Land use/cover map for ESPA project Area

1. Introduction

The land use/cover map of the study area of ESPA was prepared using Remote Sensing Technology. For this purpose, Multispectral IRS images of moderate resolution were used to delineate major land uses and land covers classes within the study area. In this process, Google Earth images were also used to delineate classes which are not possible to delineate from Multispectral IRS LISS-III images. The detail description of the methodology of the land use /cover mapping is given below.

2. Methodology

Satellite Data

The cloud free multispectral IRS P6 LISS-III and IRS R2 LISS III images, acquired on 5th March and 5th April 2013, were collected for land use/cover map preparation. Table-1 shows the detail of the satellite image specification. The image acquisition dates were selected considering the growth stage of boro season rice crops and other land use practice. Figure-1 shows the boundary for which images were available and processed for land use/cover map preparation.

Table-1: Detail Specification of IRS satellite images

Sensor	Path	Row	Resolution	Number of Bands	Acquisition Date
IRS P6 LISS III	109	55	24 m	4 bands (B, G, R, and NIR)	05 April 2013
	109	56			
IRS R2 LISS III	110	56	24 m	4 bands (B, G, R, and NIR)	05 March 2013
	110	57			

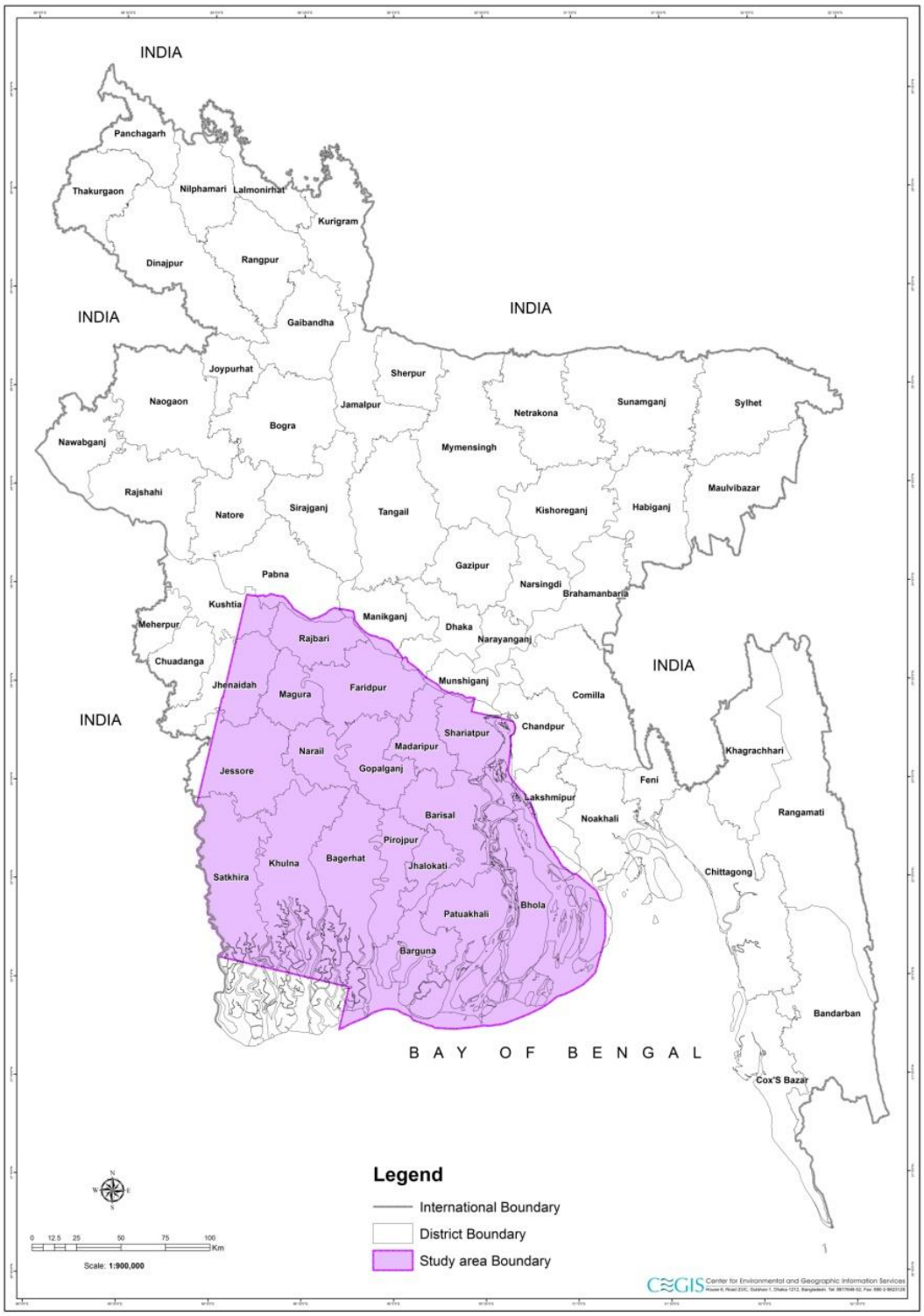

Figure-1: Study Area of Land use/cover mapping

Geo-referencing

After procurement of satellite images, all the IRS satellite images were georeferenced into Bangladesh Transverse Mercator projection system. The DGPS corrected satellite images available in the CEGIS archive were used as reference images. The Nearest Neighbor resampling method was used for resampling the data. The projection parameters of BTM are given below.

Projection Type: Transverse Mercator
Datum Name: Everest
Scale Factor at central meridian: 0.99960000
Longitude of central meridian: 90:00:00.000000E
Latitude of origin of projection: 0:00:00.000000N
False easting: 500000.000000 meters
False northing: -2000000.000000 meters

Field survey

Field survey was carried out for reference data collection from the study area for analyzing satellite data. The main purpose of the field survey is to relate land use and land cover on the ground to the spectral patterns in the images that represent those land uses and land covers. A total of 199 sites were visited and corresponding reference data such as current land use/cove, GPS location, Name of location were collected. Among those visited sites, 115 were used for image classification and 84 were used for accuracy assessment.

Image interpretation

Object-based classification technique of eCognition software was used for segmentation of the IRS images. The segmentation process results images objects based on similar pixels values. Then the object characteristics such as mean value, standard deviation, ratio, etc. of the spectral bands were used for classification.

3. Results

Figure-2 shows the Land use /cover map of the study area. The accuracy assessment tools of ERDAS imagine was used for accuracy assessment. The ground reference data of 84 sites were used for this purpose. The overall accuracy of this land use/ land cover map is (73/84)*100 or 86%. The major classes such as “Boro season rice”,” Other crop agriculture”, “Bagda shrimp culture”, “Settlement with Homestead vegetation (Rural), “Settlement with Homestead vegetation (Urban)”, “River/ Canal”, “Mud flat”, “Sand”, “Mangrove”, and “Water logged” were extracted from the images. In this process, field collected reference data were used to classify the image objects. Other classes such “Golda and other fish culture”, “Fresh water fish culture”, Mixed: Boro, Golda and other fish culture” were extracted from Google Earth images using onscreen digitization technique. Figure-2 shows the Land use /cover map of the study area.

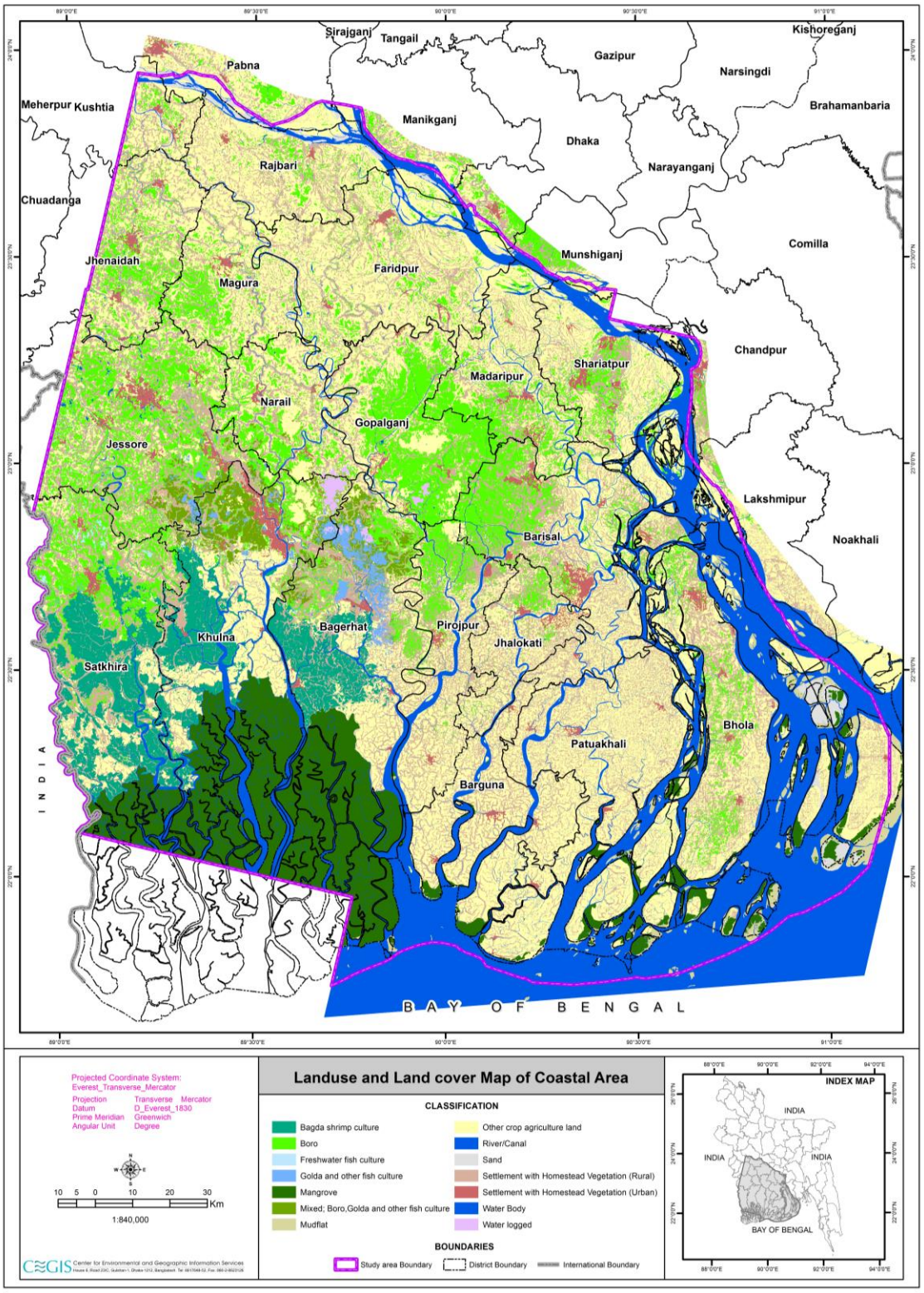

Figure-2: Land use and Land cover Map of the Study Area