

Assessment of socioeconomic characteristics and adoption of sustainable land management practices in northern Ghana: the case of legume and cereal farmers

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Introduction

Soil depletion rate in Ghana is high, estimated at 35kgN, 4kgP and 20kg K per hectare. This situation is further worsened in the northern part where there is severe soil erosion and land degradation in various forms resulting in food deficit and a subsequent food insecurity. Integrated Soil Fertility Management, ISFM, which encompasses several components is a sure way to maintain soil fertility and Northern Ghana has enjoyed relatively high successes in the implementation of the technology (Vanlauwe et al., 2015). BUT, full adoption of the ISFM package is minimal. This study sets out to identify component of ISFM practiced by smallholder farmers and identify the factors that determine the full adoption of ISFM in the Northern part of Ghana.

Study location

The study was carried out in four out of the five regions in Northern Ghana namely Upper East, Upper West, North East and Northern regions which are situated within two agroecological zones: Sudan and guinea savannah. The sampling frame for this study was smallholder cereal and legume producers. A multistage sampling procedure was used and, data was collected from 288 farmers through fact to face interviews.

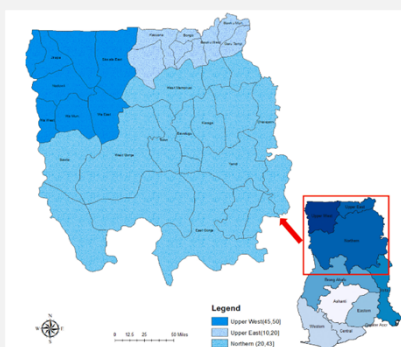
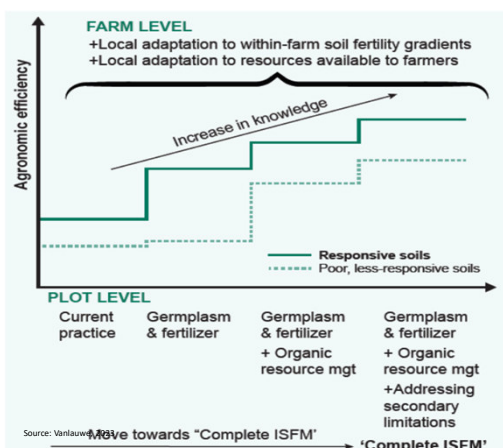


Table 2: ISFM practices adopted by farmers

ISFM Practice	Pooled data	Rice farmers	Maize farmers	Groundnut farmers	Cowpea farmers
Non-application of fertilizer	37.15	37.84	33.19	41.95	34.92
Use of only organic fertilizer	26.04	33.33	28.38	29.89	39.68
Use of only inorganic fertilizer	50.69	51.35	58.08	53.45	47.62
Use of both inorganic and organic fertilizers	40.97	55.86	44.10	41.95	76.19
Non-application of fertilizer and hybrid seeds	33.68	34.23	33.19	37.36	36.51
Use of organic and hybrid seeds	37.85	49.55	41.92	39.66	82.54
Use of inorganic and hybrid seeds	15.28	22.52	18.78	16.67	31.75
Use of both organic and inorganic and hybrid seeds	39.93	51.35	44.54	40.23	79.37
Use of inorganic and hybrid seeds	45.14	52.25	51.09	47.70	74.60

Source: Analysis based on field survey



Highlights

- ISFM adoption can be enhanced by facilitating land regimes that makes it easier to acquire and own farmlands for cultivation.
- This can be achieved through appropriate land reforms at the local and national level.
- Young farmers are more likely to adopt new farm practices including ISFM, there is the need to encourage the youth who show interest in farming by facilitating their land acquisition and ownership.
- The adoption of ISFM can be promoted through increase contact with extension agents who can offer training to bridge the gap in limited knowledge in land management.

Method

- The sampling frame - smallholder cereal and legume producers.
- Multi-stage sampling procedure
- Sample size: 288

3 stage least square regression

$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_i \end{bmatrix} = \begin{bmatrix} Z_1 & 0 & \cdots & 0 \\ 0 & Z_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & Z_i \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_i \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \vdots \\ \epsilon_i \end{bmatrix}$$

$$y = Z\beta + \epsilon$$

Table 1: Determinants of ISFM adoption

Explanatory variables	None	Only inorganic	Organic & inorganic	Organic, inorganic & hybrid seeds
Gender	-0.344 (0.304)	-0.049 (0.510)	-0.869 (0.196)**	-1.299 (0.457)*
Age	0.007 (0.008)	-0.002 (0.012)	-0.024 (0.006)**	-0.029 (0.009)**
Farm size	0.036 (0.023)	0.005 (0.039)	0.020 (0.014)	0.054 (0.025)**
Land ownership	-0.503 (0.208)**	-0.645 (0.381)*	0.843 (0.169)**	-
Extension contacts	-	-0.613 (0.671)	1.231 (0.196)**	1.323 (0.268)**
Access to loan	0.427 (0.292)	0.085 (0.713)	-0.252 (0.260)	-1.181 (0.466)**
Constant	0.945 (0.496)	0.801 (0.839)	1.073 (0.377)**	-
Sample size	288	288	288	288
Parms	13	13	13	12
RMSE	0.293	0.345	0.222	0.293
R-squared	0.446	0.512	0.802	0.636
Chi-squared	48.01***	20.97*	104.85***	54.58***

Error probabilities: ***p<0.01, **p<0.05, *p<0.1,

Source: Analysis based on field survey

Acknowledgements



Field assistance