



## Mapping Spatial Variability of Irrigation Water Quality in Kamburupitiya Divisional Secretariat Area, Matara, Sri Lanka

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### ABSTRACT

Irrigation is a procedure of controlled run in multiple water sources in a judicious manner for maximizing crop production. Quality irrigation water is one of the essential inputs of agriculture for sustaining productivity, farmers' income and rural development. The present study was carried out to assess and map spatial variability of irrigation water quality in the Kamburupitiya divisional secretariat area for paddy by selecting seventy nine paddy fields located in 46 Grama Niladhari divisions (GN). The pH, EC (ds/m), salinity (ppt) and TDS (mg/l) were measured six times in all samples from September 2020 to February 2021 using EXTECH pH meter and WalkLAB Professional Conductivity-TDS-Salinity meter. About 20% of selected water samples (17 paddy fields) which reported the highest EC, pH, salinity and TDS were further analyzed for total hardness (TH), total alkalinity (TA), Calcium (Ca<sup>+2</sup>), Magnesium (Mg<sup>+2</sup>), nitrate-nitrogen (N) and total iron (TI). Sampling sites were tracked using Global Positioning System (GPS) while sampling. Spatial variation of pH, EC, salinity and TDS were mapped using ArcGIS software for the selected GPS points. As the maximum permissible levels of measured parameters for Sri Lankan irrigation water is not available, the mentioned parameters were compared with Sri Lankan drinking water standards except for EC. The mean EC of the study area was  $123.81 \pm 49.97$  ds/m while the maximum EC value recorded in the study area (Bibulewela GN division) was slightly higher than that of the WHO standards for drinking water. The mean values of pH was  $7.84 (\pm 0.32)$ . The maximum pH value of the irrigation water was equal to the upper limit of the SLS standard for drinking water. The salinity was in between 0-0.03 ppt while the TDS was in the range of 25.31 - 201.33 mg/l. Maximum values of the salinity and TDS were less than that of the SLS standard for drinking water. Furthermore, TH, TA, concentrations of Ca<sup>+2</sup>, Mg<sup>+2</sup>, N and TI in irrigation water were significantly different ( $p < 0.01$ ) from the recommended maximum permissible levels of drinking water. All measured values were lower than that of the SLS drinking water standards. Therefore, it can be concluded that the quality of the water supplied to the paddy fields in the Kamburupitiya DS division was at a satisfactory level except for the Bibulewela GN division, indicating its suitability as irrigation water for paddy production. This study suggests the importance of developing quality standards for irrigation water in Sri Lanka.

**Keywords:** *Irrigation water, maximum permissible levels, quality, salinity, SLS standards*