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SPATIO-TEMPORAL ANALYSIS OF RUBBER AREA AND ITS ASSOCIATION WITH SOIL AND TOPOGRAPHY IN KANYAKUMARI DISTRICT

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Reliable and up to date information on agricultural land and its changes are important for agriculture planning and management. Using remote sensing and GIS techniques, the present work aimed to find the spatio-temporal changes in natural rubber areas in Kanyakumari district of Tamil Nadu over a period of 27 years (1980-2007) and its distribution over soil management units (SMU) and slope. Landsat MSS and TM as well as IRS P6 LISS III data were used as satellite input data and ASTER digital elevation data for deriving slope information and ortho-rectification of satellite image. Satellite images were individually classified using K means clustering and labeled based on ground knowledge and ground control points (GCP) and compared with ground survey statistics. Rubber area along with slope and SMU map was brought into GIS and overlay analysis was done to understand the spatio-temporal changes in rubber area. Area under rubber in 1980 was 10693.3 ha and it increased to 15886.7 ha in 1992 and then to 20781.7 ha in 2007. About 8891.5 ha have been newly planted with rubber during 1980-2007. Majority of this newly planted area has come up in good to moderate soil with moderate to gentle slope. Present study also revealed that rubber area is skewed towards old plantations. The study assumes significance because so far no spatio-temporal rubber area mapping has been carried out in the study area. And also the study has thrown light on the skewed distribution of rubber area towards old age which will be useful for planning the replanting programmes. There is a need for integrated analysis of rubber area distribution with soil, topography and climate variation to assess their influence on rubber performance and to develop site specific management practices.

Keywords: GIS, Remote sensing, Rubber, Spatio-temporal change

INTRODUCTION

Planning, management and monitoring the use of scares natural resources at local and regional level require information on spatial and temporal distribution of land use land cover (Chaurasia *et al*., 1996; Jayakumar and Arockiasamy, 2003). Natural rubber (NR) area in our country has expanded in the last past 50 years because of its economic value in the world market. In India, the state of Kerala and Kanyakumari district of Tamil Nadu state are the traditional rubber growing areas accounting for 90 per cent of

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distributed over poor soil and steep slope which need suitable conservation measures to conserve soil and water. This assumes significant importance in the context of change in rainfall pattern and intensity brought by climate change. This study has once again brought to light the expansion of rubber area outside the surveyed area and call for the updating of rubber growing soil information. Limitation of this study is that resolution of the satellite data was not uniform for all the three study period and there are no past published rubber distribution map available to cross check present classification. However past satellite data is the only source to trace back to the past for information and the ground based rubber area statistics published by Rubber Board is the authentic information available for comparison. There is a need for integrated analysis of performance of rubber in relation to its distribution over different slope classes and soil types coupled with climate condition to develop a site specific package of practices to enhance the rubber yield.

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