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Is Integrated Soil Fertility Management a Viable Pathway Towards the Sustainable Intensification of Smallholder Farming Systems in Sub-Saharan Africa?

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Abstract

Sub-Saharan Africa needs to produce more food, feed, and fiber to support its growing population and intensification of smallholder agriculture is a crucial component of any strategy towards this goal. Where intensification is desirable, Sustainable Intensification (SI) denotes a commonly accepted goal to achieve this but does not specify a priori how it should be approached. Three principles are usually considered for SI: (i) production of more food, feed, fuel and/or fiber per unit of land, labour, and/or capital used, (ii) preservation of important ecosystem services, including those governed by healthy soils, and (iii) resilience to shocks and stresses, including climate change.

Integrated Soil Fertility Management (ISFM) aims at increasing crop productivity and the agronomy efficiency of applied inputs but targeting appropriate combinations of improved varieties, fertiliser, organic resources, and other soil amendments, the latter as required based on site-specific constraints limiting crop productivity ISFM also targets scarcely available production resources within heterogeneous farming systems, thereby taking into account within-farm soil fertility gradients which are common feature of smallholder farming systems in densely populated, resource-limited farming landscapes. Examples are given on the performance of ISFM interventions with maize-legume and cassava-legume systems within heterogeneous farming environments.

Since ISFM is not addressing the provisioning of soil-based ecosystem services operating beyond an individual plot or farm, to achieve SI, other investments will be required that require interventions beyond individual farms, often based on collective action. It is argued that such interventions, in absence of incentives such as payment for ecosystem services schemes, will be of interest to smallholder farming communities once the productivity question is addressed.

Besides improving productivity while conserving/enhancing the natural resource base, SI also aims at increasing resilience to climate shocks and change. Adaptation to climate change at farm level often includes many of the elements that are key to ISFM, such as adoption of new crop varieties, adoption of mixed crop-livestock farming systems, optimised intercrop systems including trees and shrubs, and soil and water conservation practices. The 'climate-smart' nature of ISFM is briefly discussed.

Keywords: Capital, feed, fiber, fuel, healthy soils, labour, land, more food, resilience, soil and water conservation

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