

Calling for mechanization: farmers' willingness to pay for small-scale maize shelling machines in Tanzania

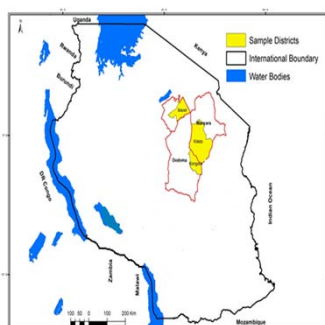
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Introduction

Maize shelling is one of the labor-intensive and arduous activities among smallholder farmers in Tanzania. There are possibilities to mechanize maize shelling. This study explores farmers' willingness to pay (WTP) for small-scale maize shelling machines and identifies factors affecting their WTP.



The study areas and methods



The study was conducted in Babati, Kongwa, and Kiteto districts of Tanzania (Fig. 1). We collected survey data from 400 randomly selected men and women farmers. A diesel-powered machine and an electric-powered machine were considered.

Fig. 1: Location of the study areas in Tanzania

We used a double-bound dichotomous choice questionnaire design to collect data (Cameron & Quiggin, 1990) on three business models, namely: (1) the rental service model (RSM), (2) the group ownership model (GOM), and (3) the private ownership model (POM). We used interval regression model to identify the factors affecting farmers' WTP for maize shelling mechanization under different business models (Cawley, 2008). Based on the results of the regression model, we estimated the mean WTP.

Results

The results of the regression analysis are displayed in Table 1. The columns show results corresponding to the diesel machine (DM) and the electric machine (EM) for alternative business models. Some of the results are:

- WTP is lower for households having relatively abundant labor while it is higher for those experiencing higher labor cost
- Men are more likely willing to pay than women in the case of private ownership model which requires higher capital
- Older people are less likely to pay for shelling machines than young ones
- Households having more wealth are more willing to pay in the case of the private and the group business models

Table 1: Results of regression model and estimated WTPs

	RSM	GOM-DM	POM-DM	GOM-EM	POM-EM
Livestock ownership	Resource		▲	▲	▲
No. of active male	Labor				
No. active female		▼			
Labor land ratio		▼		▼	▼
Hired labor cost			▲		▲
Machine experience	Experience		▲		
Tillage mechanization					
Male respondent	Farmer demography			▲	▲
Age of respondent		▼	▼	▼	▼
Babati district		▲		▲	▲
Kiteto district	Location	▼			
WTP (TZS) (mean)*		1,240	150,308	714,007	68,324
Market price (TZS)	1,000	140,000	1.4 million	43,750	350,000

* WTP estimates written in blue color are significantly different from market price.

▲ Positively influence WTP ▼ Negatively influence WTP ◻ Does not influence WTP

Conclusion

Our results show that several factors affect farmers' WTP for maize shelling mechanization. The mean WTPs are equal or greater than the market price except in the case of the POM-DM which requires high capital. The three business models could be feasible options to promote mechanization of maize shelling in the areas.

References

- T.A., & Quiggin, J. (1990). Estimation using contingent valuation data from 'dichotomous choice with follow up' questionnaire. *J. Env. Econ. & man.*, 27, 218-34.
- Cawley, J. (2008). Contingent valuation analysis of willingness to pay to reduce childhood obesity. *Econ. Hum. Biol.* 6, 281-292.