

Mapping Soil pH and Electrical Conductivity of Sugarcane (*Saccharam officinarum*) Land Using Arc GIS in Gal-Oya Plantation, Ampara, Sri Lanka

P.G.B. Priyadarshana¹, T.A.N.T Perera¹, W.M.C.J. Wijekoon¹,
D.G.P.G.C. Senevirathna², M.M.D. Surath Perera² and G.Y. Jayasinghe^{1*}

¹Faculty of Agriculture, University of Ruhuna, Sri Lanka

²Gal-Oya Plantation (Pvt.) Ltd, Hingurana, Ampara, Sri Lanka

*victorlion3000@gmail.com

Gal-Oya plantation (2750 ha) is one of the main sugarcane growers in Ampara district. The yield produced by the plants depends on several soil parameters. Objective of this study was to evaluate and map the soil pH and electrical conductivity (EC) distribution in the fields of Gal-Oya plantation and to examine the influence of pH and EC on crop yield. For the experiment, a total of 306 soil samples were collected at 15 cm and 40 cm depths from 49 blocks in the field. The GPS locations of the sample points were recorded. Soil pH and EC values were measured by using OHAUS Model ST300 meter. Soil texture was analyzed by using hydrometer method. Arc GIS 10.5 software and Google Earth Pro were used for spatial analysis. Soil pH and EC distribution map was developed by using Inverse Distance Weighting (IDW) interpolation method. The results showed that the, soil pH and EC do not have a significant influence ($\alpha = 0.05$) on the sugarcane yield of the study area. Soil pH at 15 cm and 40 cm depths were in the range of 5.7-7.3 and 5.8-7.8, respectively. The soil EC at 15 cm and 40 cm depths were in the range of 13.7 - 81.2 $\mu\text{S}/\text{cm}$ and 12.2-109.8 $\mu\text{S}/\text{cm}$, respectively. Soil pH at 15 cm and 40 cm depths had a positive correlation. Soil EC at 15 cm and 40 cm depths has a positive correlation as well. Gal-Oya Plantations consist sandy to clay loam soils according to the analysis. The organic matter content in the study area is relatively low (0.052% to 3.219%) and may lead to nutrient deficiencies and poor soil physical properties.

Keywords: Arc GIS, Inverse Distance Weighting, Organic matter, Soil EC, Soil pH