

ECOLOGICAL IMPACT OF RUBBER (*HEVEA BRASILIENSIS*) PLANTATIONS IN NORTH EAST INDIA. 1. INFLUENCE ON SOIL PHYSICAL PROPERTIES WITH SPECIAL REFERENCE TO MOISTURE RETENTION

A. K. Krishnakumar, Thomas Eappen, Nageswara Rao,
S. N. Potty and M. R. Sethuraj

Krishnakumar, A. K., Thomas Eappen, Nageswara Rao, Potty, S. N. and Sethuraj, M. R. (1990). Ecological impact of rubber (*Hevea brasiliensis*) plantations in North East India. 1. Influence on soil physical properties with a special reference to moisture retention. Indian J. Nat. Rubb. Res. 3(1): 53-63.

An attempt is made to quantify the influence of rubber plantation on soil physical properties with special reference to moisture retention. It was observed that rubber plantations, adopting proper agro-management practices, helped in the enrichment of organic matter which consequently improved physical properties such as bulk density, soil porosity, moisture retention and infiltration. An increase in organic matter in the surface layer was recorded. Moisture retained at field capacity (-0.033 MPa) was higher by 5.45 per cent. A higher available water storage capacity (AWSC) was also recorded in the samples from plantation. The moisture desorption pattern showed that at -0.5 MPa 90.34 per cent of the available moisture was desorbed from surface soils from the rubber plantation whereas from outside the plantation in the same layer only 67.38 per cent was desorbed. Infiltration studies revealed that flow rates initially and after attaining steady state were respectively 67.5 and 138 per cent higher inside the plantation, compared to the field subjected to shifting cultivation. A preliminary study conducted to compare the other forestry species on their influence on soil moisture retention also has been presented.

Key words – *Hevea brasiliensis*, Ecology, Rubber plantation, Shifting cultivation, Soil physical properties, Moisture retention, Field capacity, Organic matter enrichment, Infiltration rate.

A. K. Krishnakumar (for correspondence), Thomas Eappen, Nageswara Rao, Rubber Research Institute of India, Regional Research Station, Agartala-799006, India and S.N. Potty and M. R. Sethuraj, Rubber Research Institute of India, Kottayam-686009, India.

INTRODUCTION

North Eastern region presents a fragile ecological system which is the outcome of indiscriminate felling of trees mainly for the traditional shifting system of cultivation, locally known as 'jhumming'. When jhumming was practised with hardly any pressure on land, the damage caused to the environment was minimum since the time lag bet-

ween successive jhumming had been long enough for the re-establishment of a luxuriant vegetation.

As the practice of jhumming involves a slash and burn prior to the undertaking of cultivation, it leads to destruction of organic matter which is further aggravated by increase in the rate of decomposition due to high microbial activity and the consequent