

EXPLORATION OF NIJHUMDWIP THROUGH REMOTE SENSING TECHNIQUE

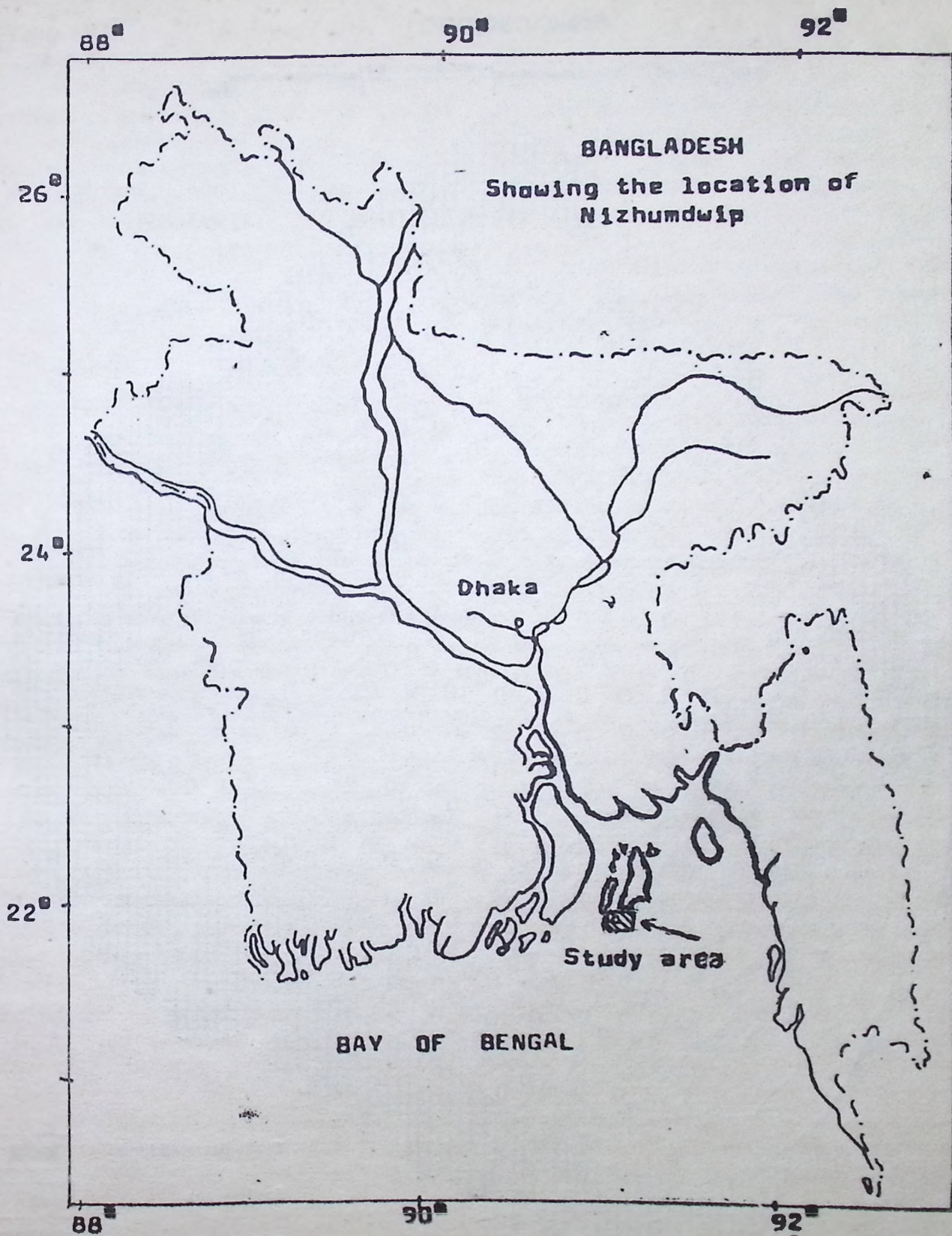
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Satellite Remote Sensing data are being extensively used in change detection and vegetation cover studies. Visual interpretation of LANDSAT imagery, black and white aerial photographs, colour Infra-red aerial photographs, diazo false colour composites of LANDSAT imagery, computer enhanced image, digitized image and stereoscopic photo interpretation techniques were adopted for the study of change detection and vegetation cover of "Nijhumdwip". The purpose of the study was to find out the rate of accretion and the succession of vegetation in the island. Groundtruth missions were performed for the collection of data. Information generated by the various methods of interpretation were correlated with known field data.

INTRODUCTION

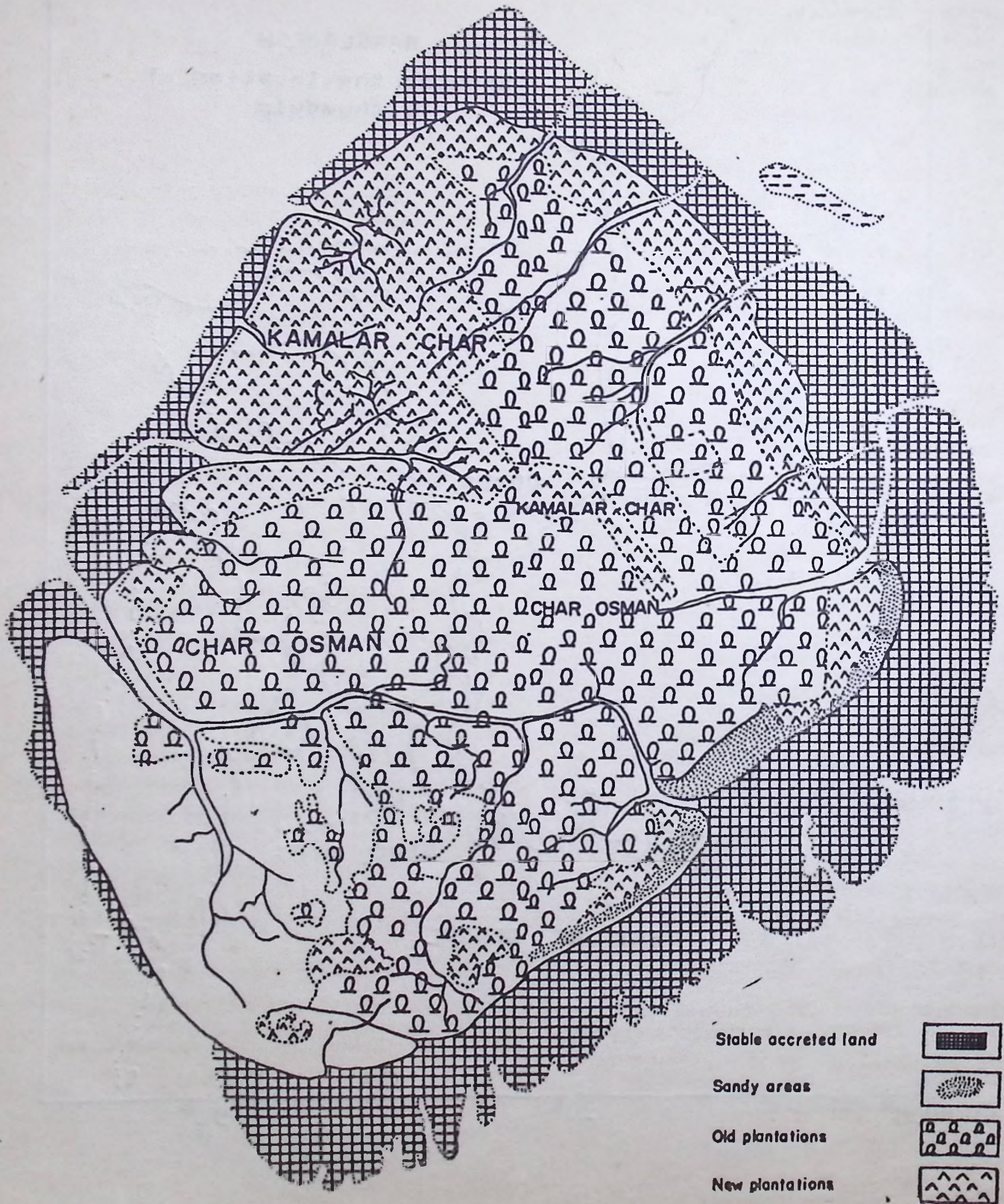
Exploration and exploitation of natural resources is a very important activity for the continued economic growth of the society. Many devices at different stages of human civilisation were introduced for the exploration of natural resources. In the modern age Remote Sensing Technique is one of the best tools for surveying natural resources particularly in the inaccessible areas. Modern remote sensing system from space is the result of the development process which began in the U. S. A. in the mid sixties. This led to the Earth Resources Technology Satellite (ERTS) project of NASA in 1970, now called LANDSAT.

LANDSAT-1 was launched in 1972 which provided the world community first multispectral data in four bands, in visible and near Infra-red (IR) range of the electromagnetic spectra with about 80m ground resolution. Subsequently with LANDSAT-2 (1975) and LANDSAT-3 (1978) data, resource management application and techniques have been very widely investigated and remote sensing of earth from space has proven its utility as a transnational monitoring system capable of gathering useful data over vast areas in a short time for different purposes. SPOT, another Earth Resources Technology Satellite is



NIZHUMDWIP

Scale 1:30,000



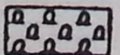
Stable accreted land



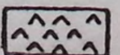
Sandy areas



Old plantations



New plantations



likely to be launched in the early 1985 by CNES of France with 10m ground resolution, which will open a new sphere of knowledge to the Scientists and Engineers for the exploration and exploitation of natural resources. This study covers the application of remote sensing data to collect short term information about the vegetation cover, land formation and other geologic information of "Nijhumdwip".

STUDY AREA

The study area "Nijhumdwip" is a small island adjacent to the southern tip of Hatia island in the Bay of Bengal. It falls between the longitudes 90°55' and 91°5' east and latitudes 22°0' to 22°10' north. The soil in the area has been formed through deposition of suspended sediment carried down in the estuarine region of the Bengal delta. The origin of the deposit is very recent and the profile characteristics of the soil is althrough massive having lithological discontinuity in layers. The texture of the surface soil is medium to light which overlies predominantly sandy deposit. The soil is generally aneorobic and saline in nature due to flooding by tidal saline water. The pH of soil is alkaline in range.

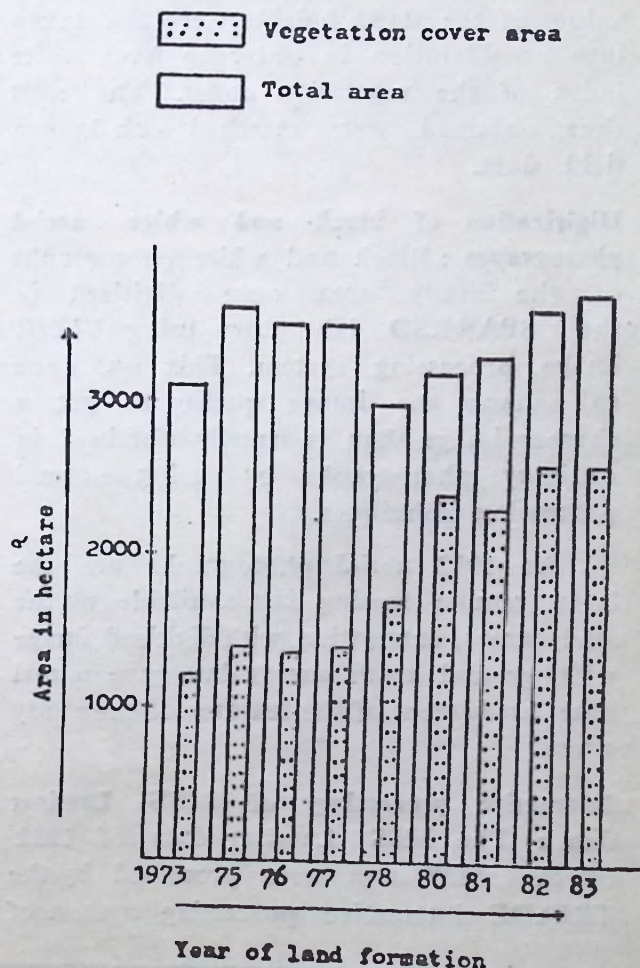
METHODOLOGY

The methodology includes the stereoscopic interpretation of black and white aerial photographs, visual interpretation of infra-red (IR) aerial photographs and photo processing and comparing of Landsat data and aerial photographs.

Interpretation of MSS Landsat data

Landsat MSS data of 1973, 75, 76, 77, 78, 80, 81, 82 and 83 of band 5 & 7 of the

study areas were blown up to 1 : 25,000 scale photographically. As band 5 data provides best information about vegetation, the vegetation area was delineated and measured from a band-5 imagery of the area by a digital planimeter. The data thus obtained from the above procedure for ten years were plotted on a graph paper and histograms were drawn showing the extent of land formation around the island. Afforestation in the island has also been shown in the histogram.



Histogram showing the land formation and vegetation cover in Nijhumdwip (1973-83)

Interpretation of black and white aerial photographs : The spectral signature registered on the photographic prints are the response of reflection characteristics of the ground and its coverage. Different objects, even the species of trees, reflect different amounts of incident radiation which helps in the recognition of different objects and perform vegetation classification.

Black and white aerial photographs of the area were studied under a mirror stereoscope to classify the vegetation cover of the island and its other features. Relative values of the stand heights were also taken into consideration in order to have a site index of the vegetation cover. The result thus obtained were matched with known field data.

Digitization of black and white aerial photographs : Black and white photographs of the study area were digitized in the SPARRSO laboratory using VIZIR image processing system. This was done to enhance the image quality to get a sharper image than is usually obtained in ordinary photographs by using normal processing techniques.

As 1982 aerial photographs are the latest remote sensing data available on the study areas, correlation with digitized image with ground truth survey data gave a real time assessment of the features of the study areas.

Interactive processing of MSS Landsat data : The MSS Landsat data of 1982 of the study area were processed by the TRIADE interactive processing system of

SPARRSO with a view to enhancing different land features. Out of many, five combinations were tried and it was possible to identify vegetation classification sand, water and sediment deposition under water around the island. Some stress in the forest area was also identified.

RESULT AND CONCLUSION

Different photo interpretation techniques yielded up-dated and authentic information about the study area. The data generated were subjected to comparison to obtain a single map of the study area. Ground truth survey confirmed the details in the map.

From the histogram it can be seen that there was an increase of area between 1973 and 1975. Total areas covering 3594 ha was found in 1975 and then erosion started and continued upto 1978. From 1979 accretion started again and in 1983 land area altogether covered 3672 ha.

Afforestation process has always been increasing throughout the past 10 years and in 1983 it covered 2650 ha of land. It is found that 50 ha of land in 1976 and 100 ha of plantation in 1981 had been washed away by tides. It is also found that there has been an increase of about 700 ha of land during the years 1973-83 by the twin action of accretion and erosion. It may be seen that the process of afforestation out paces the process of land formation. However, long term studies are needed before any conclusions can be drawn on the subject.

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