Farmers' willingness to invest in mechanized maize shelling and potential financial benefits: evidence from Tanzania

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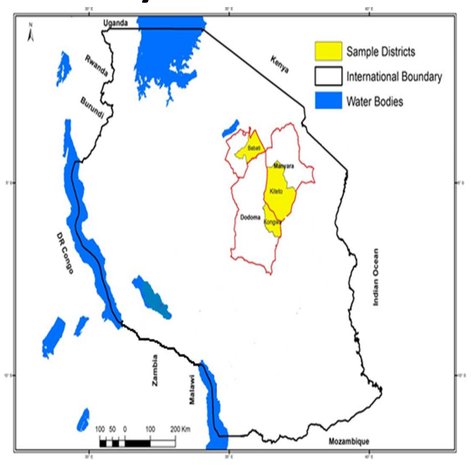
1. Introduction

Sub-Saharan Africa has the least mechanized agriculture in the world. However, the situation has changed since recently in favor of mechanization while limited empirical evidence is available on how mechanization can be enhanced among smallholder farmers. This study explored farmers' willingness to invest (WTI) in mechanization services by considering the group business model (GBM) and the individual business model (IBM) of mechanized maize shelling in Tanzania. Moreover, it analyzed the potential financial benefit for those farmers who would like to invest in mechanized maize shelling.

2. Study location and methods



The study was conducted in Babati, Kongwa, and Kiteto districts of Tanzania(Fig. 1). We collected data from 400 randomly selected farmers through face-to-face interviews.

Fig. 1: Location of the study areas in Tanzania

The willingness to invest analysis was done based on the survey data collected considering a diesel-powered machine with a 4hp engine capacity (Fig 2). The double-bound dichotomous choice questionnaire design to collect the data. We used interval regression model to identify the factors affecting farmers' WTP for maize shelling mechanization under different business models. The potential financial benefit from adopting the machines based on a mathematical model tailored for this purpose.

Results

a) WTI Analysis

The results of the WTI analysis show that:

- Farmers having better formal education, greater wealth, and experience in using shelling machines, and those who experienced the high cost of hired labor, had the highest probability of investing in mechanized maize shelling within the GBM.
- Male-educated farmers who had better wealth and experience in using maize shelling machines, but encountered labor constraints in their farming, were more likely to go for the IBM.
- About 65% of the sample farmers are willing to invest in mechanized maize shelling within the GBM, while about 10% of them would like to do so within the IBM

Fig 2. Diesel-powered machine on operation, input (left side) and output (right side)

b) Profitability analysis

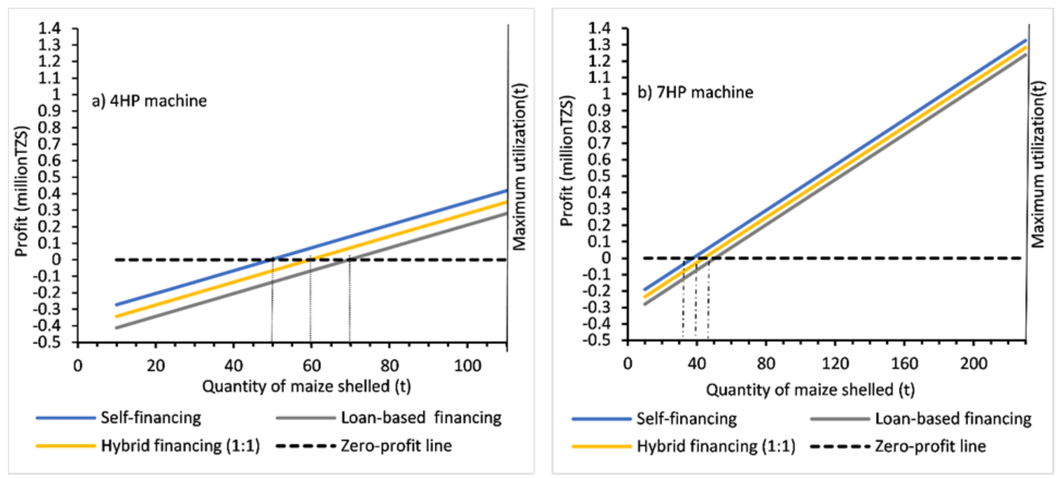


Fig. 3: Profitability of selected small-scale maize shellers, 4hp and 7hp engine capacity

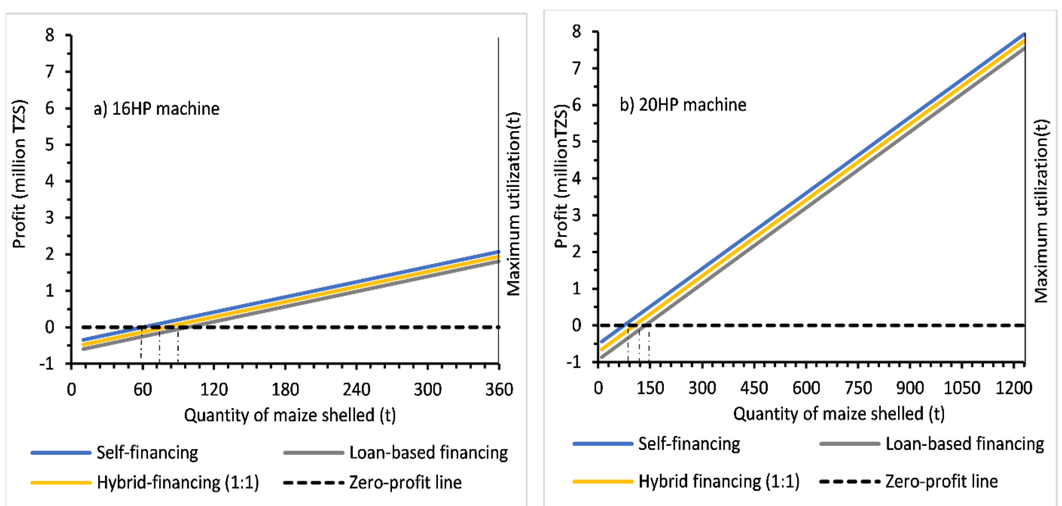


Fig. 4: Profitability of selected medium-scale maize shellers, 16hp and 20hp engine capacity

Conclusion

- The farmer-to-farmer (FtF) strategy can be used to promote mechanical maize shelling in rural Tanzania
- Both GBM and IBM are feasible to enhance maize shellers among farmers, but the GBM is better in terms of attracting more farmers
- Maize shellers of various capacities can be promoted as they are financially feasible.

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