Economic Analysis of Fertilizer Options for Maize Production in Tanzania

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Key messages

- ✓ Most of the fertilizer options under this study are better than farmers' practices in terms of net benefits, returns to labor, and benefit-cost-ratio
- ✓ DAP, Minjingu Mazao and Minjingu granular can be taken as good options in view of less risk farmers whereas a combination of manure & Minjingu mazao would dominate the others for highly risk averse ones.
- ✓ The two fertilizer options under up-scaling (Minjingu Mazao and DAP) are superior to farmers practices in terms of yield and net return as evaluated by farmers

Objectives and approach

The objective of this study is to compare different fertilizer options in terms of financial benefits in maize production. The fertilizer options are displayed in Table 1. Improved maize varieties (SC627 and PAN691, depending on location) were intercropped with pigeon pea in all fertilizer options studied. We used data from agronomic trials in 2014 and 2015 in five villages of Babati district. In addition, we conducted participatory cost benefit analyses with 20 groups of farmers who tried the fertilizer options on their farms. We used three economic parameters for comparison i.e. gross margin, returns to labor, and benefit cost ratio based on analysis of variance. Moreover, we conducted stochastic efficiency analysis with respect to a function (SERF).

Key results

Results show that all of the new soil fertility management options would result in significantly higher financial benefit than the farmers' practice. The exception is the 6t/ha manure option which would yield even lower than the farmers' practice (Table 1). The differences are clearly visible from the cumulative distributions (Figure 1). The SERF results show that Minjingu Mazao is the most risk efficient option relative to the farmers' practice. However, combining Minjingu Mazao with farm yard manure would be the most preferred one for more risk averse farmers while Minjingu Mazao would take the next position (Figure 2).

Significance and scaling potential

The little use of inorganic fertilizer in Tanzania has hampered productivity growth among the smallholder farmers. Our results indicate that the use of inorganic fertilizer would increase productivity and income. Therefore, the scaling of such scientifically proved technologies would be useful to enhance food security and reduce poverty among smallholder farmers.

Table 1: Mean financial benefits of fertilizer options

Practice	Gross margin (TZS/ha)	Returns to labor (TZS/pd)	BCR
Farmers' practice	57272[b]	3909[b]	1.06[b]
	(327078)	(3594)	(0.63)
Diammonium Phosphate (DAP)	571387[a]	8529[a]	1.71[a]
	(415875)	(3781)	(0.55)
Minjingu rock phosphate	564873[a]	8470[a]	1.67[ab]
	(371488)	(3377)	(0.46)
Minjingu Mazao	573251[a]	8546[a]	1.66[ab]
	(358618)	(3260)	(0.43)
Minjongu Mazao + farm yard manure (3t/ha)	451631[a]	7440[a]	1.50[ab]
	(289975)	(2636)	(0.34)
Farm yard manure only (6t/ha)	-76919[c]	2635[c]	0.83[c]
	(154341)	(1403)	(0.24)

Note: means with similar letters are not significantly different from each other at 5% alpha level; Pd= personday; Figures in parenthesis are standard deviations.

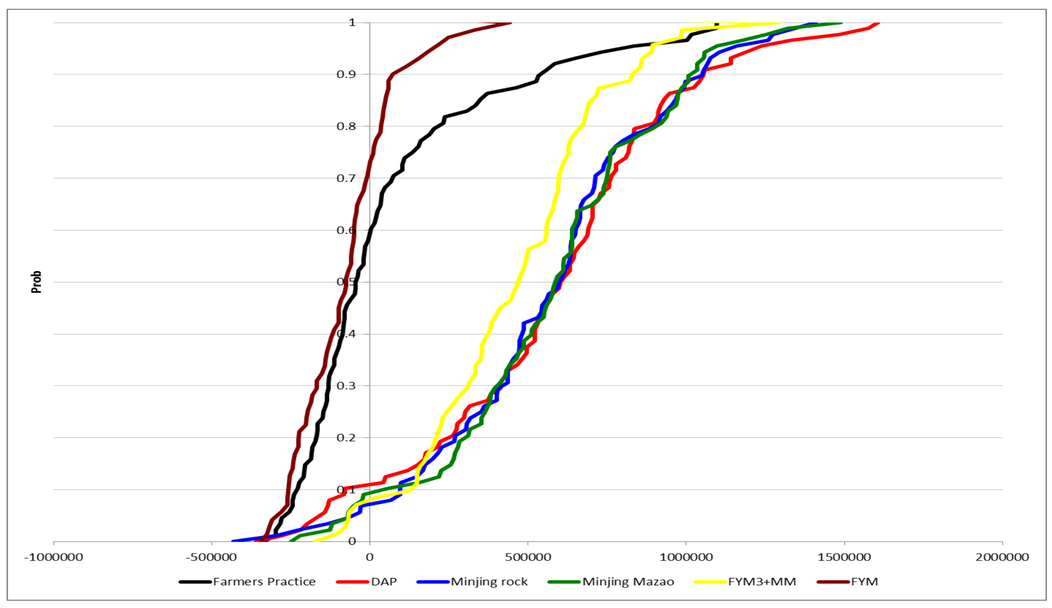

Figure 1: Cumulative distributions of gross margins for fertilizer options

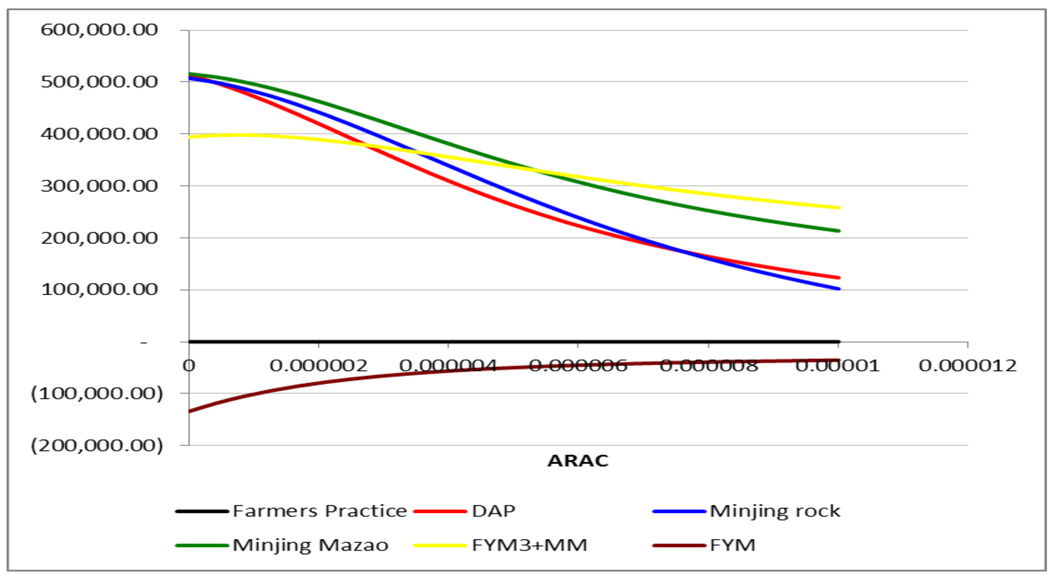

Figure 2: Risk premium of fertilizer options relative to farmers' practice

Partners

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