SATELLITE-BASED REMOTE SENSING TECHNIQUE AS A TOOL FOR REAL TIME MONITORING OF LEAF RETENTION IN NATURAL RUBBER PLANTATIONS AFFECTED BY ABNORMAL LEAF FALL DISEASE

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Most parts of the traditional natural rubber growing regions of India, extending from Kanyakumari district in the south to Kasaragod district in the north received excess and prolonged rains during 2013. This led to severe incidence of Abnormal Leaf Fall (ALF) disease caused by the fungus, *Phytophthora* sp. We demonstrate here for the first time the use of satellite-based remote sensing technique to monitor LAI in natural rubber holdings in real time. Leaf retention was monitored every month between April and December 2013 using real time satellite-based remote sensing measurements from rubber holdings spread across all districts in the traditional rubber growing region of the country that were earlier mapped using satellite imageries. Corresponding LAI data for 2012 was also similarly estimated from satellite data. It was found that as the monsoon advanced, LAI decreased substantially in both years, but the reduction was much more substantial and prolonged in many districts during 2013 than 2012, reflecting increased leaf fall due to ALF disease in 2013. The decline was more pronounced in central and northern Kerala than in the south. Kanyakumari district is generally known to be free from ALF disease, but there was considerable leaf loss due to ALF in June 2012 and June and July 2013 even as the monsoon was unusually severe in 2013. Weighted mean LAI for the entire period of April to December was estimated based on LAI and per cent of total area under rubber in each district for the two years. This was markedly less in 2013 than 2012. The implications of poor leaf retention for biomass production (net primary productivity), carbon sequestration and rubber yield are discussed.

Keywords: Abnormal leaf fall, Leaf area index, MODIS, Remote sensing

INTRODUCTION

Almost 90 per cent of India's natural rubber is produced from the traditional rubber growing regions that stretche from Kanyakumari in the south to Kasaragodu in the north (IRS, 2012). This part of the country has been witnessing marked rise in temperature in recent years and decades (Jacob and Satheesh, 2010; Raj *et al.*, 2011; Satheesh, 2014). Earlier analyses have shown that for a unit concomitant rise in maximum

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