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DETECTION OF *LITHOCARPUS GRANDIFOLIUS* (DC.) S.N. Biswas FOREST IN RASUWA DISTRICT USING REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM

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ABSTRACT

This paper develops a detection of *Lithocarpus grandifolius* in Rasuwa district with application of Remote Sensing. The plant is distributed throughout Nepal at 1400 m - 2000 m, Himalaya (Nepal to Bhutan). NE India (Meghalaya, Nagaland), Myanmar. China, Indo - China and Malaysia. The analysis has demonstrated that this approach can produce supervise classification results using only SPOT (Satellite Pour I' Observation de la Terre) satellite data in the form of false color composite (FCC) with high resolution of 20 m sq. The SPOT uses 4 Bands, Red, Green and Infrared Band, among them the panchromatic band has stereo capability. Only Green Band or Band 1 *has* classified as *Lithocarpus grandifolius*. The SPOT satellite has the best resolution amongst the other remote sensing satellites and its products have been selected for this study and collection of ground information.

Key words: Rasuwa, Distribution, SPOT Satellite image, Remote sensing

INTRODUCTION

Lithocarpus grandifolius is a tall tree about 18 m high. Its Nepali name is Arkhauli Boldung in Tamang, belonging to Fagaceae family. Leaves petioled, 8-35 cm long, 3-10 cm broad, elliptic to lanceolate, acuminate, leathery, base cuneate or rounded. Flowers yellowish in clusters. Fruits an acorn. Plant is propagated by seeds. Flowering season is May-July and fruiting season is August-Septem. The plants are commonly found and collected by local people for fuel in the study area. Roasted seeds are eaten by tamang people. Oil from the seeds is used for scabies. Wood is used for preparing plough by local people. Bears eat and very like the seeds.

Remote sensing is the science and art of obtaining information about an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area or phenomenon under investigation (Lillesand and Kieffer, 1979). Remote sensing technique is a quicker, less expensive and more accurate method of survey compared to the conventional method. Geographic Information System is a tool for resource survey and inventory, which provides a primary source of up to date geographic data (Archibald, 1987).

STUDY AREA

A field study was carried out in the Rasuwa district of Central Nepal lies in Bagmati Zone, between the longitudes (85º 10.92'E to 85º 53.7'E) and latitude 27º 51.36' to 28º 23.1'N with altitude ranging from 600 to 7245 m. It is a remote and mountainous and Himalayan area covered with 1544 sq m. More than 80% land area covered by Langtang National Park. The study area encloses the catchments of two major river systems, one draining west into the Trishuli and other east to the Bhote Koshi. Langtang Lirung (7234m) is the highest point in the southwest. The lowest point in the study area is approximately 6,00 m from the sea level.

METHODOLOGY

The SPOT satellite data have been used during the research study. It is in the form of false color composite (FCC) having a resolution of 20 m sq. The SPOT uses spectral bands with the capability to discriminate plants. Satellite has three spectral bands so each pixel of SPOT satellite data consist three-file value. The SPOT uses four bands; among them the panchromatic band has stereo capability. The SPOT satellite has the best resolution amongst the other remote sensing satellites and its products have been selected for this study and collection of ground information. The base map on 1:50,000 scale and 1: 25000 scale sheets were prepared from the survey of the topography of Nepal. During the image processing following bands spatially defined and spectrally homogenous field samples have been shown in the map as in different colors.

GREEN BAND (BAND 1)

In the SPOT data of Green Band (Band 1) the minimum data file value is 23 and maximum data file is 72. The data file values are grouped according to the following spectral ranges 23 to 27 (1); 28 to 32 (2); 33 to 37 (3); 38 to 42 (4); 43 to 47 (5); 48 to 52 (6); 53 to 57 (7); 58 to 62 (8); 63 to 67 (9); and 68 to 72 (10).

RED BAND (BAND 2)

For the Red Band (Band 2), minimum spectral value is 12 and maximum spectral value is 76. Pixels were grouped as spectral class according to the following spectral range 12 to 16 (1); 17 to 21 (2); 22 to 26 (3); 27 to 31 (4); 32 to 36 (5); 37 to 41 (6); 42 to 46 (7); 47 to 51 (8); 52 to 56 (9); 57 to 61 (10); 62 to 66 (11); 67 to 71 (12); and 72 to 76 (13).

NIR BAND (BAND 3)

For the NIR Band (Band 3), minimum spectral value is 14 and maximum spectral value is 93. Pixels were group as following spectral ranges, 14 to 18 (1); 19-23 (2); 24 to 28 (3); 29 to 33 (4); 34 to 38 (5); 39 to 43 (6); 44 to 48 (7); 49 to 53 (8); 54 to 58 (9); 59 to 63 (10); 64 to 68 (11); 69 to 73 (12); 74 to 78 (13); 79 to 83 (14); 84 to 88 (15) and 89 to 93 (16). The result of

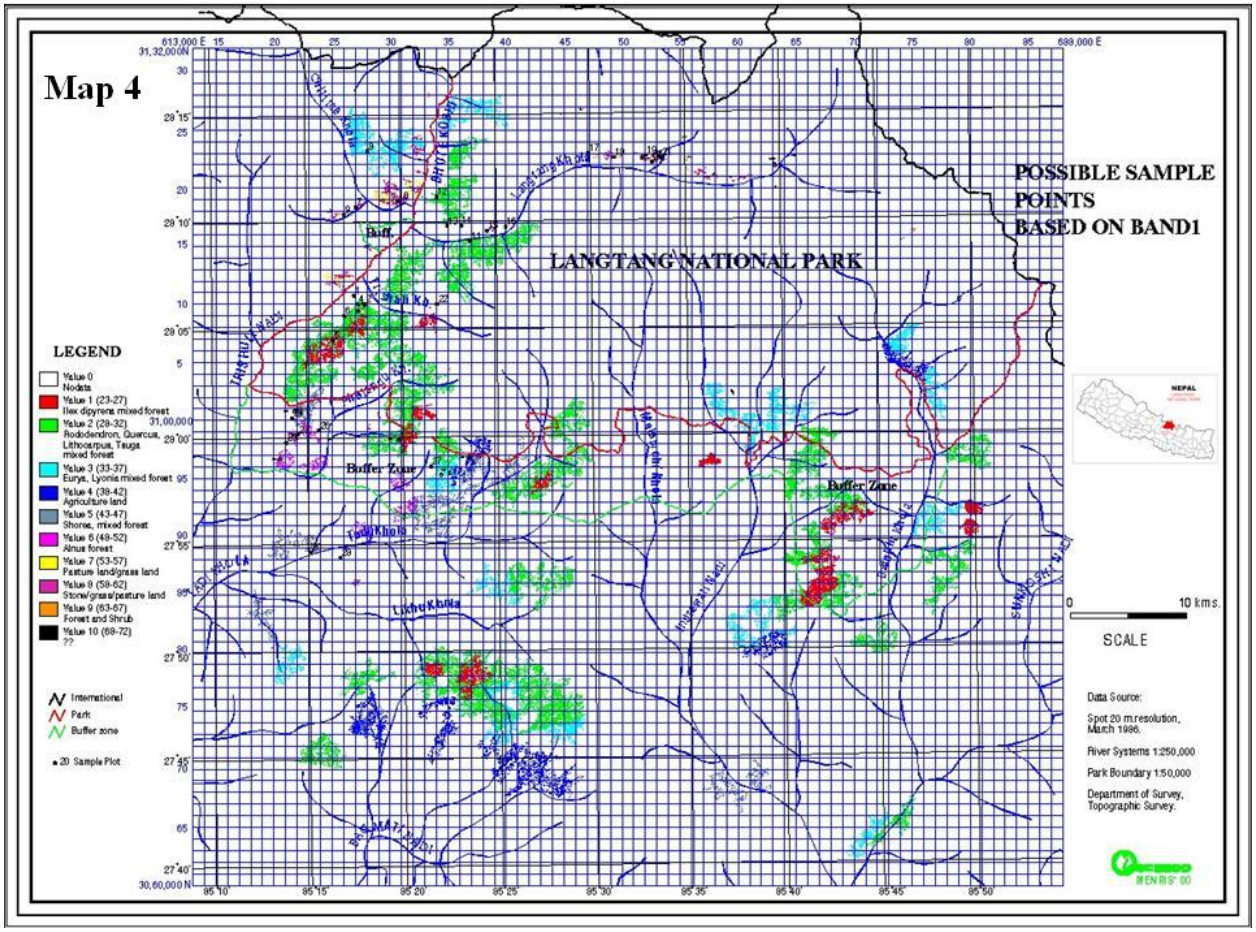
The analysis of the SPOT satellite imagery has been carried out using visual image processing techniques by the Mountain Environment and Natural Resources' System (MENRIS) Division of the International Centre for Integrated Mountain Development (ICIMOD), Nepal. Black and white

aerial photographs have been used as secondary data. Erdas Imagine 8.3.1 software was applied during the image processing or supervises classification.

RESULTS AND DISCUSSIONS

Green Band or Band 1 *has* spectrally classified as *Lithocarpus grandifolius* mixed forest, the spectral range is 28 to 32. This forest lies in southern direction of Dhunchebazaar in north-facing slop 22.02° at an altitude of 2350 m with 85°17.7'E and 28°06.20'N longitute and latitude respectively. The more frequent species are *Quercus incana*, *Lithocarpus grandifolius, Eurya acuminata,* and *Benthamidia capitata.* Other associated species are found in this plots are *Berberis aristata, Betula alnoides, Elaeagnus conferta, Indigofera dosua, Lindera pulcherrima., Lyonia ovalifolia, Prunus cerasoides, Quercus lanuginosa, Quercus semecarpifolia, Rhododendron arboreum, Semecarpus anacardium, Symplocos theaefolia, Tsuga dumosa, Viburnum coriaceum, Viburnum mullaha*. In this plot, most of the trees are cut down and plants are regenerated from the cutting part.

Green Band has classified as *Lithocarpus grandifolius* mixed forest associated with *Dodecadenia grandiflora*, *Quercus incana, Viburnum cylindricum* near Bamboo Hotel (on the way of Kyangjin valley in Rasuwa district. It lies the longitude and latitude 85°23.64' E and 28°09.11' N respectively with an altitude of 2000 m from the sea level.



CONCLUSION

The main conclusion is that the Green channel is essential with the spatially defined the method for the discrimination of *Lithocarpus grandifolius forest or a* agriculture land, *Rhododendron arboreum* forest, *Lyonia* forest, *Ilex dipyrena*, *Shorea robusta* forest, *Alnus nepalensis*, *Ilex dipyrena*, *Rhododendron* mixed forest, *Tsuga dumosa*, *Lyonia* forest as glacier land and water.

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