

# WATER USE BY NATURAL RUBBER TREES IN THREE DIFFERENT AGRO-CLIMATIC REGIONS OF INDIA

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Water mining by mature rubber trees grown under three different agro-climatic conditions, viz. traditional rubber growing region in Kerala, and two non-traditional regions, namely the hot and dry North Konkan region in Maharashtra and cold Sub-Himalayan region in West Bengal was measured using thermal dissipation probes (TDP). In Kerala and West Bengal, rubber trees were grown under rain fed conditions whereas in the drought prone Maharashtra, they were grown either as rain fed or irrigated (during rain-free summer months). The mean water mining rate was 22 L tree<sup>-1</sup> day<sup>-1</sup> in Kerala, around 23 L tree<sup>-1</sup> day<sup>-1</sup> in West Bengal and around 25 and 19 L tree<sup>-1</sup> day<sup>-1</sup> for irrigated and rain fed trees, respectively in Maharashtra. Water use efficiency (WUE) of mature rubber trees estimated as dry rubber production or tree biomass for a unit amount of water consumed varied between the three regions. In Kerala this worked out to be 8.0x10<sup>-4</sup> kg rubber kg<sup>-1</sup> water and 3.8x10<sup>-3</sup> kg biomass kg<sup>-1</sup> water whereas in the drought-prone Maharashtra WUE was very less (3.7x10<sup>-4</sup> kg rubber kg<sup>-1</sup> water and 2.0x10<sup>-3</sup> kg biomass kg<sup>-1</sup> water in rain fed and 4.8x10<sup>-4</sup> kg rubber kg<sup>-1</sup> water and 2.3x10<sup>-3</sup> kg biomass kg<sup>-1</sup> water in irrigated trees). In the case of cold prone West Bengal, WUE was 6.7x10<sup>-4</sup> kg rubber kg<sup>-1</sup> water and 3.4x10<sup>-3</sup> kg biomass kg<sup>-1</sup> water. Our results showed that the higher the rubber yield or biomass production, the higher the WUE and therefore, WUE of rubber trees is determined predominantly by rubber yield or biomass production rather than by the amount of water consumed.

**Key words:** Agro-climatic regions, Rubber tree, Thermal dissipation probes, Water use efficiency

## INTRODUCTION

There is a public perception that natural rubber (NR) cultivation results in depletion of ground water even as there is no scientific evidence to support this general contention. Natural rubber plantations occupy large areas of land which account for almost 21 per cent of the total cultivated area and

14 per cent of the total geographical extent of Kerala (MoE & F, Govt. of India, 2018). It is reported that ground water level has gone down in the state in recent decades (Shaji *et al.*, 2008). It is generally believed that when mature rubber trees are felled, water levels in the nearby wells go up. These empirical observations are often taken as

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