Linking Knowledge to Action:

Co-developing best-bet options for integrated soil fertility management in agricultural landscapes of Africa

Project Summary

Blending local and technical knowledge is a key principle to foster relevant, credible and legitimate action research in development that increases adoption of improved management practices in agricultural landscapes. A recent review shows that little utilization of fertilizer in Africa and limited profitability driven by low fertilizer use efficiency are closely related, and linked to the failure to recognize differences in soil quality and the importance of complementary practices. The InPaC-S knowledge sharing methodological approach fosters co-learning between farmers and agricultural professionals (e.g. national research and extension, NGOs, universities, government, private sector) through a number of participatory tools that guide the development of simple indicators of soil quality to differentiate soil quality classes in-situ and to tailor best-bet integrated soil fertility management (ISFM) options that match different soil quality classes. Sets of 4 workshops conducted in Ghana, Tanzania and Uganda respectively (1 national workshop + 3 regional workshops led by trainees) will build the capacity of at least 225 agricultural professionals to use and teach the InPaC-S methodological approach and 2,160 farmers will make better informed decisions that improve their resource and nutrient input use efficiency by the end of the three year project.

Background

A participatory approach and a methodological guide were developed to identify and classify local indicators of soil quality and relate them to technical soil parameters, and thus develop a common language between farmers, extension workers and scientists. This methodological guide was initially developed and used in Latin America and the Caribbean-LAC (Honduras, Nicaragua, Colombia, Peru, Venezuela, Dominican Republic), and was later improved during adaptation and use in eastern African (Uganda, Tanzania, Kenya, Ethiopia) through a South–South exchange of expertise and experiences. The aim of the methodological guide is to constitute an initial step in the empowerment of local communities to develop a local soil quality monitoring and decision-making system for better management of soil resources. This approach uses consensus building to develop practical solutions to soil management constraints identified, as well as to monitor the impact of management strategies implemented to address these constraints.



Fig. 1: Grey-coloured soil in Busiu sub county, one of the project sites in Mbale district. indicating the low soil organic matter content

"Empowerment of local communities to develop a local soil quality monitoring and decision-making system for better management of soil resources"

Problem Definition

Soil fertility has been described as the single most important constraint to food security in sub-Saharan Africa (SSA). Sixty five percent (65%) of the agricultural land in SSA is classified as degraded and impacts the livelihoods of 1.5 billion people, often dis-proportionally affecting women and the poor. The human impact on the productive capacity of agricultural land in SSA is largely related to unsustainable soil management that contributes to loss of soil organic matter and nutrients, soil erosion and soil acidification. The soil resource constitutes the very foundation of agriculture and therefore sustainable agriculture is inherently dependent on soil fertility in the long term. Yields and crop response to nutrient input use depend on the soil fertility status of the agricultural plot. Therefore, we would expect farmers allocating nutrient inputs according to their perception of soil quality. However, a recent World Bank review using Living Standard Measurement Study – ISAI data representing a large section of SSA shows that fertilizer input use was virtually the same across plots of different soil quality.



Fig. 2: Low soil fertility is a major cause of low agricultural productivity in sub Saharan Africa

This finding reveals the high potential for low profitability resulting from most attention being focused only on increasing the quantity of fertilizer used by farmers. It further highlights the need for urgent attention to the soil condition, and complementary practices, to minimize trade-offs as part of a more holistic strategy to raise the efficiency of farmers' use of nutrient inputs, crop productivity and profitability contributing to food security and nutrition, as well as poverty reduction. This finding also signals a knowledge gap among farmers and raises important questions about the accuracy and drivers of farmer perceptions of soil quality. Furthermore, it stresses the need for capacity building of agricultural professionals (e.g. national research and extension, NGOs, universities, government staff, private sector) and farmer communities on soil fertility management and the need for investment in simple soil quality tests.

Objectives

The main objective of the project is capacity building of agricultural professionals from key national institutions in Ghana, Tanzania and Uganda and farmer communities in the utilization of a participatory methodological approach to mobilize and integrate local and technical knowledge on indicators of soil quality and soil fertility management. InPaC-S participatory tools (Barrios et al. 2011, 2012) will be used to co-develop simple indicators of soil quality to increase farmer's ability to discriminate among soil quality classes. Farmers and agricultural professionals would jointly and systematically tailor ISFM options for different soil quality classes. Tailoring of best-bet ISFM options according to soil quality classes, and other relevant context factors when needed, will ensure feasibility and the most efficient use of nutrient inputs and resources on-farm, thus contributing to increased profitability and poverty alleviation in farmer communities. New partnerships will be sought in each country that enable co-learning among research, development and private sector actors. Joint fund raising will be encouraged for large scale evaluation of best-bet ISFM options through planned comparisons as part of research-in-development efforts that improve the effectiveness and impact of scaling up efforts.

Methodology

The InPaC-S workshops involve: i) blending the knowledge and experience of farmers and agricultural professionals to generate simple soil quality indicators that are relevant, credible and legitimate, ii) systematically guiding the tailoring of best-bet integrated soil fertility management (ISFM) options. Different group dynamics are used to build the Participatory Space and learn from each other's backgrounds/experiences and foster team work for knowledge sharing through learning activities that build a basic common knowledge base on technical indicators of soil quality and soil fertility management. The preparatory phase is concluded by learning the InPaC-S tools to identify, classify and prioritize local indicators of soil quality. Knowledge sharing activities are organized with farmers representing different communities from the study area. Farmer priorities on local indicators of soil quality are summarized in the Synthesis Matrix, these local indicators are then linked to technical

indicators of soil quality that reflect different soil properties in the Integration Matrix, and finally, focusing on the status of soil properties modifiable through management, a basket of ISFM options is generated and captured in the Management Options Matrix. This last matrix guides the tailoring of ISFM options to soil quality classes and farmer's capacity to use inputs. All the information generated is shared with the farmer communities during the Soils Fair when farmers bring soils, indicator plants and soil organisms from their farms and split into four groups that rotate through thematic tables where simple soil quality assessment demonstrations are provided. One national InPaC-S workshop, followed by three regional workshops led by trainees in each country, would enhance the multiplicative effect of our training-of–trainers approach. The project is being impalement Ghana, Tanzania and Uganda. (Fig. 2). In Uganda, the sproject is taking place in Busiu and Busoba sub counties, Mbale district (Fig. 4).

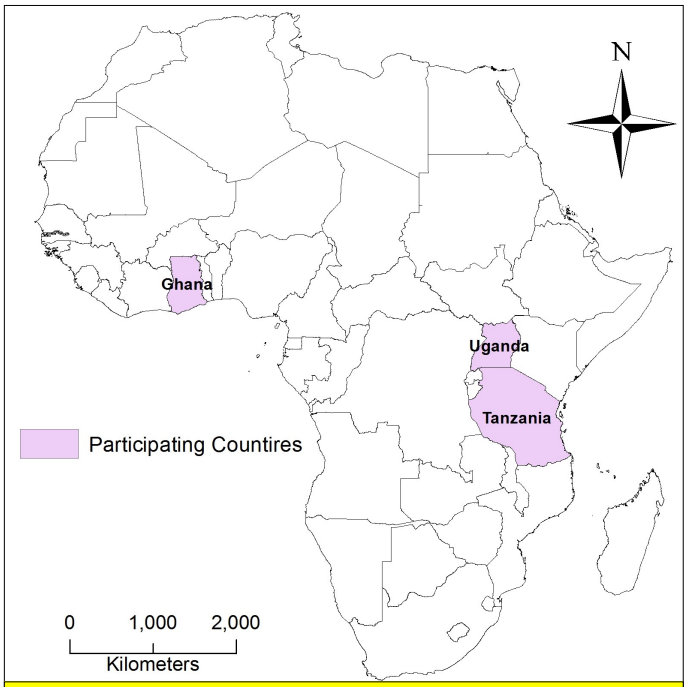

Fig. 3: Countries where the InPaC-S project methodology is being implemented

It is estimate that at least 225 agricultural professionals will be able to use and teach the InPaC-S methodological approach and at last 2160 farmers will be able to make better-informed decisions that improve resource and nutrient input use efficiency by the end of the three-year project. Farmer-to-farmer exchanges would likely contribute to indirect impacts that could double or triple the number of farmers directly reached. Special emphasis will be made to engage women farmers through facilitating mechanisms that allow their knowledge and experience to be integrated into decision-making processes affecting agricultural management.

Expected results

- Scaling up of the InPaC-S knowledge sharing methodological approach to integrate local and scientific knowledge on soil quality indicators and integrated soil fertility management that significantly builds and develops capacities of at least 225 agricultural professionals and 2160 farmers by the end of the three year project.

- Development of simple "hybrid-knowledge" indicators of soil quality to easily and accurately discriminate different soil quality classes in farmer's fields.

- Development of a basket of ISFM options tailored to match local soil quality classes and capacity to use inputs, but also taking into consideration gender aspects and linkages to markets.

- Increasing farmer's resource and input use efficiency thus contributing to profitability and poverty reduction in rural households across selected agricultural landscapes of Ghana, Tanzania and Uganda.

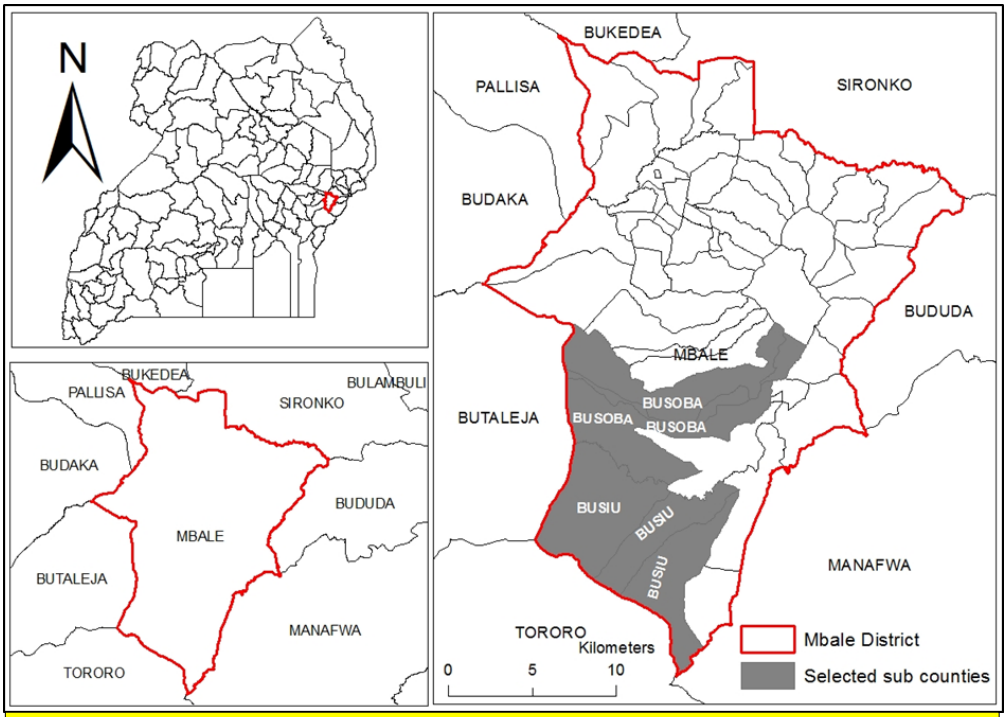

Fig. 4: Location of sites for the InPaC-S project in Mbale district, Eastern Uganda

- Development of new partnerships among research, development and private sector actors that encourage co-learning.

- Fostering agricultural intensification trajectories that have greater impact and are more sustainable through an effective and inclusive model of continuous learning and adaptation to context diversity.

Potential Development Impact

This project will contribute to enhance awareness about the importance of soil quality status in guiding agricultural management decisions that improve resource and nutrient input use efficiency, and consequently profitability which largely underpins the sustained adoption of improved soil fertility management practices. Fostering rural innovation through effective knowledge sharing in agricultural landscapes is our strategy to building the adaptation capacity of small farmers to global change. This involves, strengthening human capital through enhanced skills to develop and use an improved knowledge base that integrates local and technical knowledge. It also involves, strengthening social capital through enhanced consensus building capacities required to guide the scaling up of best-fit options that will benefit large numbers of farmer households. Coe et al (2014) highlight that successful scaling-up needs recognition of: i) the importance of the fine-scale variation in social, economic and ecological context in guiding local adaptation; ii) the importance of an enabling environment, and iii) a research design that enables co-learning among research, development and private sector actors. This requires participatory action research approaches like InPaC-S, that build on previous integrated systems approaches, to guide the embedding of research within development investments.

Sustainability

The InPaC-S participatory methodological approach contributes to building a network between Embrapa, ICRAF and key stakeholders from Ghana, Tanzania and Uganda sharing a common methodology to blend local and technical knowledge to assess soil quality classes on-farm, guide the tailoring of ISFM options by soil quality class, and improve resource and nutrient input use efficiency underpinning profitability. This methodological "bond" will facilitate the joint preparation of new proposals. Strong long-term collaboration between Embrapa Solos and ICRAF will facilitate the integration of lessons learned from joint efforts in the last 8 years into scaling up efforts in Africa, and ICRAF country offices will also play a facilitative role. Our training-of-trainers approach is expected to build a cadre of proficient InPaC-S trainers from Africa able to lead further scaling up efforts across the continent. We expect that during the lifetime of the project new partnerships will be built among research, development and private sector actors that will foster joint mobilization of funds for the deployment of large scale planned comparisons in the structure of development actions that allow the monitoring of performance of options in different contexts. This way, the effectiveness of development improves yearly, as we learn and get a better understanding of what works where and for whom.

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