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Effect of market access on farmer's production decisions in Mbeere south, 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. Food security, being a big challenge not only in Kenya, but in Africa and many developing nations is a challenge that needs solving. Understanding what motivates them to farm what they farm is critical in helping them address the challenges they face so as to maximize on output and benefits from their farm. 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 factors affecting farmers' production decisions in Mbeere South in Embu County specifically taking a keen interest in resource availability, farm inputs, market access, and education and training. A sample of 384 respondents was drawn from the sub county encompassing the four administrative wards. The study made use of questionnaires to collect data which was later analysed to get an understanding of the respondent's opinions on the different variables under study including the effects of resource availability, market access, farm inputs and education and training on farmers' production decisions. The study analysed both descriptive statistics to define characteristics of the respondents and their opinions on the different variables under study and inferential statistics to understand the extent to which the results reflected a wider population. The study concluded that availability of resources, access to markets, availability and price of farm inputs and education and training had a significant effect on farmers' production decisions. The study concluded that it was important to increase access to finances, agricultural inputs, markets and education and training so as to improve farm decisions and increase productivity of farmers in rural Mbeere South. 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, market access, water projects, well being

Introduction
In sub-Saharan Africa, 61.4 % of people live in rural areas. With 57.3% Africans working in the agricultural sector according to data from the UN Food and Agriculture Organization (FAO). 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. 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) [23].
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. According to Lecoutere & Jassogne, 2016 [18] part of the reasons why smallholder household farming systems are not always efficiently, sustainably and equitably managed can be found in the way intra-household decisions are made. The study continues to argue that in order to improve the relationship between intra-household decision making and efficient, sustainable and equitable household farming, it's important to introduce a program encouraging participatory decision making whose end result would be a confident change in household farm investment and consumption behavior resulting in changes in intra-household decision making.

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. 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 the country, livestock and rangeland production systems are continuously subjected to high stress leading to low production and productivity, attributable to livestock population growth and crop encroachment (Alassaf, *et al* 2011) [2]. The decisions concerning how to manage resources are decided at the level of the family level and also at village or higher levels. Families make decisions to put up settlements on places characterized by limited land resources, whose result is practicing of inadequate management practices leading to lower farm productivity. In marginal lands there is a reflection of this in an increasing pressure on marginal and degraded land which affects the sustainability of these and a resultant drop in the farm-family income.

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 in a 2018 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. Regarding agriculture, few women were involved in making decisions about agricultural production. The only activity for which women made decisions on their own was raising chickens and pigs. Apart from this activity, when women participated in agricultural decision-making, it was in the form of joint decisions made with their spouse.

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.

Factors like learned behaviors, 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. 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. Additionally, decision making processes of farmers' production are considered to be more complex compared to other sectors, due to the fact that agricultural activities depend and have a largely impact natural resources. The availability and the cost of labour are changing due to changing economies in the African continent and its result is a scenario in which farmers face serious questions on deciding the benefit of farmers in selling their labour in urban centers or to use of it on the family farm to increase productivity. To help farmers make better farm decisions, it is of core importance to understand concepts, principles and tools of farm management.

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. 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). 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 noncommercial, 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. The implication is that "the farmer" is not a single person in the vast majority of households. In addition to a lack of planning, a single individual is responsible for all relevant decisions. This person is much more likely to be a man than a woman. 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). This is anchored on the fact that the world is currently facing an ever changing environment which presents a big challenge for decision-makers, as they have to react and adapt quickly to fit the fast moving changes of a global market. According to a report by the Kenya Food Security Steering group (2019), food availability in 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.

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

The study sought to answer the following research question:

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

Theoretical Review

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) [27]. 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 [27] 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

The research was conducted using a descriptive research design. According to Kothari and Garg, (2019) [17] 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) [17] involves the study of only a part/ subpart of a population under study. In this particular study, the research design helped in the assessment of what factors affect the production decisions of farmers in Mbeere South. It assessed the views, opinions, sentiments, and thoughts of farmers about the effects of various factors that influence their decisions on what to farm, how to go about it and their reasons for producing specific crops. 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 choice for Mbeere South Sub County was influenced by the fact that many households have continuously opted to plant cash crops at the expense of planting food crops notwithstanding the fact that the area is continuously food insecure based on the fact that it falls in the arid and semi-arid belt of Kenya.

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;

$n= (1.96^2*0.5*0.5)/0.05 = 384.16$ households = 384 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

1. Instruments Return Rate

The study distributed a total of 384 questionnaires and only 273 were returned and used for the analysis. Table 4.1 shows the response rate.

Table 1: Response rate

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

Table 4.1 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.

2. 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.

2.1 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 figure 4.1.

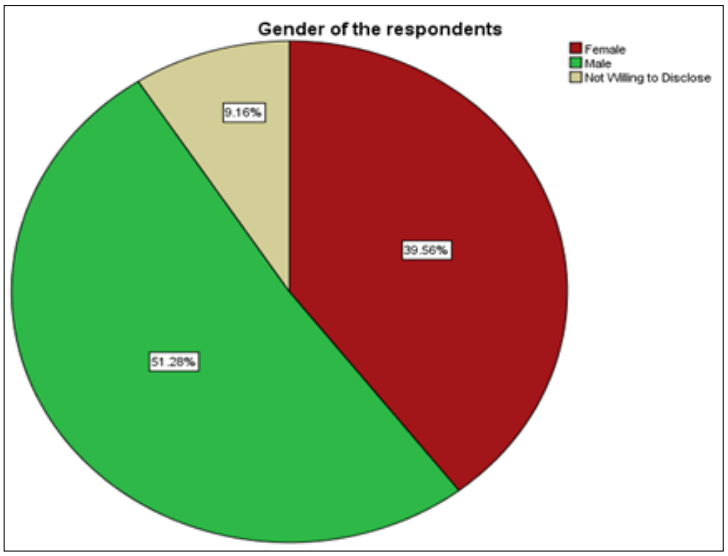

Fig 1: Gender of the Respondents

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 4.2.

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 figure 4.2.

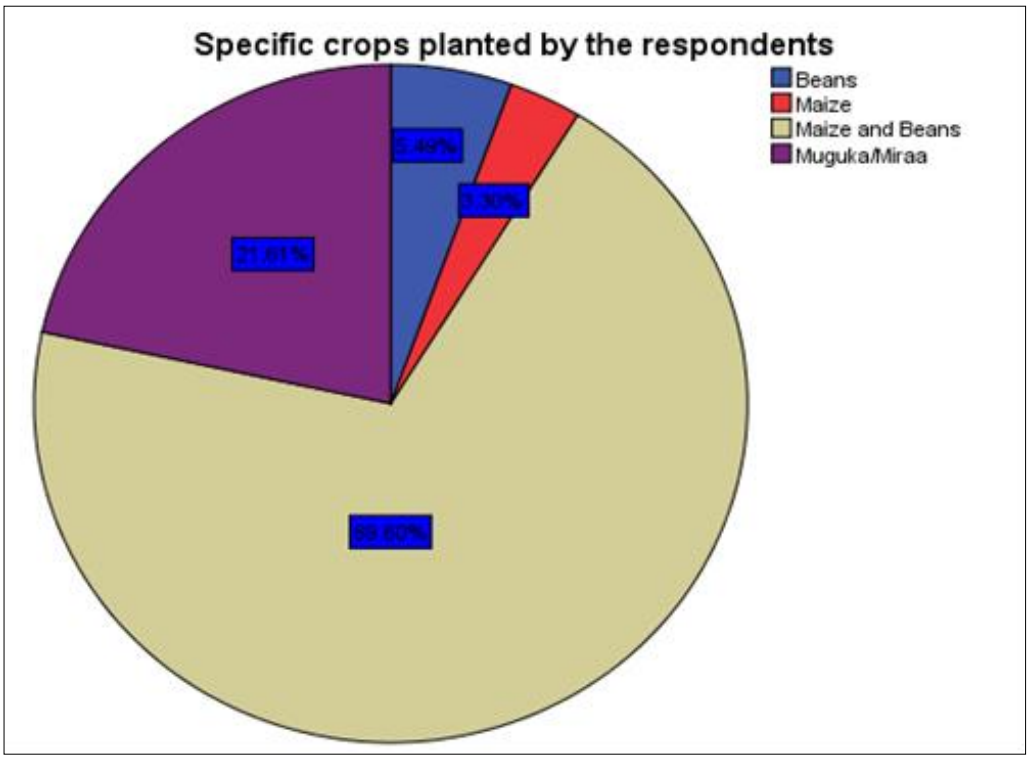

Fig 2: Types of crops grown in the area

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.

3. 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 2.

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

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.

4. 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 4.10 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, the availability of markets and terms of trade as some of the socio economic influences of decision making.

5. 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

		Well-being of the Community
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).

6. 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 4.13.

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 a unit change in market access would result in a 33.2% change in production decisions (R Square = 0.332).

Summary, Conclusions and Recommendations

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 respondnts, 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 betweeen 3 to 5 members. This supported the County's Integrated development plan which estimated famly 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 repondents 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. Favorable 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) [9] 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 centres 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 behavior. 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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