

ASSESSMENT OF FERTILITY STATUS OF SAU FARM SOILS AND DEVELOPMENT OF DATABASE

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Extended Summary

The project titled "Assessment of fertility status of SAU farm soils and the development of database" was carried out in Soil science Department of SAU. For this purpose, 108 soil samples from 54 plots at 1-15 and 15-30 cm depth, were analysed for soil texture, organic matter, pH, cation exchange capacity (CEC), total N, available P, K, S, Zn, Cu, Fe and Mn. Detailed information on the physico-chemical properties and nutrient status of the soils will certainly help the teachers and post graduate students to develop justified fertilizer trial for different crops. Development of database of soil testing results will offer a quick reference at a glance.

The objectives of the research project were – a) to evaluate major physico-chemical properties such as soil texture, pH, CEC, and organic carbon of surface and subsurface soil, b) to evaluate the nutrient status (N, P, K, S, Zn, Cu, Fe and Mn) of soil and c) to develop database of soil testing data of the research plots.

There are 54 plots in SAU farm (Fig-1, layout of the farm). Soil samples were at random collected from two depths (0-15 and 15-30 cm). Therefore there were 54x2 or 108 composite samples in total. The soil samples were analysed for soil texture, organic carbon, pH, cation exchange capacity (CEC), total N, available P, K, S Zn, Cu, Fe and Mn Zn, Cu, Fe and Mn by standard methods. Organic carbon was determined by Walkley and Black's wet oxidation method total N by micro kjelahl method, available S by turbidimetry method, available P by Olsen method (Olsen et al, 1954) and micronutrients (Zn, Cu, Fe and Mn).

Soil Texture

The percentage of sand in surface soil (0-15 Cm) ranged from 15.64 to 36.24 and that of subsurface soil (16-30 cm) from 21.64 to 40.24. In general, subsurface soil had higher amount of sand than surface soil. The percentage of silt in surface soil (0-15 cm) varied from 36 to 59.4 and subsurface soil (16-30 cm) contained 29.4 to 50.6 % silt. Mostly the surface had greater amount of silt than subsurface soil. The percentage of clay in surface soil (0-15 cm) ranged from 19.76 to 34.96 and that of subsurface soil (16-30 cm) from 17.76 to 46.96. More than half of the samples showed an accumulation of clay in the subsurface soil. Most of the surface and subsurface soils were Loam in texture. As the amount of clay increased with depth, some subsurface soil samples were classified as Clay Loam.

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Organic carbon: The percentage of organic carbon in surface soil (0-15 Cm) ranged from 0.247 to 2.15 and that of subsurface soil (16-30 cm) from 0.209 to 0.970. In general, surface soil contained higher amount of organic carbon than surface soil.

Soil pH: Soil pH ranged from 4.88 to 7.41 in surface soil (0-15 cm) and from 4.93 to 8.06 in subsurface soil (16-30 cm). In general, subsurface soil had higher pH than surface soil.

CEC (cmol/kg): CEC (cmol/kg) ranged from 13.17 to 23.31 in surface soil (0-15 cm) and from 11.84 to 31.31 in subsurface soil (16-30 cm). In general, subsurface soil had lower values of CEC (cmol/kg) than surface soil.

Total N (%): In the surface soil (0-15 cm) the highest value of total N was 0.1629% and the lowest 0.0187%. on the other hand, in the subsurface soil (16-30 cm) the highest value of total N was 0.0851% and the lowest 0.0187%. In general, subsurface soil had lower values of total N (%) than surface soil.

Available P (mgkg⁻¹): Available P (mgkg⁻¹) varied from 17.64 to 31.21 in surface soil (0-15 cm) and from 15.86 to 41.93 in subsurface soil (16-30 cm).

Available K (meq/100g soil): Available K (meq/100g soil) ranged from 0.120 to 0.212 in surface soil (0-15 cm) and from 0.108 to 0.285 in subsurface soil (16-30 cm). In general, surface soil had higher values of Available K (meq/100g soil) than subsurface soil.

Available S (mgkg⁻¹): Available S (mgkg⁻¹) ranged from 5.30 to 36.07 in surface soil (0-15 cm) and from 6.115 to 20.79 in subsurface soil (16-30 cm). In general, surface soil had higher values of available S (mgkg⁻¹) than subsurface soil.

Available Zn (mgkg⁻¹): Available Zn (mgkg⁻¹) ranged from 0.782 to 1.812 in surface soil (0-15 cm) and from 1.082 to 2.012 in subsurface soil (16-30 cm). In general, subsurface soil had higher values of available Zn (mgkg⁻¹) than surface soil.

Available Cu (mgkg⁻¹): Available Cu (mgkg⁻¹) ranged from 0.1753 to 1.5258 in surface soil (0-15 cm) and from 0.1483 to 1.6884 in subsurface soil (16-30 cm). In general, surface soil had higher values of available Cu (mgkg⁻¹) than subsurface soil.

Available Fe (mgkg⁻¹): Available Fe (mgkg⁻¹) ranged from 8.798 to 21.17 in surface soil (0-15 cm) and from 12.17 to 22.64 in subsurface soil (16-30 cm). In general, subsurface soil had higher values of available Fe (mgkg⁻¹) than surface soil.

Available Mn (mgkg⁻¹): Available Mn (mgkg⁻¹) ranged from 1.466 to 3.398 in surface soil (0-15 cm) and from 2.029 to 3.773 in subsurface soil (16-30 cm). In general, subsurface soil had higher values of available Mn (mgkg⁻¹) than surface soil.