

Research Application Summary

**Soil survey information for sustainable agriculture in Ikwuano local Government area Abia State South East Nigeria**

Nuga, B.O.<sup>1</sup> & Akinbola, G.E.<sup>2</sup>

<sup>1</sup>Faculty of Agriculture, University of Port Harcourt, Nigeria

<sup>2</sup>Department of Agronomy, University of Ibadan, Ibadan, Oyo State, Nigeria

Corresponding author: babatundenuga@yahoo.co.uk

**Abstract**

A semi-detailed soil survey of the land of Ikwuano Local Government Area Abia State South East Nigeria was undertaken. The soils were sampled with the aid of soil auger to identify major soil types and their morphological properties (e.g. soil colour, texture, consistence, structure). Pedons were dug in representative soil mapping units and analysed for morphology, physical and chemical properties. The soils were classified as inceptisols and appeared suitable for upland rice, cashew and cassava.

Key words: Abia State, Ahiara series, inceptisols, mapping unit, Port Harcourt, soil survey, suitability evaluation

**Résumé**

Une étude semi-détaillée du sol de la région d'Ikwano de l'Etat d'Abia au sud-est du Nigéria a été entreprise. Les sols ont été prélevés à l'aide de la foreuse du sol pour identifier les types principaux de sol et leurs propriétés morphologiques (par exemple, la couleur du sol, la texture, la cohérence, la structure). Les pédons ont été creusés dans les unités représentatives de cartographie du sol et analysés pour la morphologie, les propriétés physiques et chimiques. Les sols ont été classifiés comme inceptisols et semblent appropriés pour la culture du riz de montagne, de l'anacardier et du manioc.

Mots clés: État d'Abia, série d'Ahiara, inceptisols, unité cartographique, Port Harcourt, étude du sol, évaluation de convenance

**Background**

One of the challenges facing most developing countries is the the inefficient use of land resources that has resulted in reduced productivity and unsustainable natural resource use. Ensuring environmentally-sound land use practices is key for alleviating hunger and rural poverty. One of the aims of the United Nation Millenium Development Goals (MDG) is to half the world's extreme poverty by the year 2015.

Land is the most important endowment of Nigeria, providing livelihood to both the agricultural and non- agricultural sectors. But discriminate land use has led to the degradation of soils which is evidenced in low level agricultural production and associated high level of hunger and poverty.

An understanding of the characteristics and spatial distribution of soils is necessary for sustainable use and management of the resource while at the same time protecting and improving the natural environment and conditions of the locals. Soil resource inventory will guide decisions on land utilization in a way that will ensure optimal and sustainable use of the resource. This study therefore mapped, classified and assessed the potential of the soils in Ikwuano, Abia State, South East Nigeria for the production of some major crops as well as making recommendation for their sustainable use.

## Literature Summary

Escaping from the downward slide of poverty and resource degradation requires identification of suitable pathways that enable rural populace to develop production systems and livelihoods that respond to local conditions (Hazell *et al.*, 2001; Pender, 2004). Development pathways for such areas demand careful adjustment of resource use strategies using a portfolio of activities that guarantee food security and input efficiency (Ruben *et al.*, 2007).

Soil survey provides a systematic basis for the study of crop and soil relationships with a view to increase productivity and help in soil conservation and reclamation (Akamigbo, 2001). It has effectively supported agricultural and natural resources management for more than a century. Soil survey plays an important role in a research of land resource potency, especially for agricultural development. Soil, as a media for cultivation need to be surveyed thoroughly, in order to be used for its natural potential (Kundarto and Virgawati, 2010).

## Study Description

A soil inventory and evaluation was carried out in Abia State, South East Nigeria. The study area lies between latitudes 5° 20' - 5° 30'N and longitudes 7° 28' - 7° 42'E. It covers an area of about 310 sq km, with elevation ranging between 109 and 152 m.a.s.l. A semi detailed soil survey of the land was carried out to identify major soil types of the area and their morphological properties. Profile pits were sampled/studied for their morphology, physical and chemical properties (e.g.soil colour, texture, pH, CEC, OC, base saturation, etc). The pedons were

evaluated for pragmatic agricultural purposes, according to FAO methods. Data were analysed using descriptive statistics.

### Research Application

The soils were acidic with average pH range of 4.5 – 5.7. Cation exchange capacities of the soils ranged between 2.48 and 27.64 Cmol/kg soil. Base saturation of the soils ranged from 15.4 - 86.3%. Organic carbon ranged between 1.6 – 29.6 g/kg soil. The soils at the order level were classified as Inceptisols and at the series level as Ahiara series. The soils of mapping unit 1 were rated as highly suitable (S1) for upland rice, cashew and cassava but moderately suitable (S2) for oil palm and maize. Soils of mapping unit 2 were rated as highly suitable (S1) for cassava but moderately suitable (S2) for upland rice, cashew, oil palm and maize.

### Recommendation

The results of this study will be used for land use planning, policy formulation, maintenance and monitoring of land resources. It is recommended that organic matter (e.g. poultry droppings, crop residues, etc) be combined with lime to increase the soil pH and organic carbon content of the soil.

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