

ABSTRACT

French bean production makes a significant contribution to the GDP, employment, farmers' income, and welfare. However, french bean farming involves many practices thus more capital is required; as smallholder farmers must invest approximately KES 311,353 per hectare of land for the french bean growing season. There is an observed 4.1% french bean demand increase in Kenya. Despite this, smallholder french bean yield is low which is 5.93 to 7.91 tonnes per hectare, compared to the world's potential yield of 9.88 to 14.83 tonnes per hectare. Hence, smallholder farmers receive low returns which may also lead to a decline in commercialization level. Therefore, the study sought to identify smallholder french bean farms and farmers' characteristics as well as to determine the effect of institutional factors, farm and farmers' characteristics on technical efficiency and commercialization of french bean production respectively. The study was carried out in areas diversifying in french bean production such as Machakos, Kajiado, Taita Taveta, Bungoma, and Trans Nzoia Counties, Kenya. Cross-sectional data on the 2021 production season was collected from 288 french bean farmers from selected counties using a cluster random sampling technique. A semi-structured questionnaire was used to collect data on institutional factors, farm, and farmers' characteristics. Data was analyzed using Stata version 17 and SAS version 9.4. Descriptive statistics was used in the characterization of smallholder french bean farms and farmers. Cobb-Douglas function under the stochastic frontier approach was used to determine the effect of institutional factors, farm and farmers' characteristics on french bean production technical efficiency. French bean production technical efficiency level among french bean smallholder farmers was found to be 86.07%. These findings suggest that given the prevailing resources, smallholder french bean farmers can still increase current production by 13.93%. Variables such as land size, manure quantity, certified seeds, second-generation seeds, fertilizer, and planting labor increased the output of french bean farmers. As a result, an increase in either input will result in an increase in french bean production. Results from the inefficiency model indicated that gender, education level, distance to market and experience all had positive and significant impact on french bean production technical efficiency. The positive effect implies that increase in any of them by one units holding other factors constant increases french bean production technical efficiency by corresponding units. Whereas, increase in soil testing negatively and significantly ($p < 0.01$) decreases french bean production technical efficiency. Tobit model was used to assess the impact of institutional factors, farm, and farmer characteristics on french bean production commercialization. The results showed that 60.09% of french bean smallholder farmers were commercialized. Results further showed that gender and age positively and significantly ($p < 0.05$) affected french bean commercialization. Household size distance to market and access to training services had a negative and significant ($p < 0.05$) effect on french bean production commercialization. The negative coefficient implies that increase in any of this factors holding other factors constant reduces french bean production commercialization. This study encourages french bean smallholder farmers to increase use of certified seeds, quantity of fertilizer, land size and manure. Male-headed households and educated farmers should be encouraged to start growing french beans. The government should establish institutions to ensure the formation of markets in french bean growing areas, thereby reducing the distance covered by these farmers when marketing french bean produce and motivating these farmers to produce more and thus deliver more output to the market.