FERTILITY CHARACTERISTICS OF SOME IMPORTANT SRI LANKAN SOILS AND THEIR ASSOCIATED ROCKS AND MINERALS

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An attempt is made to establish relationships between fertility characteristics of agriculturally important soils of Sri Lanka, and their associated rocks and minerals.

The most widely distributed soils in Sri Lanka are the Alfisols or Reddish Brown Earths of the dry zone, the parent material of which is residuum or colluvium from intermediate or basic, metamorphic crystalline rocks of the Vijayan Series and the Khondalite Series.

The surface horizons of these soils are slightly acid to neutral, while the sub-soils vary from acid to slightly acid. The C.E.C. varies from 10 to 20 m.e./100g soil, while the base saturation in sub-soils varies from 60 to 90 per cent, the dominant basic cation being Ca.

These soils are non-friable and have moderately slow infiltration rates, and water availability is low. Mineralogically the sand fraction is dominated by quartz; the other minerals are feldspar, mica, hornblende, rutile, zircon, ilmenite and magnetite. Kaolinite is the dominant clay mineral, but in addition mica, iron oxides and smaller amounts of smectite occur in the clay fraction.

The Non-Calcic Brown Soils of the dry zone are generally loose to very friable sandy loams of weak structure. They are slightly acid to neutral in reaction. Their C.E.C. values vary between 5 and 15 m.e./100g soil and base saturation in sub-soils is 50 to 70 per cent. The dominant basic cation is Ca.

Ultisols occur in the wet zone of Sri Lanka and support plantation agriculture that accounts for a significant proportion of foreign exchange earnings. The parent materials of these soils consist of residuum, colluvium or local alluvium derived from a wide variety of crystalline metamorphic rocks of Precambrian age. They are mostly weathered quartzo-feldspathic gneisses and biotite gneisses.

Ultisols are generally more acidic, relative to the alfisols and are more leached than the latter. They contain clay minerals of low activity, or clays of variable charge. These soils have CEC values of 5 to 15 m.e./100g soils. The base saturation in sub-soil horizons of these soils vary; prominent A_1 horizons have CEC values between

10 to 30 m.e./100g soils; base saturation between 5 to 10 per cent in the sub-soils. The dominant cations are Ca and Mg.

Mineralogically the ultisols contain sands composed of quartz, magnetite, ilmenite, sillimanite, rutile, zircon, garnet and the iron oxides. The clay fraction consists of kaolinite, gibbsite and iron oxides.

The oxisols, which are stated to be the most abundant soils of
the tropics, occur in Sri Lanka as superficial discontinuous deposits in the coastal regions of north-west, north and north-east Sri Lanka. Two or three deposits which resemble these red-earths also occur close to the south-east coast.

These red earths consists of uniform, red earthy material containing quartz, clay and iron oxides and small amounts of ilmenite, magnetite, spinel, zircon, garnet and monazite. The soil is very uniform and free of pebbles and there is no stratification or bedding. Usually a layer of ferruginous gravel and pebbles underlies the soil.