

MAPPING THE RECENT PATTERN OF RUBBER AREA EXPANSION IN NORTH EAST INDIA THROUGH EARTH OBSERVATION SATELLITE DATA

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Physiography, climate and soil play a crucial role in the growth and yield of natural rubber (*Hevea brasiliensis*). Tripura and Assam are the two major rubber producing states, which account for 88 per cent of total natural rubber production in North East India. In this study, the recent pattern of expansion of rubber area in Tripura and Assam according to elevation was monitored using Sentinel 2 satellite data as of 2021-2022 and high-resolution Cartosat I satellite data as of 2010-2011. In the last decade, rubber area had expanded substantially in both the states. Satellite derived spatial extent of rubber area in Tripura was estimated to be around 1,12,455 ha in 2021-2022. From 2010 to 2021, about 64,084 ha of rubber area were expanded in the state at a rate of 5826 ha year⁻¹. In 2021-2022, there was 41,414 ha of rubber area in Assam, an expansion of about 24,544 ha compared to high-resolution estimates from 2010-2011, at 2231 ha year⁻¹. Rubber area in these states expanded substantially to higher elevations between 2010 and 2021; around 77 per cent of the area expansion occurred between 50 and 100 m in Tripura and 55 per cent of area above 100 m in Assam. Assam showed considerable expansion of rubber area to higher elevations than Tripura. Delineating the area by elevation is vital in order to select rubber clones suitable for higher elevations as well as to predict yield in the newly expanded regions. Monitoring spatial and temporal expansion of the rubber area would also help to assess and develop plans for sustainable management of rubber plantations and monitoring land use changes. Rubber plantation expansion is promoted in the North-eastern states of India to increase domestic natural rubber production and enhance socio-economic status of people in the region. Geospatial datasets derived from the current study can help to monitor future changes in rubber plantation expansion in the North-eastern part of India.

Keywords: Cartosat 1, Elevation, North East India, Rubber plantations, Sentinel 2, Spatial and temporal expansion, Sustainable livelihood

INTRODUCTION

Natural rubber (*Hevea brasiliensis*) is predominantly cultivated in South East Asia and in some parts of West Africa due to its industrial and economic relevance (IRS, 2021). Global rubber area and production are

currently around 14 million ha and 13700 metric tonnes, respectively (IRSG, 2021). A rapid expansion of rubber cultivation in these regions has caused environmental and ecological impacts. Large areas of tropical forests, secondary forests and other land uses