

# Analysis of Technical Efficiency of Smallholder Sorghum Producers in Machakos and Makindu Districts in Kenya

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## Abstract

Majority of the rural households in Kenya depend mainly on agriculture as a source of food and livelihoods. Agricultural productivity has been declining due to many factors including climate change. Declining agricultural productivity has in turn resulted in increased food insecurity in the country. Consequently, there is a renewed interest in promoting drought-tolerant crops such as sorghum, which are known to perform well in the arid and semi-arid lands of the developing world. Owing to its ability to thrive in drought prone and low input conditions, sorghum production has been widely promoted among smallholder farmers in the arid and semi-arid parts of Kenya. However, performance of sorghum production among the smallholder farmers has remained low. This study was carried out to determine the technical efficiency of sorghum production among smallholder farmers in Machakos and Makindu districts in Kenya. Multistage sampling technique was used to sample a total of 143 sorghum-farming households; 71 households in Makindu district and 72 in Machakos district as representative samples. A semi-structured questionnaire was administered to collect data and information on farm inputs and outputs; and on farm and farmer characteristics. Data Envelopment Analysis technique was used to estimate efficiency scores, while a Tobit regression analysis model was used to determine the influence of farm and farmer characteristics on the technical efficiency. Result highlights showed that the average technical efficiency achieved overall in both districts was 41%. This implies that technical efficiency in sorghum production in Machakos and Makindu districts is low and could be improved by 59% through better use of available resources given the prevailing state of technology. Research findings suggest that technical efficiency was positively influenced by various farm and farmer characteristics such as land sizes planted with sorghum and use of manure; and formal education of the household head, household size, years of sorghum farming experience, membership to farmer associations, hired labour, and production advice given to farmers. It is recommended that in order to reduce technical inefficiency farmers should be trained appropriately to improve their agronomic knowledge on sorghum production. Farmers are also encouraged to form and be active members of farmer associations. Policies and programmes that promote extension services should be emphasized in order to improve performance of sorghum production enterprise in Machakos and Makindu districts, Kenya.