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"Solidarity in a competing world — fair use of resources"

Impact of Soil Conservation Practices on Soil Health, Climate Smartness and Performance of Smallholder Farms in Western Kenya

Rolf Sommer[1], Job Kihara[1], John Mukalama[1], Anne Njeri Karanja[2], George Ayaga[3], John Nyambati[3], Birthe Paul[1]

[1] *International Center for Tropical Agriculture (CIAT), Kenya*
[2] *Kenyatta University, Kenya*
[3] *Kenya Agriculture and Livestock Research Organization (KALRO), Kenya*

Abstract

Sustainable agricultural intensification is one of the major concerns to meet the growing demand for food, while conserving the natural resource basis for future generations. Undoubtedly, soils provide the fundamental basis for food production. The continued loss of soils and soil fertility is jeopardising the sustainability of agriculture in many parts of the world, and sub-Saharan Africa (SSA) in particular. Here, limitations in soil organic matter, the loss of soil health and key nutrients are major factors constraining agricultural productivity.

The poster provides first insights of an in-depth research on the impact of best-bet conservation practices (zero-tillage, residue retention, manuring, liming and mineral fertiliser application) on soil health, climate smartness and performance of smallholder farming systems in western Kenya. Therefore, a range of soil biological and soil health indicators of contrasting treatments (business as usual vs. best bets) were assessed in CIAT and KALRO long-term trials as well as on farmer's fields, such as the microbial diversity, structure and composition, and indicators describing nitrogen use efficiency, as well as greenhouse gas emissions from soil, in particular nitrous oxide, and soil organic carbon sequestration (potentials). These were compared against crop yields and other farm household performance indicators, to evaluate potential tradeoffs between ecological sustainability, resilience, income, workload and farmer's acceptance.

Insights from this study will help fine-tuning and guiding future implementation of soil protection and rehabilitation measures in Kenya under the BMZ/GIZ global programme on Soil Protection and Rehabilitation for Food Security, as part of the German One World — No Hunger initiative.

Keywords: Kenya, rehabilitation, smallholders, soil protection

Contact Address: Birthe Paul, International Center for Tropical Agriculture (CIAT), Tropical Forages Program, Nairobi, Kenya, e-mail: b.paul@cgiar.org