ABSTRACT

A detailed soil survey was conducted in an intensively cultivated rice-based cropping area of West Central Table Land agroclimatic zone of Orissa to characterize and classify the soils, evaluate fertility status and develop a suitable method of soil fertility classification. Biotite-gneiss is the predominant parent material of the upland (Pedon 1), midupland (Pedon 2) and midlowland (Pedon 3) whereas colluvium deposited over biotite-gneiss is the parent material of lowland (Pedon 4) soils. The predominant pedogenic processes for the first three land types is eluviation, illuviation, leaching and brunification whereas for the lowland it is enrichment and gleization. Prominent relationship has been observed between land types and soil characteristics. The degree of horizonation as expressed through the number of sub-horizons gradually increases along the slopes.

The upland soils (Nuapali series) are classified as fine-loamy, mixed, hyperthermic Ultic Haplustalfs; the midupland soils (Pardhiapali series) as fine loamy, mixed, hyperthermic Udic Haplustalfs; the midlowland soils (Sankarma series) as fine, montmorillonitic, hyperthermic Udic Haplustalfs and the lowland soils (Majhipali series) as fine-loamy, mixed, nonacid, hyperthermic Aeric Fluvaquents. Ten soil types were found in the study area divided into eighteen sample units.

Fertility status of the study area, with respect to four available macronutrients and four micronutrients viz. N, P, K, S and Fe, Mn, Cu, Zn, were evaluated and a fertility rating procedure for micronutrients was proposed. In the surface layer (0-15 cm), medium level of N and S, low level of P and K and sufficient level of Fe, Mn, Cu and Zn was most extensive covering 34.18 per cent area.

A system of soil fertility classification was proposed based on available nutrient levels; the categories of the system being class, subclass, group, subgroup, fertility management unit and detailed nutrient (management) unit. All the eighteen sample units of the area are assigned with nutrient values ranging from 1.75 to 2.50; thus remaining in the range of medium level (F2). The proposed system including sufficiency, limitation and nutrient levels is hoped to be of immense help for growing different crops.