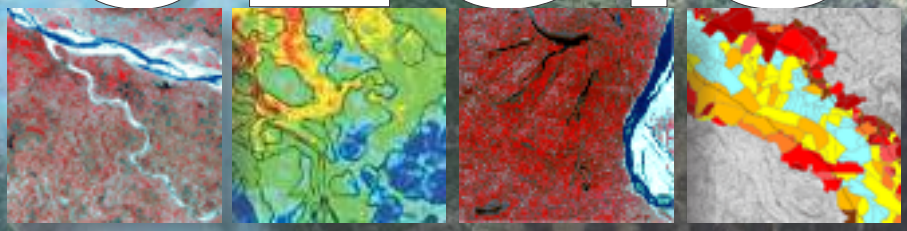
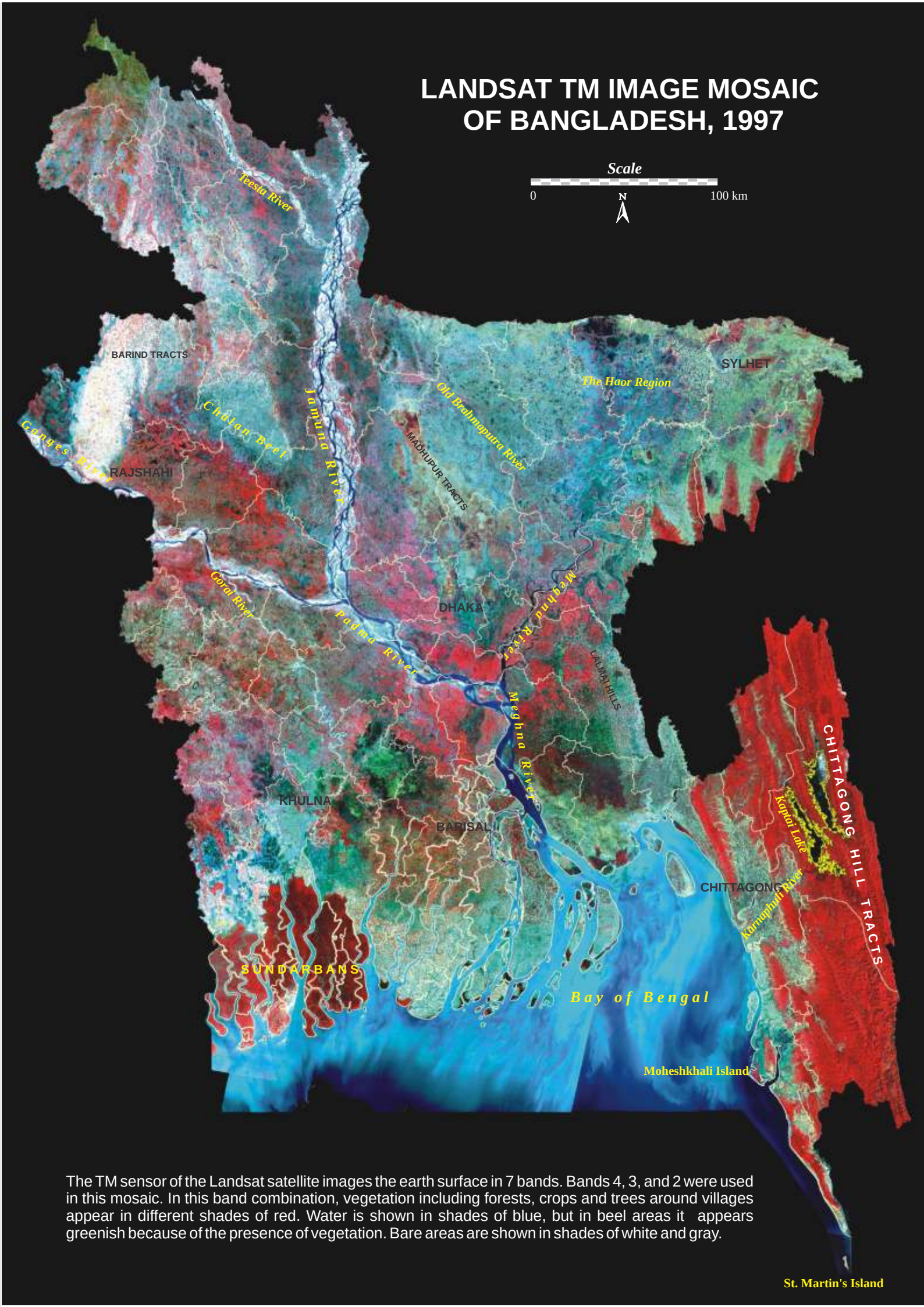
# CEGIS



CENTER FOR ENVIRONMENTAL AND GEOGRAPHIC INFORMATION SERVICES

# LANDSAT TM IMAGE MOSAIC OF BANGLADESH, 1997




The TM sensor of the Landsat satellite images the earth surface in 7 bands. Bands 4, 3, and 2 were used in this mosaic. In this band combination, vegetation including forests, crops and trees around villages appear in different shades of red. Water is shown in shades of blue, but in beel areas it appears greenish because of the presence of vegetation. Bare areas are shown in shades of white and gray.

The Center for Environmental and Geographic Information Services (CEGIS) is an independent organization for Integrated Environmental Analysis using Geographic Information System (GIS), Remote Sensing, Information Technology and Databases. It is a think tank that provides solutions to stakeholders facing challenges in sectors such as, water resources, agriculture, fisheries, engineering, transportation and environment, and recommends technical options based on local realities that are feasible from the socio-economic and institutional points of view.

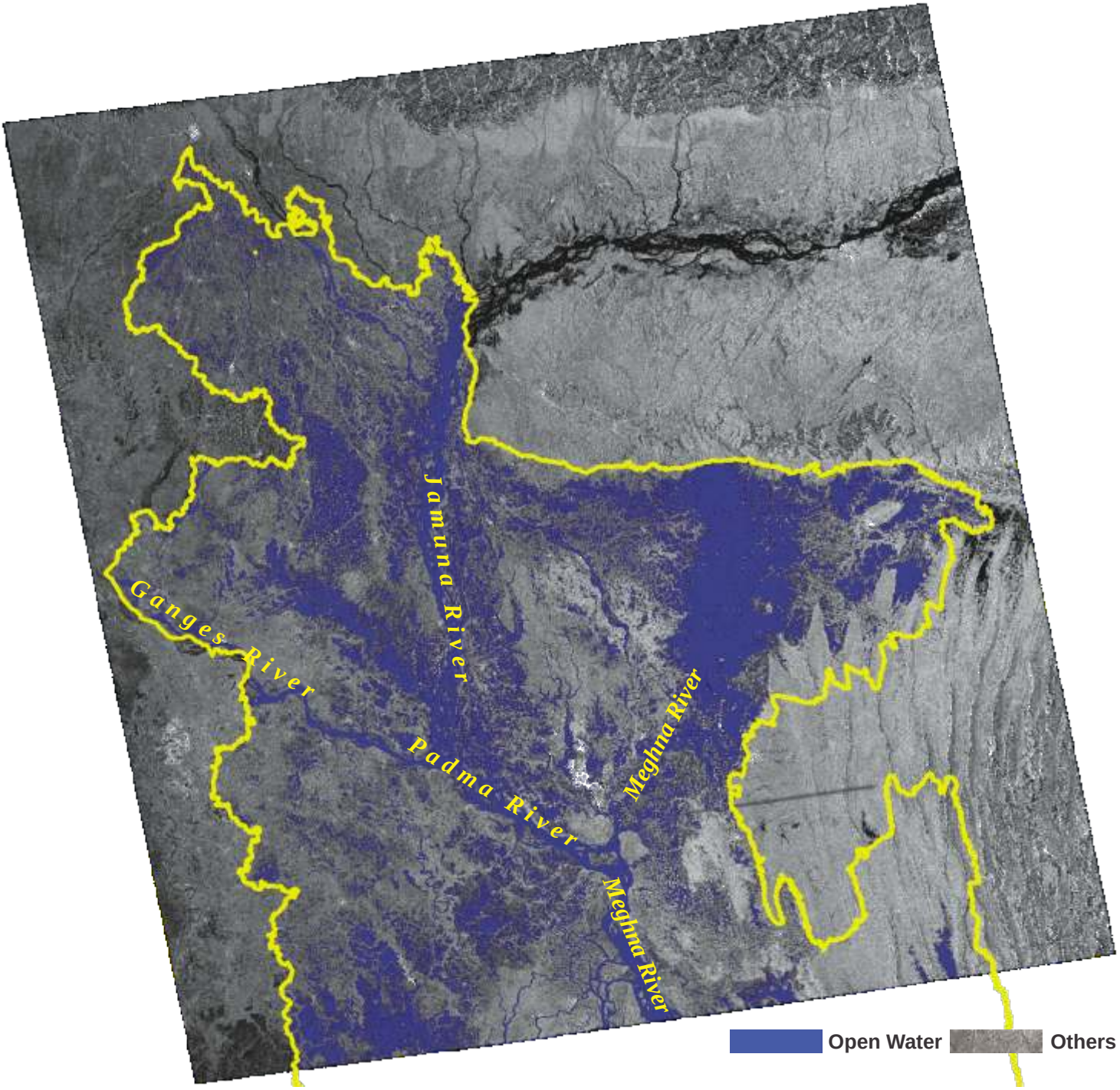
The services and products of CEGIS relate to advice and consulting, research and development, spatial analysis, information and database, and training. The organization has been set up under the aegis of the Ministry of Water Resources supported by the Government of Netherlands. The clients of CEGIS are the Water Resources Planning Organization (WARPO), the Bangladesh Water Development Board (BWDB), other agencies of the Government of Bangladesh, and private sector organizations.

The most notable of CEGIS' strengths is its multidisciplinary group of highly qualified scientists and technical professionals who are skilled in conducting integrated studies of water related problems. Its systematic approach to work, good ties with institutions within and outside the country and easy access to expertise from other countries, all contribute to the success of the organization.

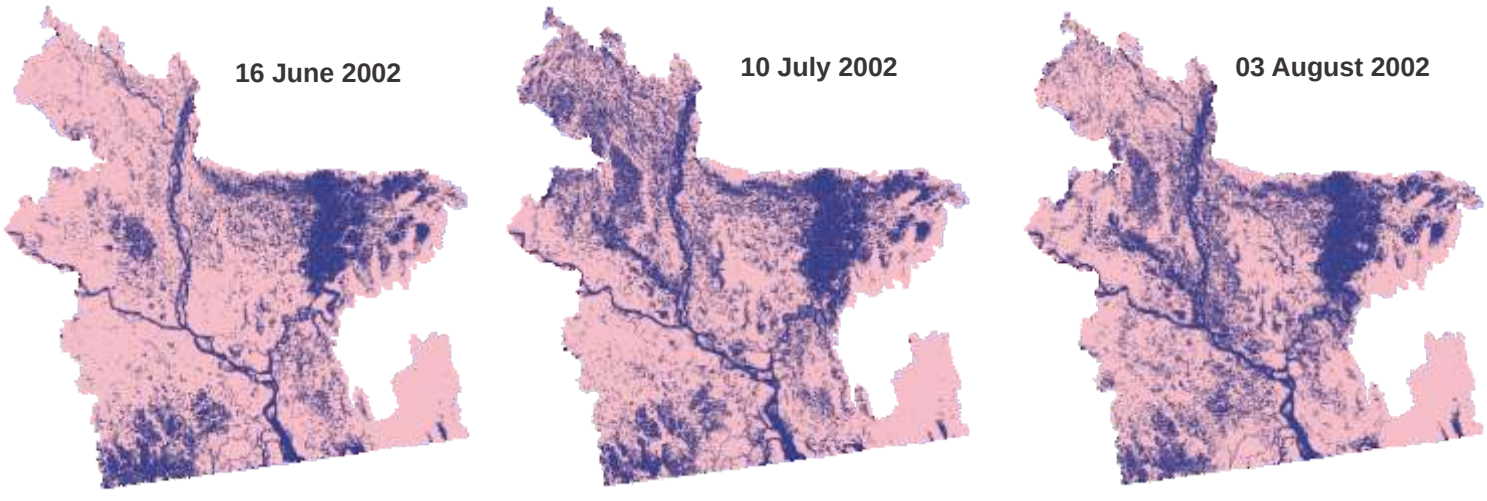
CEGIS is structured around its disciplines and services that include Environmental Analysis for integrated environmental studies; Spatial Analysis for interpreting and processing satellite images and GIS; Database and Information Technology for expertise in spatial databases, administration, programming of databases and Web systems; and Training on various courses. The services of the organization are supported by an administration and a finance section along with a well equipped and professional computer system unit. CEGIS has a well stocked library that contains reference materials and project documents related to environment, water resources, forestry, rural and economic development, GIS etc. and pursues communication and outreach activities.

# Flood Monitoring 2002

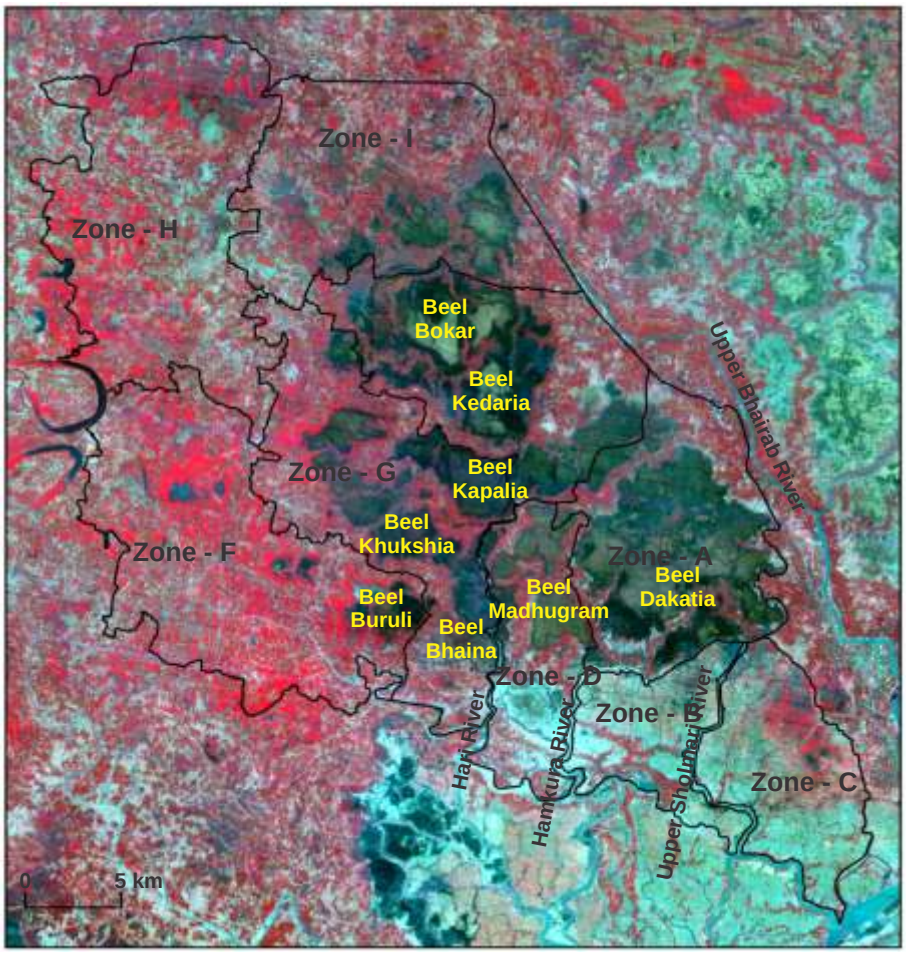
**Open water extent map derived from RADARSAT ScanSAR Wide Beam Image, 03 August 2002**



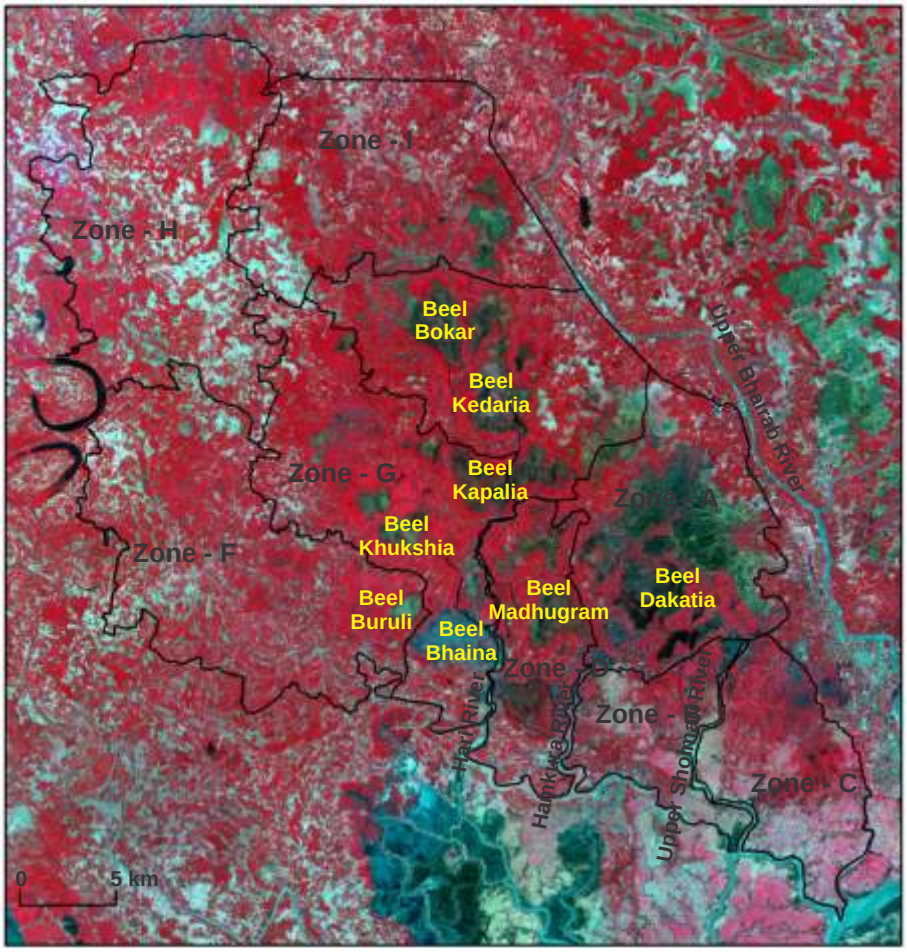

**Time series of classified radar images showing changes in open water extent through 2002 monsoon.**



# Khulna-Jessore Drainage Rehabilitation Project (KJDRP)




Landsat TM image March 1997




IRS 1D LISS III image April 2001

The Khulna-Jessore Drainage Rehabilitation Project (KJDRP) was taken up for removing drainage congestion on a sustainable basis in parts of Khulna and Jessore Districts in Southwest region of Bangladesh. Environmental and social impact assessment of KJDRP, carried out by CEGIS, recommended Tidal River Management (TRM) that would maintain the drainage system. Environmental, socio-economic and institutional monitoring of KJDRP by CEGIS reveal that active participation of the stakeholders through Water Management Associations (WMA) has been key to the application of the TRM concept in removing drainage congestion from more than 90% of the project area, thereby bringing down poverty level from 75% during 1993 to 53% during 2002.

Change in landuse/landcover in the study area is monitored with the help of satellite images.

| Class Name | Area | |
|---|---|---|
| | March 1997 (%) | April 2001 (%) |
| Water (includes rivers, water-bodies, beels with and without aquatic weeds | 26 | 16 |
| Agricultural crops | 32 | 45 |
| Fallow land | 15 | 12 |
| Settlements | 27 | 27 |
| Total: | 100 | 100 |

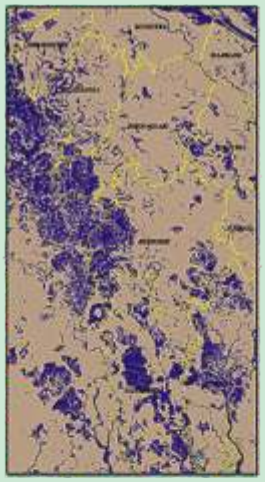
Green vegetation cover
Water
Moist soils
Fallow lands
Water Management Association (WMA) zone boundary

# Satellite based radar image for mapping and monitoring floods of 1998

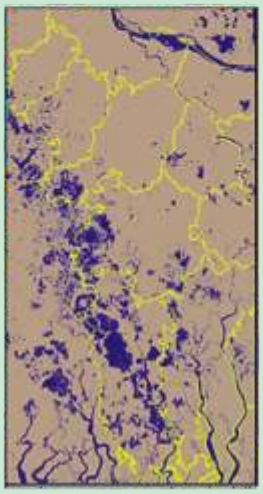
# Flood damage assessment in the South-West Region of Bangladesh for the year 2000


Radarsat Image of 13 August 2000 showing open water in blue.

Radarsat Image of 06 September 2000 showing open water in blue.



Radarsat Image of 30 September 2000 showing open water in blue.



Radarsat Image of 26 October 2000 showing open water in blue.

- Flooded Settlements (all affected settlements could not be detected)
- Water, Rivers, Beels, Shrimp Ghers on Oct. 14 but not on Oct. 26
- Water, Rivers, Beels, Shrimp Ghers on Oct. 26
- Apparently Undamaged Aman
- Aman under floodwaters from Sep. 30 to Oct. 14 but not on Oct. 26 (some may survive with low yield)
- Aman under floodwaters from Sep. 30 to Oct. 26 (severely damaged)

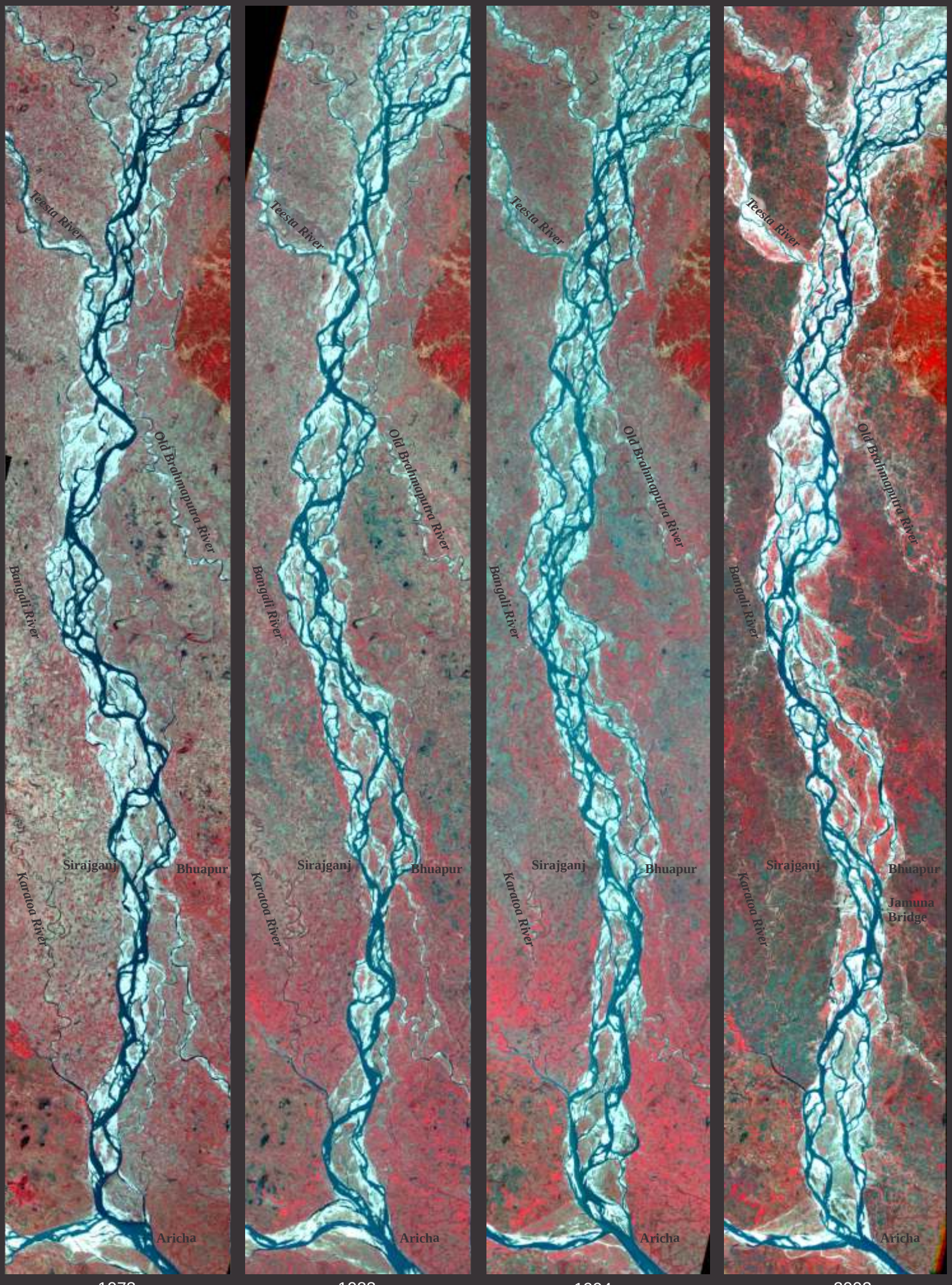
Scale

0 20 km

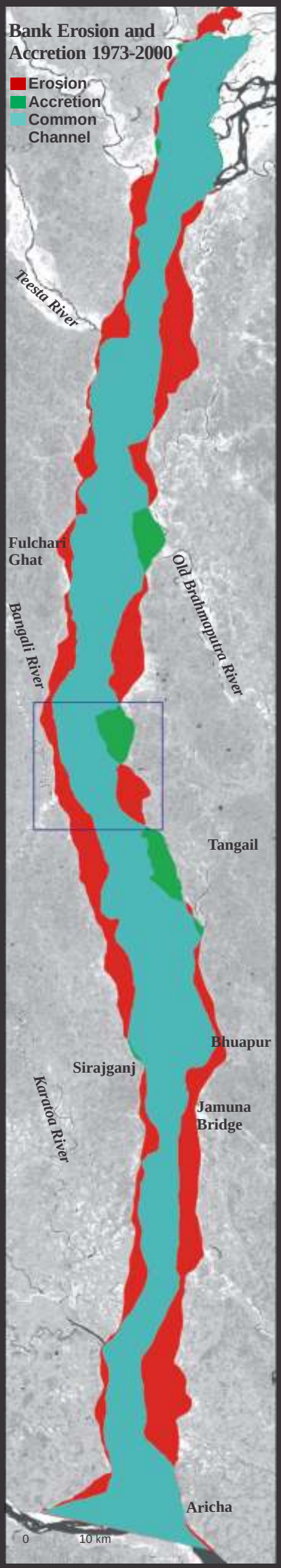
N

# Satellite images of the Jamuna River 1973 - 2002

**Digital image processing and GIS techniques help quantify and map morphological changes from the time series of images.**

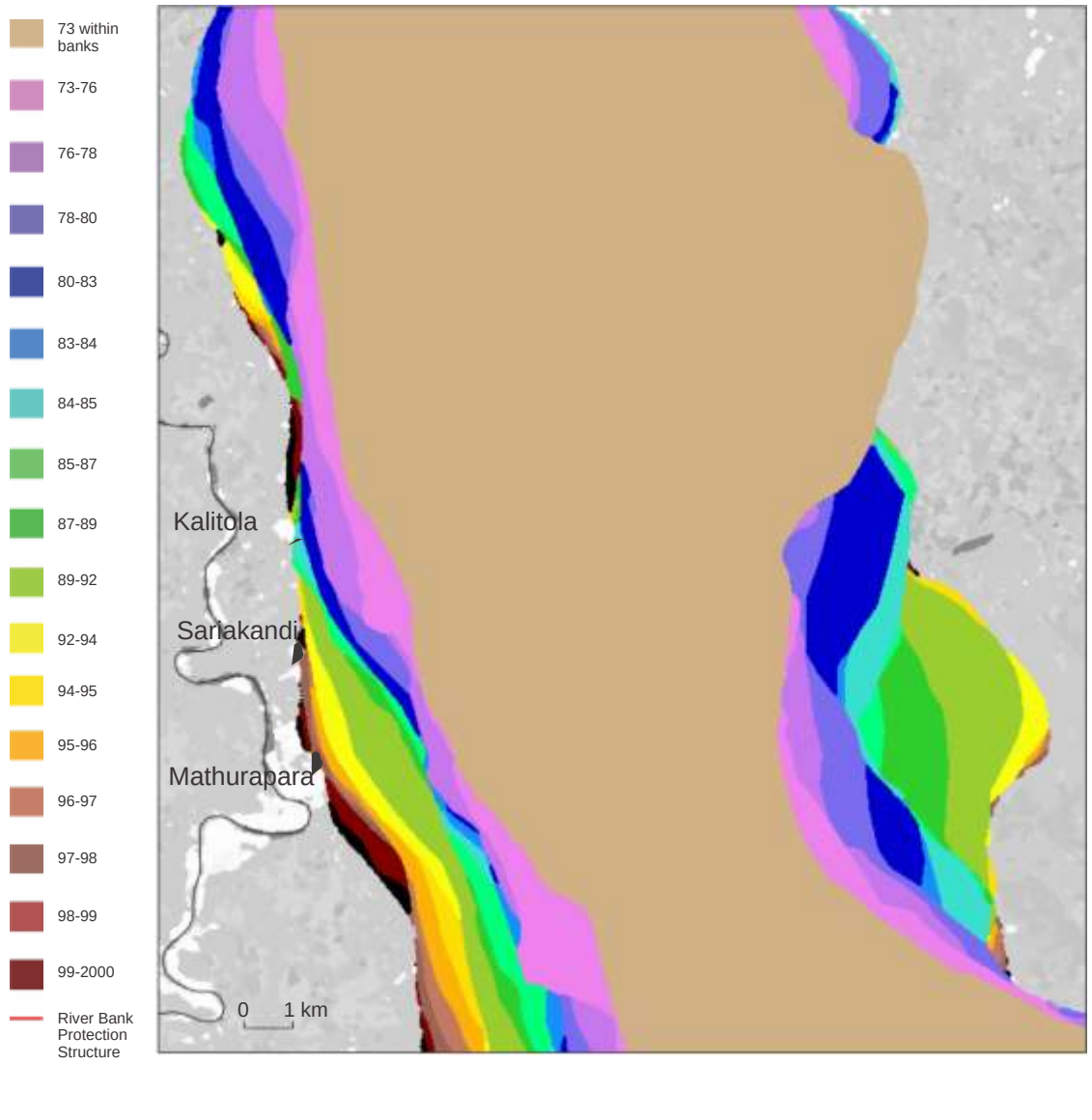


# Jamuna River Bank Erosion




The highly dynamic nature of the Jamuna River causes annual erosion of tens of square kilometers of floodplain along both its banks. Over the last thirty years, this river eroded nearly 820 $km^2$ while accretion was only 120 $km^2$ . During this period, the erosion has made about 0.7 million people landless and homeless. Many agencies are working on protecting the banks of the river including the BWDB and FAP projects. CEGIS provides support to most of these agencies by carrying out morphological analysis and predictions based on remote sensing and other hydro-morphological data. This analysis helps to plan, design, and maintain bank protection structures.

## Cumulative floodplain loss due to bank erosion 1973-2000



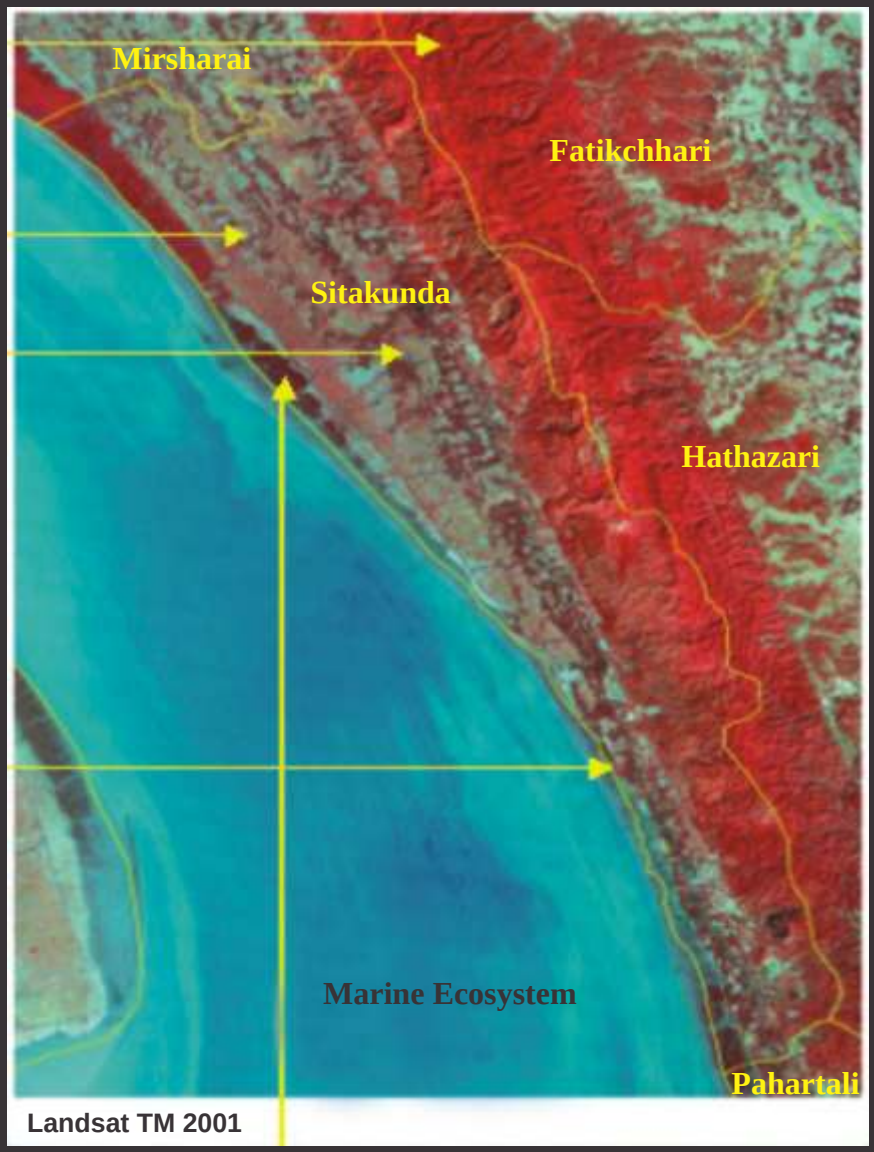
# Ecological classification of a coastal area using satellite image of 2001

Hills & Foothills

Agricultural lands

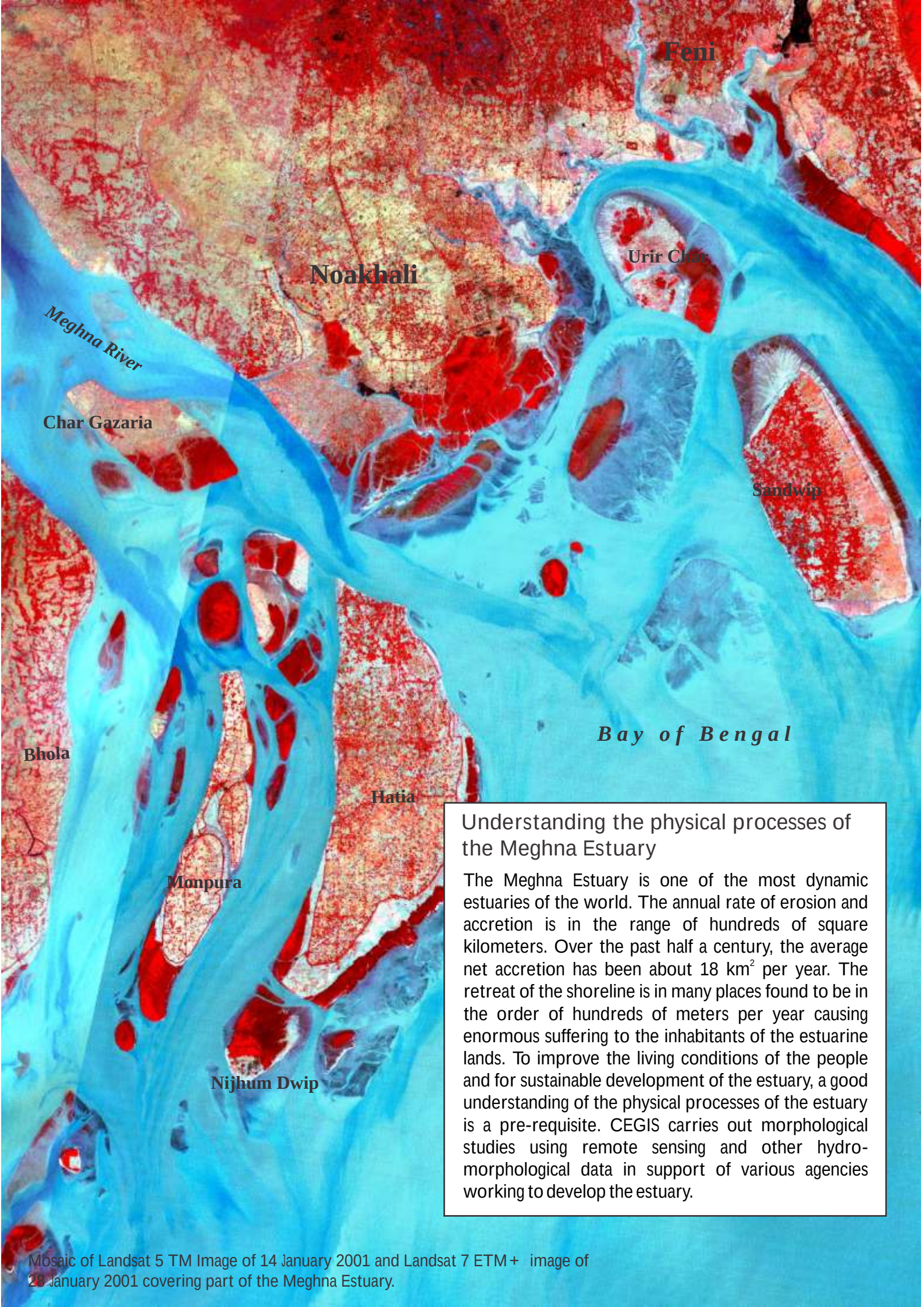
Village groves

Dike vegetation




Landsat TM 2001

Mangroves




## Understanding the physical processes of the Meghna Estuary

The Meghna Estuary is one of the most dynamic estuaries of the world. The annual rate of erosion and accretion is in the range of hundreds of square kilometers. Over the past half a century, the average net accretion has been about 18 $km^2$ per year. The retreat of the shoreline is in many places found to be in the order of hundreds of meters per year causing enormous suffering to the inhabitants of the estuarine lands. To improve the living conditions of the people and for sustainable development of the estuary, a good understanding of the physical processes of the estuary is a pre-requisite. CEGIS carries out morphological studies using remote sensing and other hydro-morphological data in support of various agencies working to develop the estuary.

Mosaic of Landsat 5 TM Image of 14 January 2001 and Landsat 7 ETM+ image of 28 January 2001 covering part of the Meghna Estuary.

CEGIS

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**COVER PHOTO:**

***Example of Terra MODIS RGB imagery product acquired on 19 March 2002.***

***Source: NASA website.***