

Abstract

The efficiency of crop production has important implications for farm yield and productivity; however, little is known about the efficiency of bean production in Uganda. This study evaluated factors influencing technical efficiency among smallholder farmers in eastern Uganda where bean growing is common to over 80% of the population. Technical efficiency measured the ability of a farm to produce the maximum possible yield given the available production inputs and technology. To assess the technical efficiency, data was collected in 2010 on a sample of 280 farming households using a multistage sampling technique. A tobit model was used to analyze the data for determinants of technical efficiency. Results showed that technical efficiency was likely to decline by 2% when age of farmer increases by 1 year, possibly due to reluctance to take up new technologies. In addition, a one hectare increase in farm size is likely to increase technical efficiency by about 1.5%. A one dollar increase in asset values was likely to increase efficiency by about 2.4%. Similarly, having access to extension services was likely to increase efficiency by over 6%. Finally, being a member of a producer group was likely to increase the technical efficiency of members by over 14%. Based on these results, there is need for increased provision of extension service and training on proper crop management and improved farming technologies to increase bean productivity. On the other hand, there is need for a programme to effectively disseminate seed of new, improved, bean varieties to farmers all over the country to improve farm yields.

Key results: Farm-specific efficiency scores across districts

District	TE		ANOVA	
	Mean (%)	S.D	F-Ratio	Sig.
Mbale	51.84	19.44	1.595	0.191
Busia	48.48	21.60		
Tororo	45.39	21.79		
Budaka	41.44	17.02		

t- test for Mbale and Budaka: t-ratio= 2.208; Sig=0.035**



Fig. 2: Mukuna, one of the cover crops used by farmers in Uganda



Fig 3: Knowledge sharing time for farmers in Eastern Uganda

Materials and Method

- The study areas were Mbale, Tororo, Busia and Budaka districts in Eastern Uganda where bean growing is common. This region is dominated by small scale farmers with limited resources and produce the crop under unfavourable conditions. The average plot sizes range between 0.1 & 0.5 ha.
- Multistage sampling technique used with purposive sampling of districts and simple random sampling at the sub-county, parish and village levels for each district; followed by random selection of 280 smallholders.
- Data collected using personally administered questionnaires in 2010 included common bean farming operations and household characteristics among other factors.
- In the analysis, a stochastic frontier model and a Tobit model were used.



Fig 1: A bean crop at one the homes in Uganda

- Technical efficiency levels did not vary significantly across districts. However, Mbale had the highest average technical efficiency levels (51.84%) among bean farms, while Budaka had the least efficient bean farms with a mean of 41.44%.
- In fact, there were differences between the lowest and highest technically efficient districts: the average technical efficiency levels between Mbale and Budaka were significantly different. This is attributed to Mbale having the highest bean productivity per ha, while Budaka was the least productive.

Tobit regression estimates of factors influencing technical efficiency

TE	Coefficient	t
Sex (1=Female)	0.020	0.720
Age (years)	-0.002	-1.720*
Schooling (years)	0.002	0.510
Occupation (1=Farming)	0.000	-0.070
Farming (years)	0.000	0.440
Farm size (ha)	0.015	1.810*
Off-farm Income (Ush)	0.017	1.640
Asset value (Ush)	0.024	2.910***
Distance to market (km)	-0.008	-2.360**
Extension service	0.064	2.550**
Group membership	0.144	2.030**
Credit (Ush)	-0.001	-0.680
Constant	0.060	0.430
Log likelihood =	58.019	41.460
Pseudo R ² =	-0.556	0.000

Conclusions

Bean productivity was significantly influenced by plot size, ordinary seeds, certified seeds and planting fertilizer. The mean technical efficiency among bean farms was 48.2%. Half of the farms had technical efficiency scores exceeding the 50% limit and could easily improve to the level of the most efficient farm. Finally, in the Tobit results technical efficiency was positively influenced by value of assets (at 1% level), extension service and group membership (at 5% level); and negatively influenced by age and distance to the factor market at 10% and 5% levels respectively.

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