3 Soil Fertility Management in Africa: A Review of Selected Research Trials

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ABSTRACT

The increasing recognition of soil fertility depletion as the main biophysical factor limiting crop production in many African smallholder farms has raised interest in using data from past fertilizer studies to identify options for increasing agricultural production. This review of selected fertility research trials in sub-Saharan Africa reveals a pool of information (i) on the principles of fertilizer application for efficient nutrient use and (ii) on potential problems arising with continuous use of fertilizers in intensively cultivated systems. Adequate soil fertility for sustained crop yields can be obtained with combined use of mineral fertilizers and organic materials. Continuous use of N fertilizers can acidify soil, which then requires liming when organic inputs are limiting. Increased deficiencies of N, P, and other nutrients can be expected as a result of intensive cultivation and unbalanced fertilizer use. The use of mineral fertilizers by many smallholder farmers remains low because of socioeconomic constraints. This suggests that locally available organic materials will continue to be used as sources of nutrients. Future soil fertility trials should, therefore, particularly aim at identifying practices for judicious use of organic materials and their combination with mineral fertilizers. Shortcomings of past soil fertility research include limited economic analysis of results and use of trial sites and management that poorly represented those of smallholder farmers. Future research should strive for active participation of farmers, longer time frames to fully evaluate residual effects and rigorous economic analysis of results.

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