IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

Impact Of Production And Processing Logistics On Farmers Participation In Maize Seed Value-chain In Baringo South Sub-County. Kenya

[1] Mirasine Meiguran, [2] Dr, Washington Adede Ochola, [3] Dr. Martha Nyangau
[1] PhD. Student, [2] Lecturer Kisii University, [3] Lecturer Kisii University
[1]Agricultural Education and Extension,
[1]Kisii University, Kisii, Kenya

ABSTRACT

Maize is the number one food crop for millions of smallholder farmers across Sub-Saharan Africa and the demand for quality maize seed presents an economic opportunity for farmers to boost their livelihoods. Maize remains a staple food for approximately 50% of the population making it a critical component in ensuring food security on the continent (Joordan , 2022), The study sort to access Baringo South farmers' participation in maize seed multiplication programme based on production and processing factors that included farmer irrigation capacity, farmer knowledge on credit terms, access to agricultural extension services, road network to and from farm gate, post-harvest equipment adequacy and quality planting seeds supplied to farmers. Quantitative data was collected using the individual respondent questionnaires administered to 366 sampled farmers with 95.08% response rate. Regression analysis by use of the estimated coefficients (β values), standard error, significance values and odd ratio of independent variables were used to assess the relationship between independent and dependent variables. Results depict that most (71.6%) of the respondents were male in comparison to 28.4% female. On age distribution, the dominance of an energetic and still productive population aged between 20 to 49 years representing 89.7% is worth noting. The odds of a farmer continued participation in maize seed multiplication programme farming in areas with good accessible was 1.829 higher than those farmers in areas with impassable roads. The probability of farmer continued participation was 0.354 lower when post-harvest equipment was inadequate and 0.161 lower as well for farmers who perceived the planting seeds supplied to farmers as being of poor quality. Results show that some farmers are exiting maize seed value chain because of the time wasted and expenses they incur as result of poor nature of roads linking their farms to the produce collection and drying yards, inadequacy of post-harvest facilities, perceived poor seed quality and limited capacity to sustainably undertake irrigated agriculture. The study affirms the need for requisite production and logistical support for farmers in rural areas in bid to enhance their production and safeguard farmers' hard-earned income.

1. INTRODUCTION

Agricultural productivity gap between actual and potential yields in Africa and other low- income countries has been a persistent challenge for the longest time. Despite agriculture being the primary source of income for 60% of the African population, value of agricultural output stands at only a quarter of Africa's GDP with its net food import bill expected to expand to 110 billion US Dollar by 2025 (AfDB, 2019). Africa's low agricultural growth is not only due to low productivity, where yields stand at 56% of the global average, but it can also be ascribed to the limited development of linkages across the agricultural value chains, especially beyond the production stage. According to AGRA (2022), the agricultural environment needs to support the progress of the smallholder farmers through initiatives that increase productivity, improved budget provision by governments and improve access to markets. Agricultural value chains in Africa continue to experience numerous constraints because of the economic and institutional environment in which they operate thus limiting what African smallholder farmers can achieve. Poor infrastructure including roads, transportation and storage facilities result to huge losses and inefficiencies in the supply chain which then hamper timely delivery of agricultural produce to markets and increases transaction costs. Inadequate post-harvest handling and storage facilities result in substantial losses of agricultural produce thus reducing farmers' income and food security. Farmers often face difficulties accessing formal markets due to fragmented supply chains and limited market linkages. This leads to reduced bargaining power, low prices for their produce, and vulnerability to price fluctuations. Devaux, Torero, Donovan & Horton (2018) noted that, agricultural value chain participation in high-end markets requires smallholders to deliver regular supplies of produce of consistent quality and sufficient quantity. Access to finance is critical for agricultural transformation. However, for smallholder farmers, inadequate financing of agricultural activities has been a major obstacle (Suwadu and Hathie, 2020). According to Chengappa (2018), case studies in the Indian context showed that farmers who participate in value chains incur fewer transaction costs, face lower market

risks and realize more profits. Despite the aforementioned potential, there are remain many weak links in the agricultural value chains that need to be addressed in bid to realize their efficiency and inclusiveness particularly for rural smallholder farmers. Agricultural sector in Kenya like many other Sub-Saharan countries continues to face a myriad of challenges. Kenya still faces a significant domestic marketing deficit in key crops (Ministry of Agriculture, 2021). Sustainable engagement with smallholder farmers is limited due to last mile challenges and inadequate capacity and resources for them to perform as credible market players. FAO (2022) noted that, establishing strong partnerships with public and private sector players to attract investment into agricultural value chains will contribute to achieving sustainable and efficient agricultural and food systems through inclusive agribusiness and value chain development. According to Suwadu and Hathie (2020), increasing public investments in physical infrastructure such as roads can generate considerable benefits, particularly in production and post-harvest activities. Another persistent challenge in the agricultural value chain as reported by Amanor (2019) is a lack of formal mechanisms for contractual enforcement that result in classic problems like commitment failure, asymmetric information and adverse transactions costs.

2. NEED OF THE STUDY.

Maize is the number one food crop and source of sustenance for several hundred million smallholder farmers across Sub-Saharan Africa and the demand for quality maize seed therefore presents an economic opportunity for farmers to boost their livelihoods. According to Joordan (2022), maize remains a staple food for approximately 50% of the population making it a critical component in ensuring food security on the continent. The importance of maize notwithstanding, maize output has deteriorated over time and is now about only 1.6 tones per hectare, leaving Kenya behind other maize producers in the continent. Ethiopia, for example, is twice as productive, with a productivity of 3.7 tones per hectare. Ethiopia realized this high productivity as a result of interventions such as improved access to extension services, using modern inputs and improved rural infrastructure. To validate this further, the quantity of maize imported into Kenya has been increasing over the past three years with 793,751 metric tones valued at Kenya Shillings 24.7 billion imported into the country in 2022 (Amboko and Mburu, 2023). According data from Kenya National Bureau of Statistics, the national average price of a kilo of loose maize grain closed April 2023 at Kenya Shillings 79 which was up 29.4% compared to the price registered in April 2022. Conversely though, maize crop recurrently fails when hit by the region's severe and recurrent droughts which then calls for countries to embrace seed varieties with climate-smart features now more than before. Averagely in Kenya, only 63.4% of the seed varieties released in 2019-2021 have climate-smart features which is way below Burkina Faso and Mali leading the pack in attainment 100% climate-smart features in several seed released ((Mureithi, 2023). Kenya's agriculture is increasingly market-driven with agricultural value chains characterized by interconnectivity of actors. While competitiveness of the value chains is key for profit and relevance, collaboration is a requisite factor to their sustainability. The role of Government and private Agencies (seed companies) in promotion of agricultural value chain specifically on maize seed multiplication among Baringo South farmers for more than 20 years is worth to note. With the long-time of maize seed multiplication programme and the perceived high-income expectation in principle, the poverty index in Baringo South Sub-County is still high standing at 51.7% (Baringo, 2018). Additionally, some farmers have begun shying off the maize seed multiplication programme in preference to other crops. The market demand for quality seeds in Kenya present huge opportunities to improve livelihoods and economic growth in the sub-county through the maize seed multiplication programme. However, to achieve this landmark, production and processing logistics (which include farmer irrigation capacity, farmer knowledge on credit terms, access to agricultural extension services, road network, post-harvest equipment and quality planting seeds) as determinants for inclusive agricultural value chain in the area need to be understood. . This understanding will provide the necessary enabling environment to implement workable integrated value chains to improve the capacity of small holders to participate in market driven agricultural development.

3. RESEARCH METHODOLOGY

This chapter outlines the research methodology adopted in the quest to address the objective of this study. The chapter is organized into the following sections: research design, sampling techniques, data collection instruments, and data analysis procedures.

3.1 Research design

This study employed a mixed-methods research design, combining both descriptive and survey methodologies to assess the of production and processing logistics on farmers participation in maize seed multiplication value chain in Baringo South Sub-County in Kenya. The descriptive design provided a comprehensive and detailed description of the socio-economic characteristics of farmers in the maize seed multiplication programme in Baringo South. The study also employed survey research design by use of structured questionnaire administered to a representative sample of participants. Quantitative data was collected and subsequently analyzed to draw meaningful conclusions about determinants of inclusive agricultural value chains. The choice of survey design was because of its ability to offer a systematic and efficient approach to gather data from a diverse range of respondents, thus allowing room to generalize findings to the broader population.

3.2 Population and Sample

The Seed Maize contractual engagement in Baringo South Sub-County is coordinated between seed companies and 27 local entities (referred to as Registered Growers) distributed within the sub-county. One registered grower is in charge of number of farmers spread in different irrigation blocks depending on their locality. According to National Irrigation Authority, the contracted farmer groups/growers have approximately 4286 farmers participating in seed maize farming. Multi-stage sampling technique was used to

select the representative sample. Purposive sampling was used to select Baringo South sub county because of it being a prime maize seed production area in Baringo County. Secondly, simple random sampling was used to select six out the twenty-seven maize seed farmer grower groups where the study was undertaken. Thirdly, required sample of farmers to be interviewed were drawn from each of the six selected farmer grower groups apportioned proportionately to number of farmers in the group. In the final stage of sampling, systematic simple random sampling was used to select the participants of the study from each of the six selected groups. This study used a confidence level of 95%, a margin of error of 0.05.

According to (Kothari, 2004), the formula for calculating sample size is given as:

$$n = \frac{N}{1 - N(e^2)}$$

Where:

- N = population size
- e = margin of error
- n= required sample size

To determine the ideal sample size for a population size of 4286 maize seed farmers in Baringo South, at 95% confidence level and a 0.05 margin of error, the required sample size for this study was calculated as follow:

$$n = \frac{4286}{1 + 4286(0.05^2)}$$

$$n = \frac{4286}{1+10.715}$$

$$n = \frac{4286}{11.715}$$

Therefore;

$\boldsymbol{n}$ **=365.855**

3.3 Data and Sources of Data

For this study quantitative data was collected using the individual respondent questionnaires. Structured questionnaires were administered to the sampled maize seed farmers with the help of six research assistants. A questionnaire was preferred because it allows the researcher to reach a larger sample of population within a limited time and is also suitable for collecting basic descriptive information. The farmers' questionnaire had two main sections; the first section captured information on farmers social and demographic characteristics including age, gender, land sizes and education level. The second section captured aspects on production and processing logistics. A total 366 questionnaires were administered out of which 348 were returned giving 95.08% response rate. Key Informant interviews (KIIs) were the main sources of qualitative data. An extensive literature review was also done to obtain the secondary data, demographic and institutional aspects of the study area.

3.4 Statistical tools used

Both descriptive and inferential statistical techniques were used for data analysis.

3.4.1 Descriptive Statistics

Descriptive analysis was done to produce frequencies, percentages, mean, and standard deviation to provide statistics that describe the basic features of the variables of the study. Hypotheses were tested by subjecting the data to statistical tests using Statistical Package for Social Scientists (SPSS) version 25, which was the main data analysis software.

3.4.2 Inferential Statistics

Correlation analysis using Pearson Correlation Coefficient(r) was used to analyze the degree of relationship (strength and direction) between the study variables at 0.05 significance level. Regression analysis by use of the estimated coefficients (β values), standard error, significance values and odd ratio of independent variables were used to assess the relationship between independent and dependent variables of the study. According to Ramosaco, Dumi and Hasani (2015), the coefficient values in logistic regression measure the expected change in the logit for a unit change in each independent variable with all other independent variables held constant.

4. RESULTS AND DISCUSSION

This chapter presents the findings of the study on the impact of production and processing logistics on farmers continued participation in the maize seed multiplication programme in Baringo South Sub-County in Kenya.

4.1 Background information of the respondents

To gain comprehensive insight into characteristics of farmers in the maize seed multiplication programme in Baringo South sub-county and contextual factors shaping their agricultural practices, a detailed background information was analyzed. The respondents in this study were smallholder farmers with diverse socio-economic backgrounds as represented by different age groups, gender, land sizes and educational levels.

4.1.1 Gender representation of farmers in maize seed multiplication in Baringo South

Understanding and addressing gender disparities by promoting inclusivity, is crucial for developing effective strategies to enhance agricultural sustainability thus creating more resilient and adaptive farming communities. Results depict that most (71.6%) of the respondents were male in comparison to 28.4% female. One key gender constraint in building linkages in farmer organization relates to inequitable participation in the associations. In some instances, membership criteria in some of the maize seed farmer groups in Baringo South was noted as a limiting factor to women's active participation, by insisting on a single membership for an entire family in the name of the head of the household. When membership criteria limit participation of some potential members (women for this case), they do not gain the benefits of improving their information about market opportunities and prices, getting extension services or accessing finance all of which limit their productivity. According to Suwadu and Hathie (2020), women are also underprivileged and face greater challenges in terms of decision-making power and control over productive resources like land, which then limits their access to credit and financing. On the contrary, Rantlo, Tsoako and Muroyiwa (2020) reported 60% female dominance in farmer participation in the informal dairy markets in Maseru area in Lesotho. The explanation given by the later was that women were obligated to oversee farm activities while men went to district business centers to look for more paying jobs.

4.1.2 Age distribution of farmers in maize seed multiplication programme in Baringo South

Table 1 presents the age distribution of the farmers in maize seed multiplication programme in Baringo South sub-county.

Table 1: Age distribution of farmers in maize seed multiplication programme in Baringo South

Age bracket(years)	Frequency	Percentage
20-29	104	29.9
30-39	121	34.8
40-49	87	25.0
50-59	25	7.2
Above 60	11	3.2
Total	**348**	**100.0**

From Table 1, the dominance of an energetic and still productive population aged between 20 to 49 years representing 89.7% cumulatively is worth to note. This can be attributed to the many youth with no formal employment and opt to engage in agricultural activities as a way of sustaining their livelihoods. Cruickshank, Grandelis, Barwitzki &Bammann (2022) noted that, young people are best placed to rejuvenate the agriculture sector, acquire the knowledge and skills needed to innovate, uptake new technologies and spearhead the digital transformation.

4.1.3 Education levels for farmers in maize seed multiplication programme in Baringo South

The study observed that majority of Baringo South farmers attained basic level of education with a majority having attained 35.6% and 32.8% secondary and primary levels respectively. Also, to note is a remarkable 23% of farmers with tertiary education (middle level colleges and universities), employed and taking part in farming. The later could be explained by the fact that this category with higher level of education are involved in other off farm economic activities from which they draw income to sustain their farming ventures. Gido, Sibiko, Oscar, Ayuya & Mwangi (2015) also reported that, higher education level of the household head had a positive and significant association with higher demand for extension as higher levels of education tended to build the innovativeness of the farmer as well as improve on their information processing capacity which is crucial in the adoption of improved agricultural production.

4.2 Impact of production and processing logistics on farmer participation in maize seed programme in Baringo South

The objective of this study was to determine the impact of maize seed multiplication programme production and processing logistics (independent variables) on farmer participation in the maize seed programme (dependent variable). Farmer participation was re-grouped into two namely continued participation and stopped participation. Because of the dichotomous nature of the dependent (outcome) variable, the dichotomy was captured as continued participation (assigned numeric value of 1) and stopped participation (assigned numeric value 0). Using Binary logistic regression, the study sort to access Baringo South farmers' participation in maize seed multiplication programme with respect to production and processing factors that included farmer irrigation capacity, farmer knowledge on credit terms, access to agricultural extension services, road network to and from farm gate, post-harvest equipment adequacy and quality planting seeds supplied to farmers.

The result of the Hosmer and Lemeshow chi-square test conducted to test for the model's goodness of fit suggests that the model was well-fitted since the p-value was insignificant and greater than 0.05 (*p*-value = 0.977). This high p-value suggests that the model's predicted probabilities match the observed outcomes well thus implying the values are approximately equal. **Table 2** presents the estimated coefficients (β values), standard error, significance values and odd ratio of independent variables in the model which include; farmer irrigation capacity, farmer knowledge on credit terms, access to agricultural extension services, road network to and from farm gate, post-harvest equipment adequacy and quality of planting seeds delivered to farmers. Dependent variable remains farmer continued participation in the maize multiplication programme in Baringo South sub-county.

Table 2: Logistic regression analysis for production and processing logistics on farmer participation in maize seed programme

	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I .for EXP(B)	
							Lower	Upper
Farmer irrigation capacity	-1.725	.302	12.628	1	.000	.178	.099	.322
Farmer knowledge on credit terms	.442	.300	2.169	1	.141	1.555	.864	2.800
Access to agricultural extension services	.374	.286	1.701	1	.192	1.453	.829	2.547
Road network to and from farm gate	.604	.296	4.176	1	.001	1.829	1.025	3.264
Post-harvest equipment adequacy	-.648	.385	2.831	1	.050	.523	.246	1.113
Poor quality planting seeds	-1.826	.643	8.076	1	.004	.161	.046	.567
Constant	2.847	.952	8.953	1	.003	17.238		

a. Variable(s) entered on step 1: Farmer irrigation capacity, Farmer knowledge on credit terms, Access to agricultural extension services, Road network to and from farm gate, Post-harvest equipment adequacy and quality of planting seeds.

4.2.1 Farmer participation in maize seed multiplication programme and nature of roads

From **Table 2**, the odds of a farmer continued participation in maize seed multiplication programme farming in areas with good accessible roads from farm gate to dying yards was 1.829 higher than those farmers in areas with impassable roads with 95% CI of 1.025 to 3.264 and significance level of 0.001. Farmers reported that they incur huge expenses in transporting the produce from farm to the collection points and to the dying yards with produce losses occurring along the way. The heavy rains experienced particularly during harvest period worsen the situation thus leaving farmers struggling using manual labor that is so costly. These results point to the fact that quality and accessible road infrastructure has significant impacts on various aspects of agricultural activities and outcomes for smallholder farmers. Good road infrastructure enhances farmers' access to information about prices, weather forecasts and best agricultural practices and this is crucial in enabling farmers make informed decisions about crop management and marketing.

4.2.2: Farmer participation and access to agricultural extension services

From the results in **Table 2**, the relationship between farmer access to agricultural extension services and continued participation in maize seed multiplication programme was insignificant. As presented in Figure 1, majority of farmers representing 61% reported to have been visited only once and another 23% who have never received any visit.

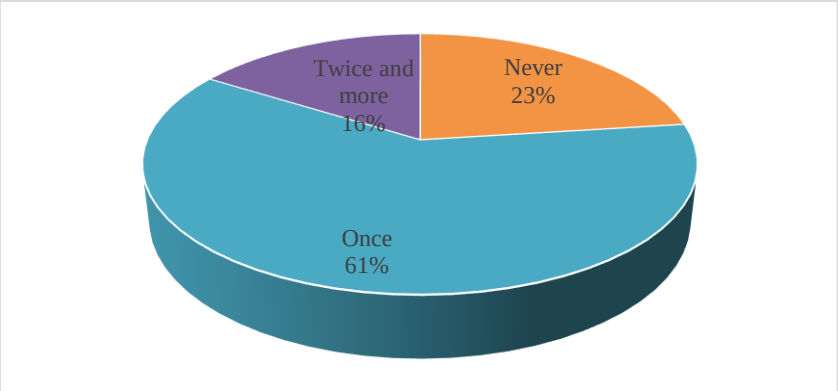

Figure 1: Frequency of monthly agricultural extension agents visits to maize seed farmers in Baringo South

Despite the insignificant relationship between access to extension services and farmer continued participation in maize multiplication programme, the study further sort to establish farmer perception on the effectiveness of the agricultural extension services provided and 60.4 % of the farmers interviewed exuded confidence that the services provided were very useful to them. Farmers' perceptions of agricultural extension services in rural areas are shaped by the impact and accessibility of these services and positive perceptions are often attributed to successful outcomes, such as increased productivity and income. This agrees with Ambetsa, Ndirangu, & Mwangi (2021) who reported that provision of extension services to farmers increased the gross margin of smallholder sugarcane farmers. Msuta and Urassa (2015) also noted that an increase in access to extension services enabled farmers to improve farming which led to increased crop yields as well as income and assets ownership by 53.8% among smallholder farmers in Kasulu district Tanzania.

4.2.3: Farmer participation and post-harvest equipment adequacy

Still as presented in Table 2, the probability of farmer continued participation in maize seed multiplication programme was noted to be 0.354 lower when post-harvest equipment is inadequate with 95% CI of 0.76 to 0.714 at 0.05 significance level. This observation can be explained by challenges that farmers face on yield losses due to adverse climatic conditions such as heavy rains and pests that damage the produce. Farmers most affected by flooding in the 2020 harvest season reported that they were not able to harvest maize seed and thus experienced unprecedented losses. Another factor mentioned by farmers as a contributing to their grain spoilage is the condition of facilities in the drying yards that were compromised by damp conditions as produce is dried in open areas (on the floor) with no shades to shield from rain. Farmers also reported that the cost of post-harvest services, including transportation and labour charges incurred during the grain drying process is sometimes prohibitive for them thus affecting their profitability. The results of the study relate well with an observation by Mesterhazy, Olah and Popp (2020) who reported that nearly half of the total grain losses occur before harvesting process begins representing 1051.5 metric tons per year. According to AfDB (2019), it is estimated that over 30% of harvested crops, 25% of fish, 14% of meat and 40% of dairy produce along the value chain is lost due to poor post-harvest management, inadequate storage facilities and poor produce handling. With the intensity of food insecurity experienced sub-Saharan countries, lessening of post-harvest losses would play a big role in boosting production and safeguarding farmers' hard-earned income. Further analysis presented a number of challenges that farmers consider their biggest hurdle in the post-harvest process. Among challenges included; high cost of labour (40.0%), inadequate equipment for transport, grain-shelling among others (35.7%) and impassable roads during rainy season (24.3%).

4.2.4: Farmer participation and knowledge on credit acquisition terms and conditions

As presented in **Table 2**, The impact of farmer knowledge on credit acquisition on farmer continued participation in maize seed multiplication programme was insignificant at P=0.141. Additionally, this study observed that 15.5% of the maize seed farmers in Baringo reported crop failure as a reason for their inability to repay credit. Despite the variable on credit knowledge and conditions being insignificant on farmer continued participation in the maize seed multiplication programme, farmers cited limited access to formal financial institutions such as banks and microfinance institutions due to physical proximity in rural areas which implied the difficulty for them to access information about credit options and requirements. Additionally, limited financial literacy among farmers, meant they are not well-equipped to understand the terms and conditions of credit products, including interest rates, repayment schedules and collateral requirements. Estimates show that only about 10% of African households in rural areas are connected to formal financial institutions (Oxford, 2019). Grandval (2023) further added that, financial institutions are often unwilling to commit to financial partnerships with small scale farmers because they consider farmer organizations to be insufficiently reliable and professional.

4.2.5: Farmer participation and quality of planting seeds supplied

From **Table 2**, the odds of a farmer continued participation in maize seed multiplication programme was 0.161 lower for farmers who perceived the planting seeds supplied to farmers as being of poor quality in comparison with those who agreed the seed is of good quality with 95% CI of 0.046 to 0.567 and significance level of 0.004. During the study, maize seed farmers reported that more than 200 acres of maize plantations yielded little to nothing despite the promising rains. This left local farmers grappling with a crisis that threatens their livelihoods and food security as they blamed the situation for poor seed quality. Farmers' perceptions of seed quality are influenced by the consistency of seed performance. They are likely to have positive perceptions if the seeds consistently result in healthy, vigorous crops with good yields. Conversely, if the seeds consistently perform poorly, farmers are

likely to have negative perceptions. The Kenya Agricultural and Livestock Research Organization (KALRO) has criticized the continuous sale and distribution of counterfeit seed products which leads to farmers acquiring fake seeds and ending up with poor or no harvests (Muriithi, 2023). From KALRO's perspective, besides portraying the scientists and researchers in bad light with the notion that the fake seeds come from their organization, the counterfeit seeds are also the leading contributor to poor harvests and low crop production by farmers.

4.2.6: Farmer participation and irrigation capacity

Still from **Table 2**, the odds of a farmer continued participation in maize seed multiplication programme was 0.178 lower for farmers with limited capacity to undertake irrigation compared with those who are capable with 95% CI of 0.099 to 0.322 and significance level of 0.000. During the study, farmer reported that, the setup of irrigation systems including the purchase of equipment such as water pumps and pipes is very expensive as farmers struggle a lot to afford the initial investment costs thus limiting their ability to optimally practice irrigation technologies. Beyond the initial investment, farmers alluded that the irrigation systems require ongoing operational expenses, including fuel for pumps, maintenance and water source management which are mostly burdensome for small-scale farmers with limited financial resources. Farmers also linked the cost of irrigation to the limited availability of water resources. The volume of water available for irrigation is a critical factor but water scarcity experienced by farmers in Baringo South just like many other arid and semi-arid lands is made worse by prolonged droughts and competition with other users. Farmers reported that they mostly rely on rivers and seasonal streams as source of irrigation water. However, the quantity and reliability of these sources vary significantly from season to season and year to year and the insufficient or unreliable water sources greatly hinder farmers' irrigation efforts. Limited irrigation capability among the maize seed farmers in Baringo South is further intensified by the high cost associated with fuel(petrol/diesel) used in running water pumping generators particularly in the irrigation blocks not covered under the National Irrigation Authority gravity powered infrastructure.

CONCLUSIONS

The results of this study prove that production and processing factors have an impact on farmer participation in the maize seed multiplication programme in Baringo South. Results point to the fact the that some farmers are exiting maize seed multiplication programme because of the time wasted and expenses they incur as result of poor nature of roads linking their farms to the produce collection and drying yards. Study concludes that efficiency in transport system has the capacity in reducing the imbalance in market benefits that have conventionally put rural small-scale farmers at a disadvantage compared to farmers in areas with good road network. Study results indicate some farmers are opting out of the programme because as a result of inadequate facilities for transport, drying and grain-shelling among others. With unavailability of artificial dryers, farmers in the maize seed programme totally depend on sun to dry their grains in open areas. This implies long time spent when the weather is unfavourable, cost of daily casual labour in grain drying process, grain spoilage, loss through theft incidents and general loss of countless man hours that could have been invested in other economic activities at household level. The study affirms that, reducing of post-harvest losses would play a huge part in enhancing production and safeguarding farmers' hard-earned income.

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