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Research Article

Mapping the Local Distribution of Some Physico-chemical Properties of the Soils of the Meriç Delta Using Geographic Information Systems (GIS)

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Abstract: The aim of this study is to analyse the some physical and chemical properties of the soils of the Meriç Delta, which is located in northwestern Türkiye and has a high agricultural potential, and to investigate the relationship between these properties and plant nutrients. Due to its alluvial soil, the Meriç Delta is a fertile agricultural area and the soil properties of the region directly affect agricultural productivity. In the study, pH, organic matter, lime and essential nutrients were analysed in 89 soil samples taken from 30 different sites at a depth of 0-90 cm. Soil texture, organic matter content, electrical conductivity and nutrient spatial distribution were mapped using Geographic Information Systems and correlation tests were carried out. The data obtained show that there is a strong positive relationship between the percentage of clay and organic matter, and that the percentage of silt is positively correlated with electrical conductivity (EC). A significant relationship was found between soil pH and organic matter, with higher pH values increasing the amount of organic matter. The results showed that nutrients such as nitrogen, phosphorus and iron are better retained in areas with high organic matter. In addition, high levels of electrical conductivity were found to reduce the bioavailability of zinc. A negative relationship was found between potassium and sand percentage and it was observed that the potassium ratio decreased as the amount of sand increased. The results of the study provide important data for improving the soils of the Meriç Delta for sustainable agricultural practices. Increasing soil organic matter content, optimising pH levels and maintaining nutrient balance are recommended to sustainably increase agricultural productivity. This study provides a valuable resource for improving the agricultural potential of the region and developing appropriate soil management strategies for sustainable agricultural practices.

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1. Introduction

The Meriç Delta is located in northwestern Türkiye and has a great potential for agricultural production. This delta offers a favorable environment for agricultural activities thanks to its soil structure