



Influence of access to markets on Farmer's production decisions in Mbeere, Embu County, Kenya

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Abstract

Decision making, being an integral part of agricultural production means that this critical component affects farmers' production overall yield and, ultimately, impact their livelihoods. The basis of these decisions include past experiences, newly presented information, financial pressures, resource availability, risk factors, availability of markets and even imposed regulations. In Embu county low crop production is also often associated with lack of appropriate farming practices and methods that are suited to the fragile ecosystems to cope with climate change challenges. The general objective of the study was to determine influence of Access to Markets on Farmer's Production Decisions in Mbeere, Embu County, Kenya. A sample of 384 respondents was drawn from the study area encompassing the four administrative wards. The study adopted questionnaires to collect data which was later analysed to establish the respondent's opinions on the influence of market access on farmers' production decisions. The study analysed both descriptive statistics to define characteristics of the respondents and their opinions on the variables under study and inferential statistics to understand the extent to which the results reflected the characteristics of the wider research universe. The study results established that access to markets had a significant effect on farmers' production decisions. The study concluded that it was important to increase access to markets so as to improve farm decisions and increase productivity of farmers in rural parts of Mbeere. The study recommended that there is a need to research on other factors affecting farmers' production decisions including climate change, culture, farming practices and government policy and regulation.

Keywords: Farmers' production Decision Making, Food security, Market access, Embu County

Introduction

Sustainable Development Goal 2 on ending hunger is specifically designed to address issues to do with food security. According to Conceicao *et al* (2016)^[14] small-scale food producers, will specifically have access to secure and equal access to land, inputs and other productive resources including knowledge, services offered in the financial sector, access to markets and opportunities for the addition of value and employment that is non-farm and which will ensure there are production systems of food that are sustainable (Lawrence, 2021). There will also be the implementation of agricultural practices that are self-resilient leading to a productivity increase that will assist in the ecosystem maintenance, leading to the enhancing and strengthening of the adaptation capacity to change in climate, extreme weather, scarcity, excessive flooding and other disasters and that progressively improve land and soil quality by 2030 (Kungu *et al*, 2023)^[25]

Decision-making is an essential aspect of farming. The decisions farmers make affect their overall yield and, ultimately, impact their livelihoods. Understanding the different factors impacting farmer decision-making can provide insight for extension providers to improve the quality of service. Decisions can be attributed to past experiences, newly presented information, financial pressures, resource availability, risk factors, availability of markets and even imposed regulations.

Globally, farming in the developing world faces increasingly complex challenges; this is particularly true in Haiti. Here, the vast majority of farms are smallholder farms averaging less than 1.5 hectares (Ministry of Agriculture, Natural Resources, and Rural Development, 2010). Although regional agricultural assistance offices do exist

within government departments, services are rarely provided to small-scale farmers. With little assistance, many farmers independently make important decisions which affect the outcomes of their livelihoods (Lawrence & Letoya, 2020). In Jordan, farmers have continued to struggle to cultivate and grow crops and in the raising of livestock despite rainfall that is irregular, drought that is intermittent and land that continuously faces degradation.

In Latin America, according to a synthesis report prepared by IFAD in 2014, researchers and policy setters are recognizing that rural poverty is a social condition that depends on the fragile and vulnerable livelihoods of smallholders which is a concept that goes beyond the lack of economic efficiency. The only way to reverse rural poverty and inequality was through continued government involvement in food production and rural development and this led to the rollout of *Bolsa familia* and the *Oportunidades* programmes in Brazil and Mexico respectively to alleviate poverty and foster growth and encourage family farming at the household level (Lawrence *et al*, 2023).

According to the FAO (2017), 26% of all climate-related losses reported in developing countries between 2005 and 2015 occurred in the agricultural sector. Climate change resilience, defined as the degree of preparedness of countries to manage climate change, varies with the world poorest nations among the least prepared (ND-GAIN 2018). Wendy and Garcia (2018), noted that research on examining the intra household decision making on small holder farms in Colombia and Nicaragua, they take a gender approach in an effort better understand agricultural decision-making practices used by households. In Nicaragua, according to the research done by Wendy and Garcia in 2018, decision-

making about food, agricultural activities, and household financial resources generally followed traditional gender norms: men were typically responsible for agriculture and farm decisions, while women were mainly responsible for decisions related to food (Lawrence *et al.*, 2023).

In Africa, rural farm decision-making is similar to decision-making anywhere. Control over a number of factors or resources is pegged on the decision maker and these can either be defined quantitatively or qualitatively precisely based on their nature and the relevant time, and, subject to a series of stimuluses and constrictions, and in his use of these factors he has a range of choices to achieve various discernible objectives. Creation of an African farm would involve the identification and valuation of these resources, constraints, objectives, and the choice of crops and techniques. It has to be taken as self-evident that rational decisions are made by smallholders as a response to motivational factors and other economic incentives in production decision making.

In sub-Saharan Africa, 61.4 % of people live in rural areas (Lawrence & Rotich, 2021) with 57.3% of Africans working in the agricultural sector. As such agriculture continues to be the principal source of a means of livelihoods for a big percentage of households in sub-Saharan Africa. With relatively few people are employed as agricultural wage workers, most of these households operate their own farms (Lawrence & Omuse, 2022). In most African production settings, farm size is extremely small in with almost all land holdings being below 5 hectares. A big number of countries have land holdings that are even smaller. For example, Malawi's 2006-07 NCAL found that only 8% of land holdings were larger than 2ha. Information from Rwanda's 2008 National Agricultural Survey, show that the comparable figure was 6% of holdings of 2 hectares or more (National Institute of Statistics 2010).

Factors like learned behaviours, societal and personal influence, and social commitment and in-group dynamics influence the decisions on production of farmers, including what to produce and how to produce it (farm management practices) in Africa. However, additional considerations have to be looked at specifically those that relate to farmers and to climate change (Lawrence, 2020). Compared to other population groups, farmers are different in that climate is the primary determinant of the productivity of farms and, therefore, climate change influences a myriad of components of agricultural systems, including but not limited to crops and livestock production, supply of inputs, soil quality and water supply. Historically, farming is also subsidized, to manage the supply of agricultural commodities, supplement unpredictable income from the farm, and influence the cost and supply of such commodities.

Decisions on the growth of cocoa in Nigeria are driven by the fact that person have limited resources and thus they must make choices in a situation where they are presented with a wide range of choices (Omojoso, Nmadu, & Sullawu, 2015) [43]. Farmers make decisions in this West African nation on a number of pre and post-harvest activities including what to produce, the use of inputs, harvest issues and post-harvest issues, which affect distribution, production, processing, prices and costs of farm produce. Farming decisions are ideally are made for the maximization of objectives of the farm which are subject to material available and human labour. Despite the

significance of women's role played in agricultural production, processing and marketing in Nigeria available literature posits that men continue to dictate decision making on the farm, even in areas that have strong evidence of provision of farm labour by women (Omojoso *et al.*, 2015) [43].

Additionally commonly considered assets including women's education and age in rural agricultural Tanzanian households, women's labor activities and their health also appear to matter for perceptions of authority. According to the study conducted by Anderson and team, wives and husbands separately interviewed disagreed with on the holder of authority over key livelihood, family and farming decisions. The study further claimed that even after controlling various individual, household, and regional characteristics, claims to decision-making authority by husbands and wives continued to vary systematically by decision suggesting that the decision characteristics by themselves also mattered. (Anderson, et al, 2016). The lack of spousal agreement over authority distribution (i.e., a lack of "intra-household accord") over various farm and household decisions is problematic for programs attempting to use survey data to establish and advise strategies for reducing gender inequality or empowering women in rural agricultural households (Anderson, et al, 2016)

Kenya's economy is focused on agriculture (KFSG, 2016). Agriculture is the single most important productive sector in the Kenyan economy, contributing approximately 25% of GDP and employing 75% of the country's workforce, according to a report by the Republic of Kenya (Republic of Kenya 2005). More than 80% of Kenyans live in rural areas and depend on agriculture, either directly or indirectly, for their livelihood. Female-headed households have been found to be poor, with a large proportion of these employed in subsistence agriculture, which is common among the rural poor and is their only means of subsistence. Farming returns are low, exacerbating poverty, due to the lack of involvement of most Kenyan women in agricultural production decision-making.

Diiroo et al (2018) argue that having the power to make important decisions about agricultural production is a crucial driver of maize productivity in a report on women's empowerment in agriculture (maize farming) (Lawrence & Letoya, 2020) How male and female partners manage decision-making processes along the production chain determines food supply in Kenyan households. The food production process includes land preparation, input purchase, planting, weeding, harvesting, storage, management, use, and selling of harvested foodstuffs. We can see how gender dynamics influence socio-cultural factors that affect how such decisions are taken when we look at the case of Lugari District, and most rural households in Kenya (Barasa, 2014).

Farm management activities used by smallholder farmers are mainly non-commercial, according to an FAO study published in 2014 on smallholder maize farmer attitudes toward commercialization. This was due to a lack of coordination for maize-related activities and a single person making farm household decisions. Women are more involved in production decisions in maize farming, for example, while men are more involved in marketing decisions. Although a 2014 FAO study found that about 60% of smallholder farmers plan how much maize to eat and how much to sell, proven input prices such as seeds and

fertilizers have a greater impact on production decisions than maize grain market prices (58 vs 46 percent).

Adult females made more decisions on annual crops than adult males in Embu County, according to an ASDSP report from 2014, with the exception of cowpea, tomato, and cabbage. According to the survey, adult males dominated production decisions on all forms of cattle and goats, while females dominated production decisions on poultry and sheep. On most animals, it was discovered that youth are less interested in production decisions. Youth are less involved in production decisions in most species, according to research. The report clearly shows that farm household decisions have a big effect on the various crops that will be grown in the county, with different members making different decisions on different crops.

Statement of the Problem

According to Embu CIDP (2018), the agricultural sector continues to play a vital role in the rural economy. Embu CIDP of 2018 further establishes that majority of the population in the County derive their livelihood from crop farming and livestock keeping, which accounts for approximately 87.9 percent of the County population. The main crops produced in Embu County are classified into three categories namely; food crops (maize, beans, green grams peas etc), industrial (coffee, tea, and *catha edulis*) and horticultural crops (carrots, tomatoes, watermelons, mangoes, and bananas).

In Embu County, low crop production is also often associated with lack of appropriate farming practices and methods that are suited to the fragile ecosystems to cope with climate change challenges (Njeru, *et al*, 2015). According to a report by the Kenya Food Security Steering group (2019), food availability in Mbeere, Embu County continued to reduce with household and county maize stocks standing at 17 and 37 percent of the long term average due to consecutive poor seasons with the expected. Crop production is continually below average with maize, cowpeas and green grams crop yields dropping production with 10, 41 and 30 percent respectively. Food access is generally constrained considering that food and cash crop production contribute to 50 percent of cash income in both livelihood zones and crop production is below average significantly reducing income from this source and consequently access to food (KFSG, 2017).

By identifying the factors which influence production decisions of farmers in Embu County, specifically in Mbeere South and to a large extent Kenya, different agricultural based service providers including the government, extension workers, private sector investors and nongovernmental organizations (NGOs) can create programming which addresses the current practices of farmers, debunk myths that could have negative impacts on farmer yields, and create learning experiences that affirm the cultural nuances of the farmers while teaching new practices to improve their livelihoods. This study therefore seeks to examine influence of Market access on farmers' productions in Mbeere, Embu County, Kenya.

Main Objective of the Study

The main objective of the study was to establish the effect of market access on farmer's production decisions in Mbeere South in Embu County

Research Question

What is the effect of market access on farmers' production decisions in Mbeere South in Embu County?

Theoretical Review

1. The sustainable livelihoods Approach

A livelihood comprises the capabilities, assets, and activities required for a means of living. Livelihoods in this context encompasses human, natural, financial, physical, and social capital. It is deemed sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities both now and in the future, while not undermining the natural resource base (DFID, 1999). The approach looks at livelihoods in a holistic way, capturing the many complexities of livelihoods, and the constraints and opportunities that they are subjected to. These constraints and opportunities are shaped by numerous factors, ranging from global or national level trends and structures over which individuals have no control, and may not even be aware of, to more local norms and institutions and, finally, the assets to which the households or individual has direct access (DFID, 1999). The approach improves understanding of the livelihoods of the poor. It organizes the factors that constrain or enhance livelihood opportunities, and shows how they relate (Serrat, 2017) [49]. The approach is a way of thinking about the objectives, scope, and priorities for development activities. According to a report by the Serrat in a 2017 study, it is based on evolving thinking about the way the poor and vulnerable live their lives and the importance of policies and institutions.

Smallholder farming can play a crucial role in contributing to food supplies and autonomy at the household and community level in rural areas. Rural peoples and food producers across the urban-rural expanse, and women as a particularly marginalized group, are often disconnected and alienated from the land, tools, skills, and knowledge systems that might develop prosperous local food systems and sustainable livelihoods. In many cases, land tenure and rights are insecure and land costs consistently rise, resulting in rural people being displaced by powerful interest groups, including through land grabbing. The Sustainable Livelihoods Framework, as developed by the Department for International Development (DFID, 1999), serves as theoretical framework and analytical structure to explore the agricultural programs observed here and their impact on livelihood options. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintains or enhances its capabilities and assets, while not undermining the natural resource base."

At the household and community level, livelihood assets (a combination of physical, natural, financial, social, and human capital) play an essential role for households and individuals in pursuing strategies (livelihood strategies) with the aim of achieving desired goals (livelihood outcomes). Livelihood outcomes in turn impact livelihood assets. An understanding of social relationships, their institutions and organizations and their embedded power dynamics is crucial to designing interventions that improve sustainable livelihood outcomes (Scoones, 1998). This approach maximizes on the use of physical, social, human, natural and financial capital to ensure that sustainable livelihoods for people in a given setting have been holistically achieved.

The sustainable livelihoods approach was applied to this study to assess how different factors influence the decision making process of farmers determine the types of crops farmers grow, their reasons for production and the methods they apply in their farms which in turn affect agricultural productivity. Specifically the framework informs how land (natural capital), labour (human capital), farm equipment (physical capital) and finances influence farm productivity and the decisions farmers make in their respective farms.

Research Methodology

Research was conducted using a descriptive research design. According to Kothari and Garg, (2019) [24] descriptive research design involves observing and describing the characteristics of items under study without influencing them in any way. Specifically, the research adopted a sample survey research design which according to Kothari and Garg, (2019) [24] involves the study of only a part/ subpart of a population under study. The collection of qualitative and quantitative data was done at the farming household level in Mbeere South Sub County.

The research focused more on Mbeere South Sub County in Embu County which has five wards including Mwea, Makima, Mbeti South, Kiambere and Mavuria. NAFIS, (2017) states that the average household in Embu County has four members. According to Embu County CIDP 2013-2018 Mbeere South has a total of 20,931 households out of which 40% are involved in agricultural activities because of the semiarid nature of the sub county. As such, the target population for the study was 8,354 crop farming households who are residents of the sub county.

The study employed a simple random sampling technique, a process that saw each household chosen randomly and completely by chance. This technique gave every household an equal chance of being selected. Each of the units was individually numbered from 1 – N and a number n (sample size) was selected from the total population (N) after all the items are mixed thoroughly. The sample size was calculated using the formula developed by Mugenda & Mugenda, 1999 for calculating sample size for a population of less than 10,000:

$$N = z^2pq/d$$

Where: n = sample size

Z = value obtained from z tables at 95% confidence level i.e. 1.96

P = probability that a farm household has information on the factors under study which is 50% or 0.5

Q = probability that a farm household does not have information on the variables under study = 1-p = 1-0.5 = 0.5

D= level of statistical significance (amount of allowed mistakes in the study process) which in this case is 5% or 0.05

Hence;

$$n = (1.96^2 * 0.5 * 0.5) / 0.05 = 384.16 \text{ households} = 384 \text{ households.}$$

The study adopted a researcher administered structured questionnaire approach to address specific objectives for the study. The questionnaire was made up of close ended questions which was accompanied by a list of possible alternatives from which farmers selected the answer that best described their situation. The questionnaire also had open ended questions which gave the respondent complete freedom of response. The questions in the questionnaire

were definite, and pre-determined and presented in exactly the same wording and in the same order to all farmers taking part in the study.

Results and Discussions

Instruments Return Rate

The study distributed a total of 384 questionnaires and only 273 were returned and used for the analysis. Table 1 shows the response rate.

Table 1: Response rate

Response	Distributed	Returned	Non response
Number of questionnaires	384	273	71
Percentage %	100	71	29

Table 1 shows a 71% response rate, which is considered appropriate according to Marton (2006), who states that a response rate of above 70% is appropriate for this kind of study. The questionnaires were administered successfully.

Findings of the study

The results of the study were presented based on the demographic variables and the objectives. The demographic data was analysed for the purpose of establishing the distribution of the respondents on the basis of gender, age, working experience, and the level of education.

Findings on demographic variables

In regard to gender of the respondents, the study sought to establish the distribution of male and female respondents who participated in the study. Gender has an influence on the factors influencing farmers’ production decisions because male and female perspectives on different factors differs. The response was presented in fig 1.

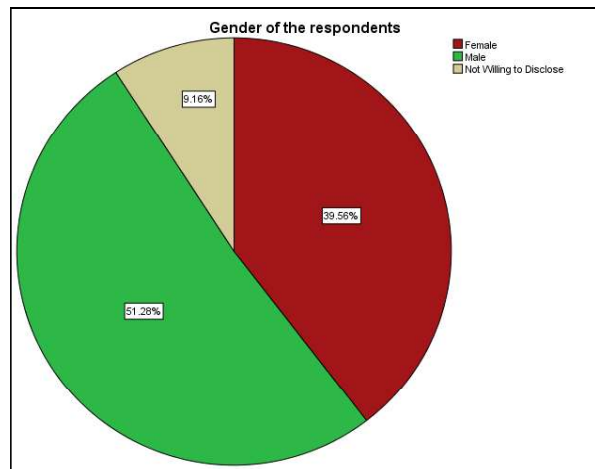


Fig 1: Gender of the Respondents

The results of the study indicated that there were 39.56% of female respondents and 51.29 percent of male respondents. However, 9.16% of the respondents were not willing to reveal whether they were male or female. The data implies that most of all people interviewed, men were more compared to women. This is true in most patriarchal communities which indicate that men participate more in farming and head most households. The margin was not very large to have influence on the overall findings of the study.

The study also sought to assess the size of the family. This variable was important because there exists an assumption that large families are likely to farm for subsistence use and also for sale because of readily available labor to work in farms. The results are presented in Table 2.

Table 2: Average family size

Family Size		
Size	Frequency	Percent
2 members	37	13.6%
3-5 members	160	58.6%
More than five members	76	27.8%
Total	273	100.0

From the results presented above it is shown that 13.6% of the respondents belonged to a family with 2 members, 58.6% 3 to 5 members, and 27.8% belonging to families with more than five members. This is supported by the Embu County CIDP which states that average family sizes in the sub county range from 3 to five members. The study also sought to find out the marital status of the respondents. The reason for selecting this variable is because for married people, their partners tend to lose influence their decision making when it comes to what to produce, production reasons and the ways to go about production. The study also sought to find out the type of crops planted by farmers in the sub county. The results are presented in fig 2.

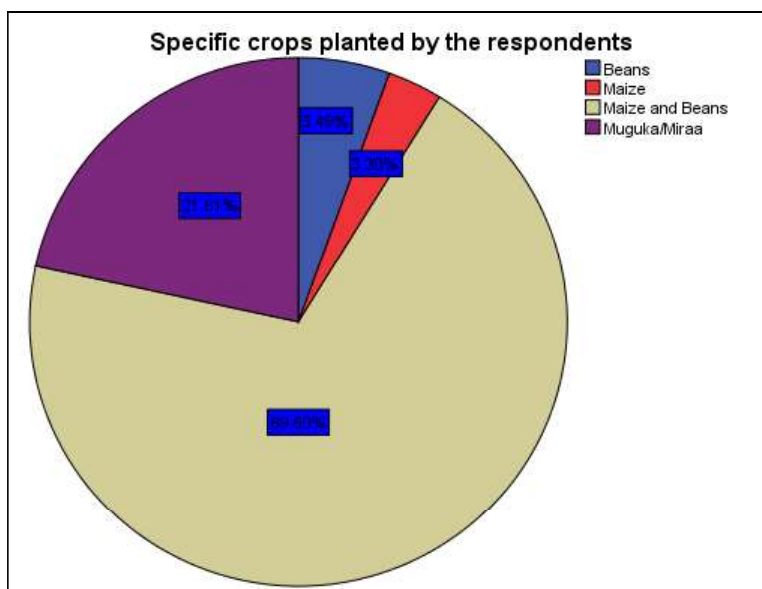


Fig 2: Types of crops grown in the area

The results show that most respondents grow a combination of maize and beans at 69.6%, followed by khat 21.6%, Beans only at 5.49% and lastly maize at 3.3%. The results indicated that most farmers specialize in growth of food crops being maize and beans with the only popular cash crop (Khat) at a mere 21.6%.

Table 3: Reasons for doing Farming

Reasons for practicing farming		
	Frequency	Percent
For family consumption	96	35.2%
For family consumption and for sale	118	43.2%
For sale	59	21.6%
Total	273	100%

The results show that 35.2% of households grow crops for family consumption, 21.6% grow crops for sale with 43.2% practicing farming for both family consumption and sale.

Table 4: Extent to which market access affects farmers' production decisions

Statement	D	A	SA	NS	M	S. D
Demand of products in the market informs the decision to produce certain crops	3.7%	60.4%	34.8%	1.1%	2.33	.564
Price of products informs the decision to produce certain crops	4%	80.6%	19.0%	0	2.19	.400
Demand of products in the market informs reasons to produce certain crops	3.3%	70.3%	26.0%	4%	2.23	.504
Price of products informs reasons to produce certain crops	7%	85.3%	13.6%	4%	2.14	.374
Demand of products in the market informs my production methods	30.4%	46.9%	22.7%	0	1.92	.726
Price of products informs my production methods	3.3%	81.7%	15.0%	0	2.12	.412

Effect of Market Access on Farmers' Production Decisions

The objective of the research was to determine the effect of market access on farmer's production decisions in Mbeere South in Embu County. The variables considered in researching on this objective included the demand of products in the market, and the price of farm produce in the market and their effect on the decision to produce certain crops, the production reasons, and the production methods farmers used to produce different crops. The respondents were asked to rate the extent to which they agreed with the various statements that were presented to them. In this section, *D will stand for disagree, A – Agree, SA – Strongly Agree, NS – Not sure, M – Mean, and S.D for standard deviation.*

The results were presented in table 6.

The results indicated that a majority of farmers (60.4%) agreed that demand of products in the market informed the decision to plant either maize, beans, a combination of maize and beans or khat. 34.8% of the respondents strongly agreed, but 3.7 % of the respondents felt that there was no relationship between demand of products and the decisions to produce certain crops. 1.1% of the respondents were not sure. As indicated earlier, farmers in Mbeere South Sub County produce crops for family consumption and for sale (43.2%) and purely for sale (21.6%). This represented 64.8% of all respondents who took part in the research. This implies that during production, demand for products grown plays a significant role in deciding on what to grow.

The results further indicated that 80.6 percent of the respondents agreed that the price of products in the market informed their decisions on what to grow in their farms. 4% of the respondents indicated that there was no relationship between demand for products and their decisions on what to farm. 19% of the respondents strongly agreed that the price of products informed their production decisions. This results confirms that both demand and price of products in the market play a significance role in informing farmers on what to grow in a particular season in Mbeere South Sub County. On whether demand for products in the market affected farmers' production methods, 70.3% of the respondents agreed, 26.0% strongly agreed, 4% were not sure with 3.3% of the respondents disagreeing.

Further, the results showed that 85.3% of the respondents believed that the price of products in the market informed their production reasons. 13.6% strongly agreed, and 4% were not sure. 7% of the respondents indicated that there was no relationship between price of produce in the market and their production reasons. Since 64.8% of the respondents indicated that they either farm for family consumption or for sale, the findings of this statement stand true. It is only normal that if you till your land to sell your crops, the price of what you sell should inform you on what to farm at a particular season. The result of the study indicate that the price of products in the market is an

important factor to consider when deciding whether to go into farming for family consumption, for sale or for both reasons. On production methods, 46.9% of the farmers indicated that demand for products in the market informs their production methods. This was the majority. Those who strongly agreed were at 22.7% with 83 of the respondents disagreeing with the statement (30%). However, a majority of the respondents (81.7%) indicated that the price of products in the market informed their production methods. Those who disagreed with the statement stood at a paltry 3.3%. 15% of the respondents strongly agreed that there was a direct relationship between the price of farm producer in the market and their production methods.

The study results are supported by Obi *et al* (2011), who argue that agricultural markets are still an important way to ensure incorporation of small farmers into national economies especially in developing countries. The results of the research are also supported by Ismail (2014), whose report argues that enhanced facilities encourage smallholder farmers to participate in the market. The results of the result which specifically determines that prices are an important factor in production decisions are supported by Mailu *et al.* in 2012 who argued that low prices at other markets, where margins did not allow adequate mark up to absorb transaction costs discouraged farmers from participating in local markets.

Factors affecting Farmers' Production Decisions in Mbeere South, Embu County

The respondents in the study were also expected to rate the various indicators of farmers' production decisions which formed the dependent variable. The results were analysed descriptively using percentages, means and standard deviations in order to make deductions on how the respondents analysed the various statement items describing the extent to which different indicators of the dependent variable affected the overall variable. The results were presented in Table 7 as shown below.

Table 5: The extent to which different variables affect production decisions

Statement	D	A	SA	NS	M	S. D
Types of Crops affects farmers production decisions	16.1%	65.9%	11.4%	6.6%	2.08	.730
Production reasons affect farmers' production decisions	1.1%	48.4%	49.8%	7%	2.50	.536
Production methods affect farmers' production decisions	1.5%	49.1%	48.0%	1.0%	2.49	.557

On type of crops and farmers' production decisions, a majority of the respondents agreed (65.9%) that the types of crops farmers grow in Mbeere South Sub County affected their production decisions. 16.1% of the respondents indicated that types of crops grown by farmers did not affect their production decisions. 11.4% strongly agreed with 6.6% of the respondents not sure.

The results further indicated that 48.4% of the respondents agreed that production reasons affected farmers' production decisions, 49.8% strongly agreed with this assertion but 1.1% of the respondents were not sure. The mean response was 2.50 with a standard deviation of 0.536 to confirm this statement. This implies the decision on whether to plant for sale, for family consumption or for both reasons had a strong bearing on what farmers planted, how they planted it and their reasons for doing so. 49.1% of the respondents

agreed that production methods affect farmers' production decisions on what to plant, their reasons to plant it and how to go about planting. 48% strongly agreed that there was a strong relationship between production methods and farmers' production decisions, 1.5% disagreed and 1% of the respondents were not sure. This is confirmed by a standard deviation of 0.557 and a mean of 2.49. The implication of these results is that there is a strong relationship between the different production methods farmers used and their production decisions. The study results are supported by Bjornlund, *et al* in 2019 who state that the allocation of resources is important in decisions on improvement of productivity of farms. The study identified education, resource ownership and the availability of markets and terms of trade as some of the socio economic influences of decision making.

Inferential statistics

The study sought to establish the nature of the effect of Resource Availability, Market Access, Agricultural Inputs, Education and training on production decisions. This was tested using correlation coefficients as suggested by Cohen, West and Aiken, (2003). Correlation analysis helps to test the Linearity of the study variables in order to make

inferences. The study used Pearson correlation (r) to test whether the relationship between the variables was significant or not at 95% level of confidence. The relationship between the two variables was considered significant if the p value was less than 0.05. It was considered to be weak if the correlation (r) < 0.5 and it was considered to be strong if the correlation (r) was > 0.5 .

Table 6: Pearson's Correlations Analysis

		Production decisions
Market Access	Pearson Correlation	.576
	Sig. Level	.000
	N	273

The results also show a strong positive correlation between market access and production decisions. ($r = .576$ and P value $= .000$). This shows that market access plays a significant role in influencing production decisions of farmers in Mbeere South Sub County. The implication of this is that the cost of farm produce in the market and their demand plays a significant role in the farmers' decisions on what to plant, the reasons to grow what they grow and their production methods. A rise in demand for crops leads to an increase in production of crops at the farm. Additionally, these results mean that the price of crops at the market price offers insight to farmers on what to produce. This agrees with a research carried out on Farm Productivity and Household Market Participation which stated that there is a direct relationship between market dynamics and

productivity at the farm (Rios, Shively, & Masters, 2009) [46].

Simple Linear Regression Analysis

This is used to test the effectiveness of a variable in predicting the dependent variable in study. The analysis helps to establish the relationship between two variables (dependent variable and independent variable). In this study, the independent variables were resource availability, market access, agricultural inputs, and education and training while the dependent variable was farmers' production reasons. Linear regression was therefore used to assess how production reasons can be predicted by each of the independent variables. The results for this study are summarized in the regression model summary shown in table 9.

Table 7: Linear Regression Model Summary

Independent variables	R	R-Square	P Value
Market Access	0.576	0.332	.000

The values of R indicate the correlation between the independent variables and the dependent variable. In this study, the correlation between market access and production decisions is strong, positive and very significant ($R = 0.576$, P Value $= .000$). Based on the results, we can deduce that market access greatly affects farmers' production decisions on what to produce, how to go about production and their reasons to do production.

The study further sought to assess the combined effect of the four independent variables on the dependent variable. Further analysis was done using the R square to determine the effect of each independent variable on the dependent variable and to what degree the effect was. The results indicate that in the case of resource availability, a unit change in market access would result in a 33.2% change in production decisions (R Square $= 0.332$).

Summary, Conclusions and Recommendations

1. Summary based on the demographic variables

The study collected and analysed the demographic data for the purpose of establishing the distribution of the respondents on the basis of gender, years they have done farming, the types of crops they grow and their reasons for farming. In terms of the gender of the respondents, a huge percentage of the respondents were male. Reasons for doing farming were mixed with the study indicating that a majority of the respondents engaged in farming both for family consumption and for sale. The rest of the respondents indicated that they engaged in farming to grow crops only

for family consumption. A large number of participants in the study represented family sizes between 3 to 5 members. This supported the County's Integrated development plan which estimated family sizes to range between the same number. A majority of the respondents were married and research on the specific crops they grew indicated that many opted to grow a combination of maize and beans at 69.6% followed by *khat*. Many of the respondents were young farmers having been involved in farming for a period ranging between 1 and 4 years. However, the pool of respondents was well represented in terms of number of years they had engaged in farming.

Extent to which market access affects farmers' production decisions

The other objective for the study was to establish the effect of market access on farmer's production decisions in Mbeere South in Embu County. The study specifically investigated the effect of demand and price of farm produce in the market on production decisions of farmers. The study got responses from the questionnaires issued indicating that both demand for products and the price of the produce greatly affected production decisions. Specifically, price had the biggest effect on production decisions. The respondents felt that price of products informed their decision to produce certain crops mostly on their reasons to produce specific crops at and their production methods.

The results imply that though demand for products is an important factor in making production decisions, it does not

outweigh the importance of the price. Farmers felt that the price of products in the market informed their decisions on either to farm for family consumption or for sale. Appealing product prices of certain commodities resulted in farmers focusing more on those than others. This was the case for the growth of khat in the stead of food crops like maize. Favourable prices in the market for the commodity resulted in more farmers taking part in its growth and production specifically in Mbeti, Kiambere and Mavuria wards.

The results of the study are supported by (Dukheri, Elamin, Kherallah, & Abur, 2012) who, in the research on impact of high food prices on farmers in the Near East state that food hike prices in 2007/2008 led to greater profitability of farms. The report further argues that when there is a rise in the prices of farm products, they are willing to adapt their farming methodologies to adapt to the changing market dynamics. High market prices of products also allow farmers to have access to farm inputs like fertilizers and seeds because of an increased income. This has a ripple effect on the productivity of the farm and the production choices of farmers.

Conclusion

The purposes of this study was to assess the effect of market access on farmers' production decisions in Mbere South, in Embu County. The respondents were asked to respond to various statements that helped describe the situation and to show the influence of the independent variable on the dependent variable. The study further concluded that market access had a strong, positive and significant correlation specifically on production reasons and what crops to produce. Specifically, the study concluded that the price of farm produce was important to farmers' production decisions. This means that though markets are not perfect because of the effect of globalization, it is important for the government to protect small scale farmers by ensuring there is a stability of crop prices in markets. This is specifically so because the results concluded that price fluctuations in the market affected farmers greatly.

Recommendations

Since agriculture is devolved under schedule IV of the Kenyan constitution, there is a need for the county government of Embu to enhance collaboration among the different stakeholders in the sector aimed at improving resource accessibility, and specifically access to inputs by small scale farmers not just in marginalized areas like Mbeere South to improve farm productivity. This is in line with Sustainable Development Goal number 2 which targets to double farm productivity and incomes for small scale farmers and producers through equal access to land, productive resources, financial services, knowledge and opportunities for value addition. According to Vision 2030, 80% of the country's population live in the rural areas and derive their livelihood from agriculture and related activities. This means that there is a need to improve markets relevant to farmers in rural areas since these are their centers of trade. Currently most stakeholders focus on markets in urban areas neglecting those in rural agricultural areas. Improving access to these markets is critical through improvement of rural infrastructure, improvement of commodity prices and availing insurance to protect farmers against losses during the farming process. This supports SDG goal 2c which calls for adopting of measures to

increase access to market information so as to limit extreme food price volatility.

Areas for Further Studies

Further study needs to be carried out in other administrative units in the country to compare the findings. This will allow the results of the current study to be used as a reference point, and also pointing out gaps that exist so as to address them continuously. There is need to specifically look at exact impact of price fluctuations in farm commodities at the market price to farmers and the resultant impact on their production decisions. The current study was a general study so there is a need to delve more in specific issues relating to market access including price and demand of products and their impacts on farmer behaviour. It is also important to look at other factors affecting farmers' production decisions including weather and climate variabilities, farming practices, government policy and regulation and culture.

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