

SOIL FERTILITY INDICES OF SMALLHOLDER FARMS IN DABERAM IRRIGATION SCHEME, KATSINA STATE, NIGERIA

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Abstract

This study investigated the physical and chemical properties of soils on smallholder farms at the Daberam Irrigation Scheme in Katsina State, Nigeria. The objectives were to examine crops and cropping systems in practice, determine soil physical and chemical properties, and assess the soil fertility status and its impacts on crop yields. A descriptive research design was adopted, combining laboratory soil analyses with structured questionnaire surveys administered to 120 randomly selected farmers using stratified random sampling. twelve composite soil samples were collected using stratified sampling from four farm plots at a depth of 0–15 cm and analyzed for Soil pH, Organic Carbon (OC), Total Nitrogen (TN), Available Phosphorus (P), Cation Exchange Capacity (CEC), Water Holding Capacity (WHC), and Particle Size Distribution (PSD). Results indicated moderately acidic to near-neutral soils (pH 5.7–6.9), with moderate organic matter (mean 2.35%), medium total nitrogen (mean 0.34%), medium phosphorus availability (2.97g/kg, and low CEC (mean 9.51 cmol/kg) and correlation analysis showed pH and Nitrogen to be more relevant soil properties. Soil texture was predominantly loamy sand and sandy loam (mean sand 81.61%), indicating moderate soil fertility. Farmers cultivate onions, vegetables, and tomatoes under surface irrigation, with widespread use of combined organic and inorganic fertilizers. Conservation tillage, crop rotation, and cover cropping are commonly practiced. Key challenges include high input costs, soil nutrient depletion, limited soil testing, and low innovation adoption. The study recommends integrated soil fertility management, government input subsidies, expanded extension training, and promotion of soil testing to sustain agricultural productivity at the scheme.

Keywords: Soil Fertility; Physicochemical Properties; Irrigation Farming; Smallholder Agriculture; Katsina State; Integrated Soil Fertility Management