

GEO-SPATIAL MAPPING AND TERRAIN CHARACTERIZATION OF NATURAL RUBBER PLANTATIONS IN KARNATAKA, MAHARASHTRA AND GOA

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In recent years, consumption of natural rubber (NR) in India has been increasing and its production is on a declining trend. Therefore the supply of NR needs to be increased to meet its increasing industrial demand in the country. This can be achieved by expanding its cultivation to agro-climatically suitable areas and temporal monitoring of NR growing areas. Thus accurate, up to date and timely NR area statistics is essential for management of the Indian rubber plantation sector. Geo-spatial mapping of NR plantations was carried out in Karnataka, Maharashtra and Goa states using recent satellite data. Indian Remote Sensing Satellite Resourcesat I and IILISS III data for the year 2013 were used for estimating spatial extent of NR cultivation. Distribution pattern of rubber area across topographic variables was studied using ASTER digital elevation model (DEM). Area of NR estimated using satellite data was compared with traditional ground survey statistics of the Rubber Board. Area under NR above three years was estimated using satellite data for the year 2013-14. In Karnataka, NR area was 31,231 ha which was 4473.2 ha lower than official ground survey statistics of the Rubber Board (35704.2 ha). Negative deviation was attributed to large area under young plantations in Karnataka. In Maharashtra, NR area was 1133 ha which was 157.8 ha deviation compared to Rubber Board statistics (975.4 ha). Rubber area statistics of Goa was 424 ha as against ground survey area of 696.3 ha. Characterization of rubber plantation distribution over terrain parameters showed that majority of NR plantations in Karnataka and Maharashtra were distributed over 100 to 300 m elevation, less than 25 per cent slope and North and South facing aspects, whereas in Goa, this was 0 to 100 m elevation, 5 to 25 per cent slope and North and South aspects occupies majority of rubber area. This was the first time mapping of NR plantations has been conducted in Karnataka, Maharashtra and Goa and therefore a temporal monitoring is required to update young plantations and to understand its spatio-temporal shift in cultivation. The geo-spatial database of NR area statistics and its characterization in relation to elevation, slope and aspect can be used as baseline information for planning sustainable NR cultivation in the study area. Moreover, this study shows effectiveness of LISS III satellite data for NR area estimation which is up to date, cost effective and quicker than the traditional survey method.

Keywords: DEM, Geo-spatial, GIS, Natural rubber, Remote sensing