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**Soil carbon sequestration capacity in paddy soils of Kurunegala district, Sri Lanka with respect to its agro climatic regions**

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Paddy field ecosystems are considered as one of the major carbon pools as they store a significant amount of carbon under water-logged conditions. Hence, it is essential to understand the carbon storage capacity in paddy fields as this would help to identify the processes related to soil carbon sequestration potential in such ecosystems. However, the soil carbon content may vary with the prevailing climatic conditions of the site. Kurunegala is one of the districts in Sri Lanka with heavy paddy cultivation and also it experiences three different agro climatic conditions (Dry, Intermediate and Wet). This study aims to assess, how the soil carbon sequestration capacity in paddy soils would vary concerning three different agro climatic conditions in Kurunegala district. Adopting the conditional Latin hypercube sampling (cLHS) design, 200 soil samples were collected from two depths, surface soil layer (0 – 15 cm) and sub-surface soil layer (15 – 30 cm) so as to represent the agro climatic regions. Soil Moisture Content (MC), Soil pH and Electrical Conductivity (EC), Bulk Density (BD), Total Carbon (TC), Microbial Biomass Carbon (MBC), Labile Carbon (LC), Water-Soluble Carbon (WSC), Total Nitrogen (TN) were analyzed using standard protocols. Results showed that the total C and MBC contents were higher in the paddy soils collected from the wet zone climatic region and low soil pH (5.5-6.5) and anaerobic conditions prevailed could be contributing to this situation. Further, the Soil C stock (70.54 Mg ha<sup>-1</sup>) was higher in the wet zone climatic region compared to dry and intermediate climates. Increased TC content in paddy soils will cause to increase in the soil TN content too. Available P and NO<sub>3</sub><sup>-</sup> contents in the paddy soil were higher in the Intermediate zone but the pH and the EC were higher in the soils from the dry zone. In conclusion, the paddy soils under the wet zone climatic conditions showed a higher carbon stock and a high potential to retain soil carbon than those in the other two agro climatic regions.

**Keywords:** Climate change, Anaerobic conditions, Microbial biomass carbon, Soil carbon stock, Total carbon.

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