DELINEATING RUBBER PLANTATIONS IN LANDSLIDE-PRONE AREAS OF KERALA USING REMOTE SENSING AND GIS

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The hilly regions of Kerala state witnessed two massive landslides causing many human casualties and serious damages to the environment and properties in the past couple of years. Natural rubber (NR) plantations are mostly located on the undulating and sloping terrains along the foothills of the Western Ghats of the state which are increasingly becoming vulnerable to landslides. Extremely intensive rainfall can destabilize hilly terrains where NR is a popular crop among others in Kerala. To estimate the spatial extent of rubber plantations according to proneness to landslide in Kerala, satellite-based area under rubber (age three years and above) was geospatially analyzed in landslide susceptible zones of the state. Further district-wise extent of rubber plantations susceptible to landslide was estimated. Landslide susceptibility map prepared by Kerala State Disaster Management Authority was utilized for characterizing area under rubber plantations into low, medium and high susceptible zones prone to landslide. Results showed that out of the total rubber plantation area in Kerala, 1.6 per cent (9,485 ha) was in the high susceptible zone, six per cent (32,398 ha) in the medium and two per cent (13,072 ha) in the low susceptible zone. All three zones together account for 9.7 per cent of the total rubber cultivation in Kerala whereas more than 90 per cent of rubber holdings in the state are outside landslide-prone region. Different districts in eastern parts of Kerala (except Alappuzha) have landslide vulnerable regions. Plantation areas under rubber in the high susceptible zone of landslide were the highest in Kottayam district followed by Idukki, Kannur, Palakkad, Pathanamthitta and Kasaragod districts. Substantial area is under medium landslide susceptible zone spread over various districts. Policymakers and planners are devising strategies to minimize the occurrence of natural hazards and mitigate the risks on the background of increased incidences of landslides, flood *etc*. in the recent past. The present information is highly useful for planning appropriate conservation and management strategies for rubber plantations in the highly vulnerable areas. An open source WebGIS portal was developed by integrating landslide susceptibility of rubber plantations in different panchayats in Kerala for easy dissemination of this information to rubber growers. Good agricultural practices are recommended through this platform for adoption at a location according to its vulnerability to landslide as well as avoiding certain cultural operations to minimize the occurrence/impact of landslides.

Keywords: Agricultural practices, Kerala, Landslide susceptible zones, Rubber plantations, Satellite data

INTRODUCTION

It is fairly well recognized that climate change can alter the air temperature and rainfall pattern with higher intensity and more frequent heavy rain events. Rainfall, both prolonged and intense is the most common trigger of landslides. Climate changes also affect the stability of natural and engineered slopes with consequent

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