

The influence of farming practices on okra yield at farms in Kilombero, Tanzania

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Introduction

- Okra (*Abelmoschus esculentus*) is an economically important and highly nutritious vegetable crop grown in tropical and sub-tropical regions.
- Climate change is projected to significantly modify agricultural systems, posing a risk to farmer livelihoods and food security.
- Sustaining and managing ecosystem service provision by nature might help increase resilience in agricultural systems.
- Agro-ecological intensification implies the reduction of agriculture's negative impacts and dependency on external inputs through the integration of ecological principles.
- Okra is one of the crops that could benefit from higher farm resilience, due to its dependency on ecosystem services, including pollination.

Research Objective

Describe how farming practices are influencing crop yields in the context of smallholder farming in rural Tanzania, focusing on okra, a common staple crop with a rich nutritional composition.

Methodology

Four wards in north Kilombero District, Morogoro Region. 58 surveys to okra farmers (25 women). Voluntary and informed consent obtained beforehand.

Linear model with Gaussian distribution used to assess how farming practices influenced estimated okra yield. Model selected through backward elimination using the Akaike information criterion.

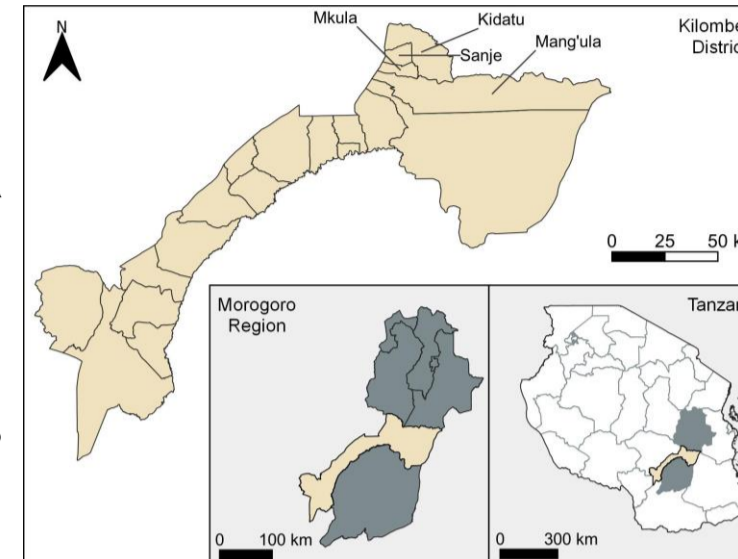


Fig.1: Map of the study area.

Estimated annual okra yield (in kg) has our response variable. The full model included the variables in Table 1 as predictors.

Table 1: Variables used in the full model before model selection through backward elimination.

Variable	Definition	Range	Mean (SD)
Estimated okra yield	Estimated annual okra yield (in kg)	20 - 3000	447.8 (567.2)
Okra variety	Binary variable; 1= if variety described as "kisasi" or long plant/fruit	0 - 1	0.6 (0.5)
Okra seeds	Number of seeds sowed in same hole	1 - 5	2.8 (1)
Pest management	Binary variable; =1 if farmer used traditional pest management practices	0 - 1	0.4 (0.5)
Soil practices	Number of different soil management practices used at farm-scale	0 - 4	1.8 (1.1)
Agroecological practices	Number of different agroecological practices used at farm-scale	2 - 9	4.5 (1.9)
Insect damage	Ordinal variable; 1= moderate, 2= severe okra damage due to insect pests	0 - 2	0.8 (0.5)
Sowing decision	Binary; 1= if decision to sow okra was motivated by weather conditions	0 - 1	0.6 (0.5)
Advice	Binary; 1= farmer received farming advice last 3 years	0 - 1	0.4 (0.5)
Synthetic inputs	Number of different synthetic inputs used at farm-scale	0 - 4	2 (1.3)

Results

1) Adoption of agro-ecological practices in smallholder farms improves okra yield. **2)** Adjusting the decision on when to sow okra seeds based on weather conditions also benefits production. **3)** Sowing too many seeds in the same spot negatively affects okra yield.

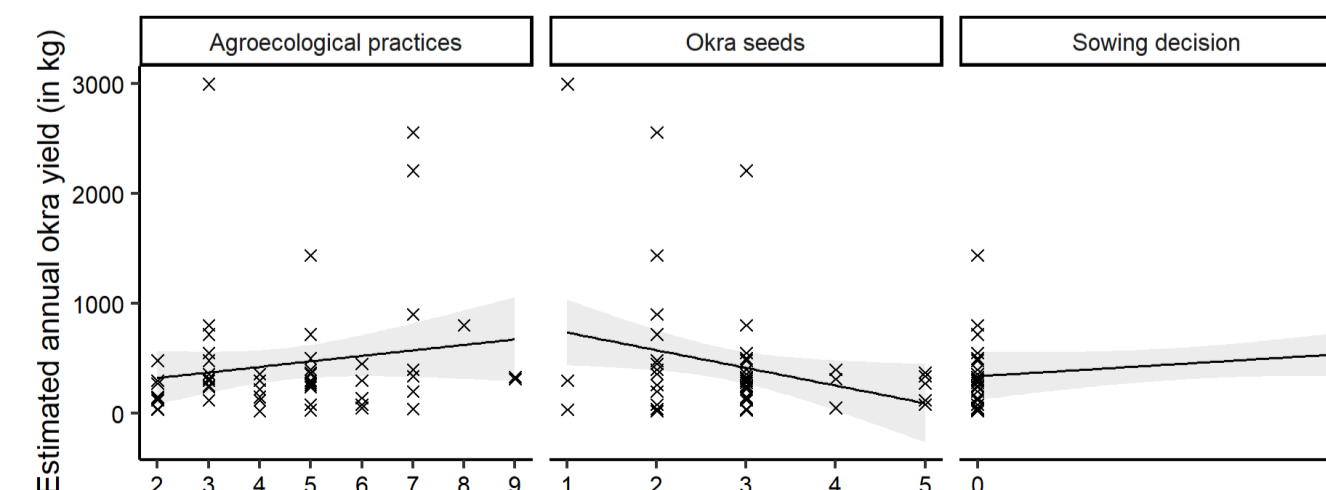


Fig. 2: Number of agro-ecological practices, number of okra seeds sowed in same hole, and sowing decision primarily based on weather conditions (1= yes) plotted against estimated okra yield.

Discussion

- This exploratory analysis provides empirical evidence suggesting that higher sustainability in agricultural systems does not necessarily come at the expense of production goals.
- Further research needed to clarify how different shades of agro-ecological management might affect agricultural production, including okra, in varying socioecological contexts and regions.
- We recommend an integrated approach to okra farm management, taking into consideration environmental and social factors, preferably along an extended timeframe, fully acknowledging synergies and trade-offs occurring at farm scale, which ultimately influence the food security and well-being of smallholder farmers.

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