

## ASSESSING AGRICULTURAL DROUGHT IN NATURAL RUBBER PLANTATIONS USING MODIS TERRA SATELLITE DATA

<sup>†</sup>S.M. Shebin, <sup>\*</sup>Shanker Meti, James Jacob, B. Pradeep and M.D. Jessy

Rubber Research Institute of India, Kottayam, Kerala, India- 686 009

<sup>\*</sup>University of Horticultural Sciences, Bagalkot, Karnataka, India

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Drought assessment and monitoring are important in the management of a crop particularly in the context of global warming and climate change. Rubber being a perennial crop goes through periods of moisture deficits during different phases of its growth. Real or near real time drought monitoring is required for adopting proper management strategies to mitigate the adverse effects of drought. Satellite-based remote sensing techniques are increasingly becoming handy in assessing and monitoring drought in many crops. Severe drought during the summer season results in appreciable reduction in growth and yield in natural rubber. In the present study, an attempt has been made to identify the spatial extent of agricultural drought stress in natural rubber plantations of Kerala and Kanyakumari district of Tamil Nadu using satellite based remote sensing data and GIS. By combining remotely sensed land surface reflectance and thermal properties from Terra MODIS, changes in land surface temperature (LST) and Normalized Difference Vegetation Index (NDVI) over a region is estimated. Vegetation Temperature Condition Index (VTCI), derived from the association between NDVI and LST gives an estimate of the temperature status of the vegetation for a given NDVI which is an indirect reflection of the soil moisture status. Our results indicate that VTCI is a powerful proxy estimate of the drought stress rubber plantations experience during peak summer season in Kerala and Kanyakumari district of Tamil Nadu.

**Keywords:** Land surface temperature, NDVI, Terra MODIS, VTCI.

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### INTRODUCTION

Assessing and monitoring drought in time and space is important in the agronomic management of any crop. Measurement of thermal radiation from the earth surface in the infrared wavelength of the electromagnetic spectrum yields useful information for monitoring drought (Wan *et al.*, 2004; Parida, 2006; Mukund, 2008). Several studies have used different

vegetation indices like NDVI which represent vegetation vigour as an indicator of soil water availability. NDVI is the most popularly used vegetation index, but this index is a rather conservative indicator of water stress as the vegetation remains green well after water deficit stress has set in (McVicar and Bierwirth, 2001) and this is particularly so in a perennial tree crops such as natural rubber.