CARBON SEQUESTRATION POTENTIAL OF RUBBER PLANTATIONS UNDER DIFFERENT SOIL MANAGEMENT UNITS (SMUs) OF KERALA

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Received: 15 July 2021 Accepted: 17 August 2021

Joseph, P., Jessy, M.D. and Mohan, M. (2021). Carbon sequestration potential of rubber plantations under different soil management units (SMUs) of Kerala. *Rubber Science*, **34**(2): 133-144.

Climate and landforms exert considerable influence on carbon (C) sequestration potential of agroecosystems. The carbon storage potential and nutrient availability in rubber plantations under different soil management units (SMUs) in three locations of Kerala namely, Thiruvananthapuram district in the southern region, Kottayam in the central region and Palakkad in the northern region were estimated. Significant variation in soil organic carbon (SOC) was observed between different locations, SMUs and SMUs under each location, whereas the variation in SOC stock between locations and SMUs within locations was not significant. An increasing trend in available potassium (K), calcium (Ca) and magnesium (Mg) in soils was observed from the southern to the northern district. Moderate to acute Ca deficiency was also noticed in the southern and central regions indicating the need for scientific intervention with respect to Ca nutrition of rubber plants. The study provided comprehensive estimates of the C sequestration potential of rubber plantations over a period of 25 years in different SMUs in various locations. Rubber plantations of the central region sequestered around 20 per cent more C than the northern region and 12 per cent more than the southern region. Among the SMUs, the C sequestration potential of rubber plantation was the lowest in SMU 5, 6 and 7. The study thus yielded valuable information for developing site-specific integrated C conservation strategies from a more sustainable and climate change perspective.

Keywords: Carbon sequestration, Rubber, Soil available nutrients, Soil management units

INTRODUCTION

The impact of climate change on agroecosystems is a major concern worldwide and can have various effects on crop performance and ecosystem stability. In the traditional rubber growing tracts of India, rubber *(Hevea brasiliensis* Muell. Arg.) is grown in diverse soil and climatic conditions. The ideal climatic conditions required for optimum rubber growth are well distributed rainfall (RF) of 2000 mm or more without any marked dry season and 125 to 150 rainy days per year with maximum temperature of 29 to 34°C and minimum of 20°C or more (Webster and Baulkwill, 1989). Rubber plants can grow in a wide range of soils and it thrives well in deep and well-drained lateritic fertile soil with an acidic pH of 4.5 to 6. For identifying the suitable or non-suitable areas for rubber cultivation and introducing rubber in new

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