

IMPACT OF CLIMATE WARMING ON NATURAL RUBBER PRODUCTIVITY IN DIFFERENT AGRO-CLIMATIC REGIONS OF INDIA

P.R. Satheesh and James Jacob

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

Received: 12 January 2011 Accepted: 20 May 2011

Satheesh, P.R. and Jacob, J. (2011). Impact of climate warming on natural rubber productivity in different agro-climatic regions of India. *Natural Rubber Research*, 24(1): 1-9.

Long term changes in climate of major natural rubber (NR) growing tracts of India were quantified and their impact on NR productivity was estimated using multiple linear regression models. Day-to-day variations in productivity in terms of dry rubber yield per tree per tap (g/t/t) could be best explained based on the variations in daily maximum temperature (Tmax) and daily minimum temperature (Tmin) and variations in other weather variables did not contribute much to the variations in daily productivity. For unit rise in Tmax and Tmin, NR productivity was affected differently in different agro-climatic regions. If both Tmax and Tmin rose by 1 °C, NR productivity will reduce by 9-16% in the agroclimatic conditions of Kerala and by 11% in the hot and drought-prone North Konkan region. On the other hand, in the cold-prone North Eastern India, there is hardly any reduction in NR productivity if both Tmax and Tmin went up by 1 °C. Our analysis show that if the present warming trend continues, NR productivity in Kerala could be reduced by 4-7% and that in North East India could go up by as much as 11% in the next decade. North Konkan region may also register about 4% reduction in NR productivity in the next decade if the present warming trend continues; however, absolute yields will continue to remain high in Kerala.

Key words: Climate warming, Maximum temperature, Minimum temperature, MLR models, Natural rubber productivity.

INTRODUCTION

It is very likely that greenhouse gases from anthropogenic emissions are warming the earth's climate. Climate change as a result of global warming can influence the growth and productivity of agricultural crops (Cynthia and Parry, 1994). Climate change can affect crop productivity in various direct and indirect ways (Cynthia *et al.*, 2001). For example, an extreme weather event like drought or storm directly impacts growth and productivity.

Changes in weather pattern can affect the incidence of pests and diseases and thus indirectly affect the crop.

Natural rubber (NR) is mostly grown in South and South East Asia which is highly vulnerable to climate change (IPCC, 2007b). Studies show that temperatures have generally gone up in this part of the world in the recent decades (Manton *et al.*, 2001). Number of rainy days and number of cool nights per year showed a declining trend and that of hot days per year increased. While we may be able to understand and appreciate