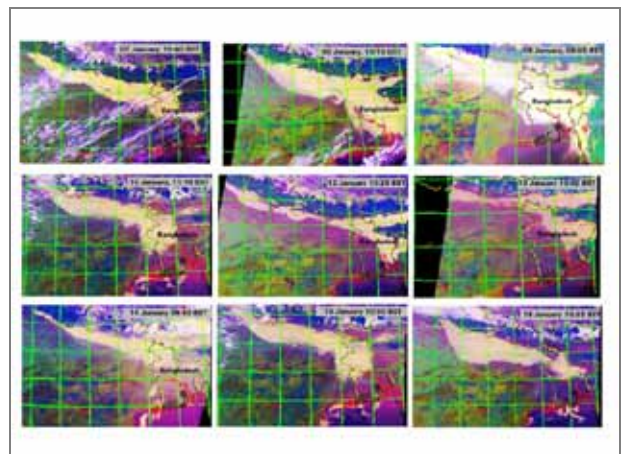


Fig. 4: Detection of Fog using NOAA AVHRR Data

On 7th January, 2006 a cold wave entered Bangladesh and prevailed till 16th January. Due to high moisture content at night along the river valleys, a large-scale low-level condensation of moisture took place and formed thick fog. The satellite picture of NOAA-AVHRR of 7-16th January 2006 showed widespread coverage of thick fog advanced along the Ganges valleys and the foothill of the Himalayas and extended over Bangladesh and Brahmaputra valleys of Assam (Fig. 4). The cold wave coupled with fog and chilly-wind paralyzed normal life. It disrupted the air, road and river communication. Due to the

low visibility, which was about 20 meters, Aricha-Daulatdia ferry service was interrupted (20 hours a day) causing much trouble to home-going people for the Eid-ul-Azha festival. The top temperature of the fog coverage was recorded below 5°C in the northern districts during this time. Casualties were also reported because of this cold wave and cold related diseases. The foggy weather and cold waves were also menacing to crops. Monitoring and advanced forecasting of the cold wave and fog using satellite data could minimize the human suffering and damage of crops.

### Determination of Land Cover Changes and Suitable Shrimp Farming Area Using Remote Sensing and GIS

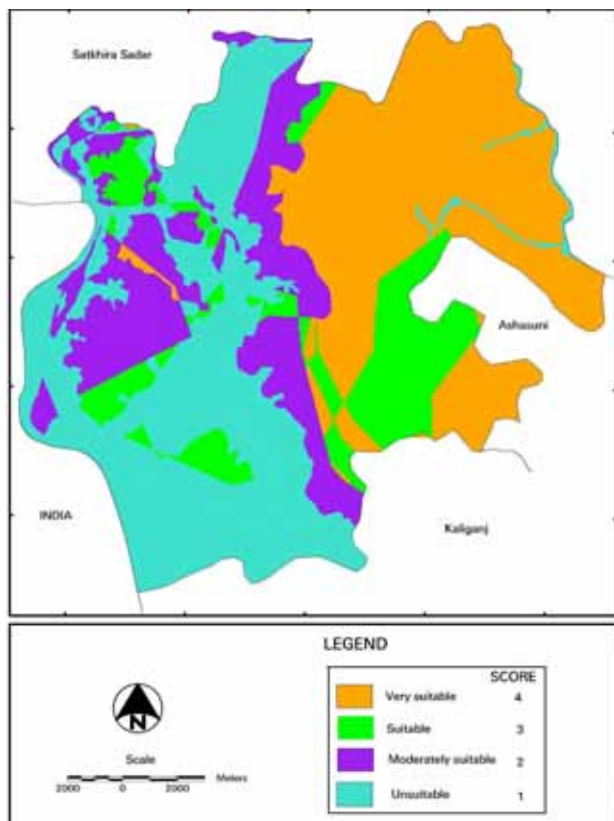


Fig. 5: Land suitability map for shrimp farming

Remote sensing and Geographical Information System (GIS) has an advantage not only in time and cost effectiveness but also in achieving a more comprehensive and integrated treatment of

aquaculture development criteria, which is difficult through conventional means alone. The present study was, therefore, conducted to identify and quantify suitable sites for shrimp farming development at Debhata upazila under the district of Satkhira of Bangladesh using remote sensing technique and GIS.

One Landsat MSS image of 1977 and three Landsat TM images of 1990, 2000 and 2004 were used to determine the spatial and temporal land cover changes. The Landsat TM image of 1990 and secondary thematic information that included land elevation, crop intensity, land capability association and soil salinity were used to develop a shrimp farming suitability map. Primary data of water pH, dissolved oxygen, salinity, phosphorus, potassium and tidal fluctuation as well as soil pH, salinity, phosphorus, potassium and texture were used to produce vector databases which were then incorporated with former data to produce a final shrimp farming suitability map.

This study shows that the shrimp farming areas have been horizontally increasing whereas the cropland areas have gradually been decreasing in the study area during the period from 1977 to 2004. This horizontal expansion of shrimp farming areas in the cropland has been creating environmental and social problems in the area. So, vertical expansion of shrimp farming is suggested.

### Financial Adviser of SPARRSO Promoted



Mr. Md. Enamul Hoque, Financial Adviser of SPARRSO has been promoted to the post of Joint Secretary on 3 July 2006. Mr. Hoque joined SPARRSO in August 2005 on deputation. He is a member of the BCS

(Administration) cadre. He obtained B.A. (Hons.) and Master degree in Economics from the University of Dhaka and Master in Development Management (MDM) from Asian Institute of Management, Manila.

## News

### **Meeting with Ex-trainees of JAXA/AIT**

A get-together meeting of ex-trainees who received sponsorship from Japan Aerospace Exploration Agency (JAXA) for training at Asian Institute of Technology (AIT) was held at Park Town International Cuisine, a local hotel in Dhaka on 30th March 2006. The meeting was jointly organized by Geoinformatics Centre of AIT, Bangkok, Thailand and Bangladesh Space Research and Remote Sensing Organization (SPARRSO) and sponsored by JAXA under its human resources development program.

The purpose of the meeting was to develop a network with ex-trainees, exchange information and experiences and identify future needs of training in their respective fields. The meeting was attended by the participants from SPARRSO, Local Government and Engineering Department (LGED), Centre for Environment and Geographical Information Service (CEGIS), Institute of Water Modelling (IWM), Disaster Management Bureau (DMB) and Flood Forecasting and Warning Centre (FFWC) of Water Development Board (BWDB). The participants discussed and shared their experiences, identified future needs of training and finally put forwarded some suggestions for development of a good network among the trainees.

### **Training on 3D Mapping**

Mr. D. Dighal, Software Engineer, ERDAS India Private Limited provided training on '3D Mapping using ERDAS Imagine' in SPARRSO Training Room on the 27-30<sup>th</sup> March 2006. A number of SPARRSO Scientists' and Engineers' attended the training.

## **Visitors to SPARRSO**

The following persons from Intergovernmental Oceanographic Commission (IOC) visited SPARRSO on 6 February 2006:

1. Dr. Demitri Travin, Project Manager, IOC – Coast, MAP-IO.
2. Mr. Michel Huet, Technical Adviser from International Hydrographic Bureau.

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## Participation in Training/ Seminar/ Conference

M.A. Shahid, PSO, participated in the workshop on "Climate Change Impact Prediction Modelling" organized by the Climate Change Cell of Department of Environment from 26-27 February, 2006 at BIAM Foundation, Dhaka.

## Presentation

O. Quader, CSO - "Remote Sensing Application in Fisheries Resources Study in SPARRSO", - a lecture delivered at the Ministry of Fisheries and Livestock on 5th February 2006.

Dr. Mahmudur Rahman, SO, -"Estimation of Carbon Pool and Carbon Release from Tropical Deforestation using High-resolution Satellite Data" - a seminar presented at the Department of Geography and Environmental Sciences, Jahangirnagar University on 25th December 2005.

**SPARRSO Internal Publication Committee:**

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The SPARRSO Newsletter is published quarterly. We welcome comments, questions and suggestions from our honourable readers.