Impacts of integrated soil fertility management on yield and household income: The case of Tamale (Ghana) and Kakamega (Kenya)

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Introduction

- Integrated soil fertility management (ISFM) has been widely promoted across Africa to improve soil fertility and hence crop yields.
- Still scant empirical evidence of its impact on crop yields and household income.

Aim of the study

- Assess the impact of ISFM adoption on maize yield and total household income.

Hypotheses

- ISFM adoption increases maize yield and household income.
- The effect increases with the number of ISFM components adopted.

Components of ISFM

- Application of chemical fertiliser
- Use of improved seeds
- Application of organic fertilizer
- Knowledge on how to adapt these practices to local conditions

➢ The progressive adoption of the different components maximizes agronomic efficiency.

Highlights

- ISFM adoption leads to higher yields in both Tamale and Kakamega, but increasing the number of ISFM components does not.
- At both locations, yield benefits did not translate into income benefits.
- From a farmers' perspective our results suggest that ISFM is not a particularly attractive choice.
- However, ISFM has positive environmental externalities, which might lead to positive effects for farmers in the medium to long term.

Data collection

- The study was conducted in Tamale, Ghana, and Kakamega, Kenya (Figure 1).
- Stratified random sampling
- Interviews with 285 farmers in Tamale and 300 in Kakamega.
- Collection of plot, farm, and household level data using questionnaires (Figures 2 and 3).

Data analysis

- Estimation of the average treatment effect on the treated (ATET) using inverse-probability-weighted regression adjustment (IPWRA).
- The IPWRA estimator combines regression adjustment and propensity score weighting.

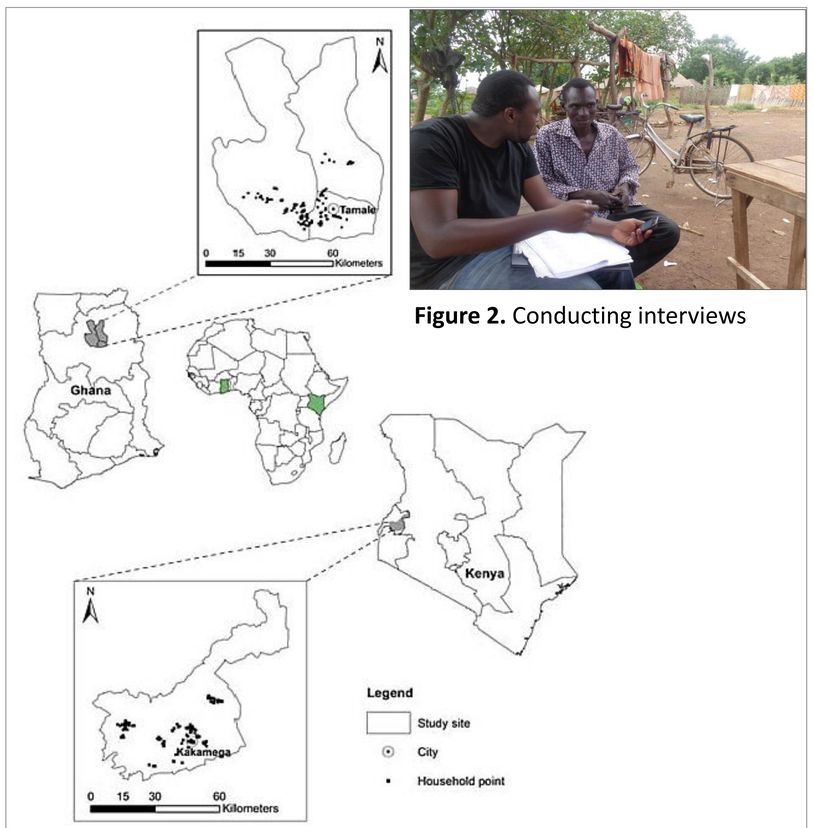

Figure 1. Maps of the study areas

Figure 2. Conducting interviews

Figure 3. Soil sample collection

Impact of adoption

- Yield effect of 27% in Tamale and of 16% in Kakamega (Table 1)
- No effect on household income

Table 1. Treatment effects for maize yields and household incomes in Tamale, Ghana and Kakamega, Kenya.

	Maize yield		Household income	
Treatment	Effect (log yield)	% change	Effect (log income)	% change
Tamale				
PA1/PA2/CA	0.19**	27.3	0.03	
PA2/CA	-0.01		0.03	
Kakamega				
PA2/CA	0.12*	15.5	0.19	
CA	-0.03		0.13	

Notes:
- PA1: partial adopter 1 (adoption of 2 components); PA2: partial adopter 2 (adoption of 3 components; CA: complete adopter (adoption of all 4 components)
- **: p<0.01; *: p<0.05

Adoption of ISFM

- Higher share of non adopters and low share of complete adopters in Tamale, Ghana.
- Hardly any non adopters in Kakamega, Kenya.

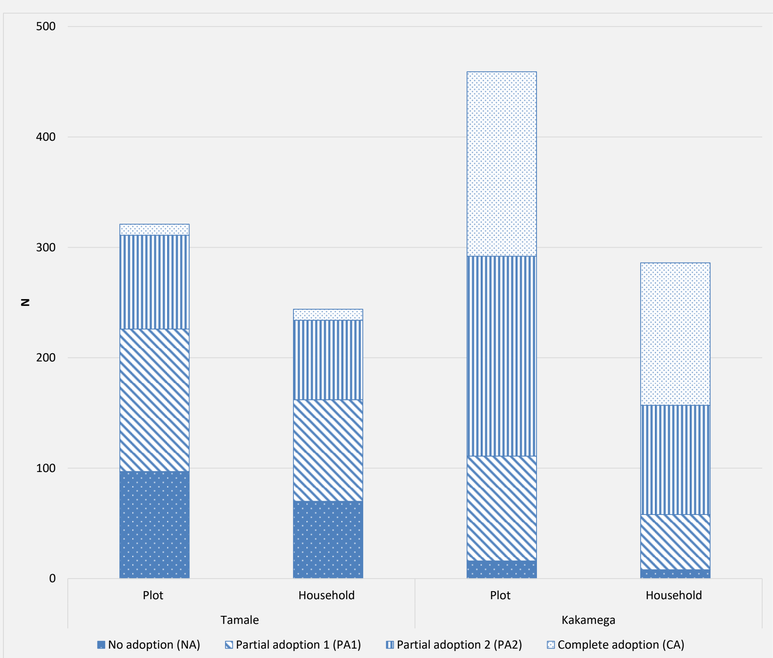

Figure 4. Adoption of ISFM components at plot and household level

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Details can be found in

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