

Factors Influencing Access to Rural Finance Market by Different Actors in Climate Smart Agriculture in Kenya.

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Citation: Miriti L, Matere S, Karienyeh M, Murage A, Kariuki S, Wambua S, and Khatali A. (2023) Factors Influencing Access to Rural Finance Market by Different Actors in Climate Smart Agriculture in Kenya. FARA Research Report Vol 7(20):214-226. <https://doi.org/10.59101/frr072320>

Abstract

In Kenya, small holder farmers face climate change related challenges. It is therefore imperative to enhance adaptive capacity through climate smart agriculture (CSA) technologies. Access to finance is a significant enabler for adoption of CSA technologies yet small holder farmers, especially women, have an acute financing gap for agriculture. The purpose of this study was to carry out an in-depth analysis of rural finance markets that support agriculture and identify factors that influence access by different actors. The study was conducted in eight (8) Kenya Climate Agricultural Project (KCSAP) counties in Kenya. Both qualitative and quantitative approach was used for data collection. A probit binary regression model was used to examine factors perceived to influence farming household access to rural finance market. Results showed a significant effect ($P < 0.001$) of gender, education level, marital status, household size, membership in farmers association, number of months household head resided on-farm in previous year, and household total asset value. Conversely, findings for rural finance actors showed a significant effect ($P < 0.001$) on gender, education level, years of business experience, distance to financial institution and operation of business under partnership. The study recommended that in order to increase utilization of rural finance market services by various actors, following factors are key; Capacity building on both financial literacy and digital banking, locality of financial services should be closer to clients especially those in remote areas, a gender-transformative approach in order to increase women access to rural financial services while also alleviating the gender inequalities in socio-cultural norms.

1.0. Introduction

1.1. Background information

Climate change presents a formidable challenge on agriculture (IPCC, 2018). Smallholder farmers, especially women, in developing countries are the vast majority and most vulnerable to the effects of climate change because of low adaptive capacity, lack of safety nets, and high exposure to livelihood and food-security risks (FAO, 2015a). The vulnerability of agriculture to climate change threatens resilience of production which plays a critical role in food security (FAO, 2011). Climate smart agricultural technologies have the potential to enhance farming systems' resilience to climate change (FAO, 2012). However, building climate-smart agricultural production requires additional capital and customized financial products (FAO 2012). This is because the transformational changes necessary to heighten farmers' productivity and their capacity to adapt to climate change, while reducing the emissions of greenhouse gases from their production process, requires financial access. Farmers access to and utilization of rural finance services is acknowledged to increase farm productivity, food supply and farming households income which also enables the poor accumulate wealth to invest in improved farming technologies and alleviate poverty (Akmal et al., 2012; Carrer et al., 2020; Das, 2018; Kiros and

Meshesha, 2022; Njeru et al., 2016; Silong and Gadanakis, 2020). Farmers with access to credit, saving and insurance services are empowered to acquire appropriate inputs, labour and equipment, invest in more profitable enterprises and effectively participate in markets (Abate et al., 2016; Akmal et al., 2012; Njeru et al., 2016). However, smallholder farmers, mostly women, find it hard to access finance yet financial services such as savings and credit to expand opportunities to adopt more efficient technologies exist (Hussain and Thapa, 2012).

Most farmers especially women and youth, have little financial literacy, scant or no collateral, few alternative and supplemental sources of income, and little or no credit history and track record of successfully repaying loans that impedes their access to financial services (Masood and Keshav, 2020; Njeru et al., 2016; Silong and Gadanakis, 2020). In addition, lenders, for instance, the current financial opportunities like mobile banking, find it difficult to reach them because they are often highly disaggregated and scattered across remote areas. This usually results to high transaction costs for the lender which is rarely outweighed by the small loan amounts that farmers require. Due to socioeconomic, political, and legal barriers accessing finance is an even more acute problem for women (KIPPRA, 2019; World Bank 2014a). The three main barriers to lending for smallholder farmers in agriculture are; inadequate enabling environments, lack of capacity to manage exposure to specific agricultural risks and high transaction costs (FAO, 2015b; KIPPRA, 2019; Turvey and Woodard, 2015).

In Kenya, majority of farmers face growing climate change and variability related challenges. Climate Smart Agricultural Technologies, Innovations and Management Practices (CSA-TIMPs) have been promoted to enhance the adaptive capacity especially for smallholder farmers. Availability and timely access to credit are critical to farmers for acquiring the required inputs to carry out farm operations (Abdallah, 2016; FAO, 2015b). A number of studies reflect the consensus that access to credit influences adoption of agricultural technologies (Abdallah, 2016; Kiplimo et al., 2015; Kirui et al., 2013; Matere et al., 2022; Namboka et al., 2017; Njeru et al., 2016). Kirui et al., (2013), reported a positive and significant influence of access to mobile money services on adoption of agricultural technologies. Although access to finance is a significant enabler for adoption of CSA-TIMPs by smallholder farmers, rural areas particularly have an acute financing gap for agriculture. Women and youths are most affected as they lack the assets that financial institutions demand as collateral (Huyer, 2016; KPRRA, 2019).

In spite of the contribution of credit to the rural development, it has been one of the crucial factors that have not been given proper attention. Rural finance market is full of imperfections, and the formal banking sector does not satisfy the growing demand for credit, with many borrowers turning to informal loan sources (relatives, private moneylenders, etc.) to meet their production and consumption needs. One of the major sources of imperfections in rural credit markets is lack of information that facilitates borrowing/lending transactions. To effectively remove market imperfections in the rural finance markets, it requires correctly identifying the reasons why they exist. This is only possible through a thorough evaluation of finance markets. There has been a renewed interest in improving access to agricultural credit in order to identify sound finance markets which can serve farmers who are often ignored by formal sources. Agricultural actors' improved access to rural finance services for climate smart agriculture (CSA) can act as a catalyst to; unlock additional sources of finance, tighten the links between financial institutions and smallholder farmers especially women and youth, and provide technical assistance to build the capacities of everyone involved in the financial ecosystem.

The purpose of this study was to carry out an in-depth analysis of rural finance markets that support agriculture and identify factors that influence access by different actors. The study was responding to two specific objectives;

1. To identify factors influencing access to rural financial services by households (Farmers)

- To identify factors influencing access to rural financial services by other value chain actors (Agro-transporters, agro-processors, agro-dealers, agro-aggregators among others).

The findings of this study informs on the sustainable strategies in formulation of interventions for enhancing rural financial markets access for actors along agricultural value chains. This will lead to increased sustainable productivity and build resilience of crop and livestock value chain actors through accessible financial services and increased capacity to invest in CSA-TIMPs for crops and livestock.

2.0 Materials and Methods

2.1 Study Site

The study was conducted in 8 out of the 24 designated KCSAP counties in Kenya namely: Kericho, West Pokot, Nyandarua, Nyeri, Isiolo, Taita Taveta, Busia and Kisumu (Figure 1). These counties were pre-selected based on KCSAP project prioritized value chains that would contribute to increased access to rural financial services hence increased agricultural productivity. The counties selected by the project were representative of the different agro-ecological zones (AEZs) namely; High, medium, semi-arid and arid zones. In each zone, the study purposively selected the counties as represented below:

Table 1: Selected Counties and the Agro-ecological Zones

Agro-ecological Zones	Counties selected
High;	Nyandarua and Kericho
Medium	Kisumu and Busia
Semi-arid	Nyeri, West Pokot and Taita Taveta
Arid	Isiolo

The study site is as shown in the map below.

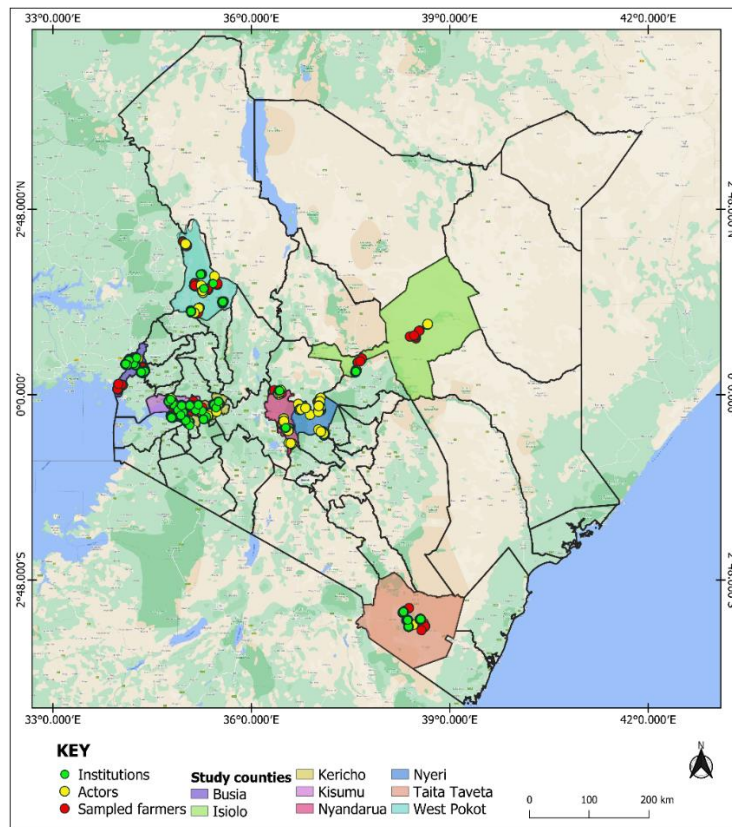


Figure 1: Map of the study sites

2.2 Sampling Design and Determination of Sample Size

The study adopted a hybrid of multi-stage, purposive and random sampling techniques. In each county, KCSAP sub-counties and wards were first identified. A scoping study was conducted to map out crop and livestock rural financial markets in the target KCSAP wards and identify the value chain actors for each market for both formal and informal financial markets. After the scoping study, an inception workshop was conducted with key stakeholders in order to heighten their understanding of the project’s proposed activities and expected results. This was aimed at enhancing their commitment to support the implementation of the proposed project activities and teamwork. Both the scoping study and inception workshop were intended to provide a sampling frame for the study.

Based on the generated sampling frames, random samples were drawn for each category of actors for the survey. Purposive sampling was used to select key informants in the sector for the key informant interviews (KIIs) and participants for focus group discussions (FGDs). Simple random sampling was employed in selecting respondents for the household (farmers) survey.

Cochran’s formula was used to determine the sample size (n) for this study. This sample size was used because it’s accepted as valid for calculating sample size which is smaller or equal to 5% of the population size and when the population size is unknown (Cochran. 1977).

Formula:

$$n_0 = \frac{Z^2 P (1-P)}{e^2}$$

Where e = desired margin of error; (4% - 8%)

Z = Statistics for level of confidence (standard deviation set at 95% confidence level i.e. ± 5 precision error)

P=Estimated proportion of the population. Assumed to be 0.50 since this would provide Maximum sample size.

q= (1-P)

The margin of error was 0.0693, approximately 7%

Therefore;

$$= (1.96^2 * 0.5*0.5) / (0.0693^2)$$

$$= 199.97 \text{ approximately } \sim 200$$

From the study sample calculation, our sample size of 200 households was obtained per county. The rationale was to create an equal opportunity to access most of the farmers and actors.

Primary data was collected through household survey, FGDs and KIIs.

Secondary data was derived from desk review to establish history of organizations, their operations, outreach, costs, performance indicators, financial services provided and socio-economic characteristics of clients, collateral requirements, and uses of loans, transactions charges, default rates, sustainability, constraints and opportunities

2.3 Data Collection tools and Procedures

Through household and market surveys, focus group discussions (FGDs) and key informant interviews (KIIs), the project gathered both qualitative and quantitative data. Structured questionnaires were used for household survey which were generated and uploaded on Open Data Kit (ODK), and then downloaded in smartphones for data collection exercise in the field. FGDs guides and KIIs check lists were used to collect data from selected value chains players and financial institutions. The instruments were pre-tested in the field with a small number of respondents outside KCSAP wards to ensure that all

thematic areas and questions were clearly understood in order for respondents to provide quality information.

Survey data was collected by trained enumerators under supervision of the research team. FGDs were conducted in each county to have in depth understanding of issues surrounding access to different financial services. The FGDs comprised separate groups of 10 male and female farmers drawn from across the KCSAP wards. KIIs comprised of state and non-state actors, farmer group leaders, other actors (agro-processors, agro-transporters, agro-aggregators among others).

2.4 Data Analysis

Descriptive statistics involving means, frequencies and standard deviations were generated using scientific software Stata, which was used to describe access, constraints and effectiveness of rural finance markets. Regression Probit analysis was used to evaluate factors influencing access to rural financial services in the selected crop and livestock value chains. Qualitative information from FGDs and KIIs were analyzed by establishing emerging common patterns and trends on the basis of discourse analysis.

2.5 Description of the Data Analysis Model

According to Nagler (2002), probit model constrains the estimated probabilities to be between 0 and 1, and it relaxes the constraint that the effect of the independent variable is constant across different predicted values of the dependent variables which is normally experienced with the linear probability model (LPM).

The probit model assumes that while we only observe the values 0 and 1 for the variable y , there is a latent, an unobserved continuous variable y^* that determines the value of y .

In estimating the probit model, the dependent variable was taken to be access to rural financial markets, which took the value of 1 if a household/actor accessed and 0 if otherwise. The mathematical formulation of the probit model was as follows:

$$Y_i^* = \omega_0 + \omega_1 z_{1i} + \omega_2 z_{2i} + \dots, \omega_i z_i + \varepsilon_i \dots \dots \dots (1)$$

$$\text{and that, } Y_i = \begin{cases} 1 & \text{if } Y^* > 0, \\ 0 & \text{otherwise} \end{cases}$$

Where: $z_1, z_2 \dots z_k$ represents random variables (Age, gender, level of Education for household head, household size, total value of household assets, membership in farmer association, distance to financial service provider, distance to sources of products), ω_i represents the parameters estimated in the model and ε_i represents unobserved error term. (Nagler, 2002).

The probit model was specified as follows:

$$P_i = \Phi(\omega Z_i) \dots \dots \dots (2)$$

Where P_i is the probability that a household/actor accessed financial services or not. Φ is the cumulative distribution function for the error term. The functional form for Φ depends on the assumption made that ε has a normal distribution with mean zero and unit variance.

The parameters $\omega_0, \omega_1, \omega_2, \dots, \omega_k$ of the probit model do not provide direct information about the effect of the changes in the explanatory variables on the probability of accessing rural financial services alone. The relative effect of each explanatory variable on the likelihood that a farmer accessed rural financial services was given by: $\frac{dp}{dz_i} = F'(Z' \omega) \omega_j$

Guided by related studies (Ayanga, 2006; Hodinott, 1992; Nzomoi, 2007) social economic attributes were identified that had a bearing on the household/actors' access to rural financial services. These socioeconomic variables include: Age, gender, level of education of household head, household size, and total value of assets owned by household, membership in farmers' association, distance to the financial service provider, and distance to the source of products.

A probit binary regression model was used to examine the factors perceived to influence farming household access to rural finance market. We report the marginal effects which is the expected change in

the probability of accessing rural finance services ($y=1$) given a unit change in an explanatory variable (x) from the mean value, *ceteris paribus*. An increase in x increases (decreases) the probability that $y=1$ by the marginal effect, expressed as a percentage. For dummy independent variables, the marginal effect is expressed in comparison to the base category ($x=0$). For continuous independent variables, the marginal effect is expressed for a one-unit change in the independent variable (x).

3.0 Results and Discussions

3.1 Household Demographic Characteristics

The study established that gender of household members in the eight selected counties were almost at par (97% females vs 94% males). The average household size in the 8 counties is 5 members. In all the Counties, household members (at least 30% and above), were in primary school while at least 30% and above members had attained secondary education, apart from West Pokot with only 28% members. Figure 2 shows the education level by Counties.

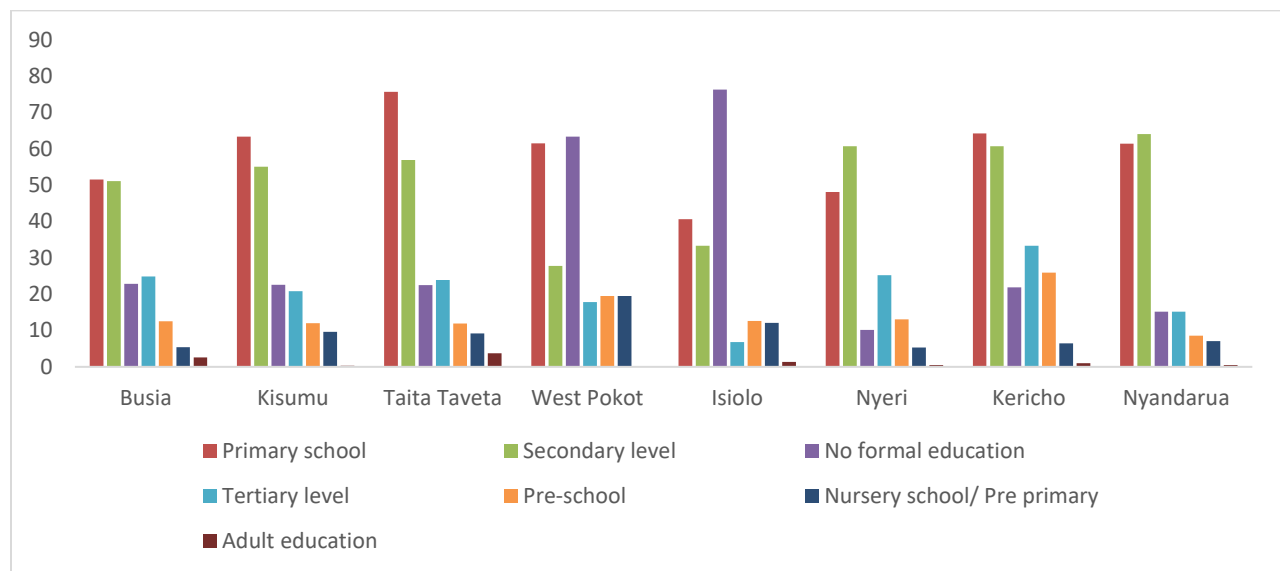


Figure 2: Level of education for Household members

In household ownership of livestock, chicken was the most dominant. However, Sheep was a major livestock asset in Isiolo (73%) and Nyandarua (54%) counties. Cattle was found to be a major asset in most counties with Kericho County leading (89%) and the least being Isiolo county (18%). Analysis by mean showed that the County with highest number of cattle per household is West Pokot. However, the mean in most counties indicates the minimum number of three.

In terms of livestock control, analysis by gender showed that women tend to control small animals which they can comfortably sell without consulting in order to handle household emergencies. Notably, no woman had control of camels. In most communities, large livestock are owned and controlled by men, but the women can use the milk to feed the household. Figure 3 shows the proportion of household control of livestock by gender.

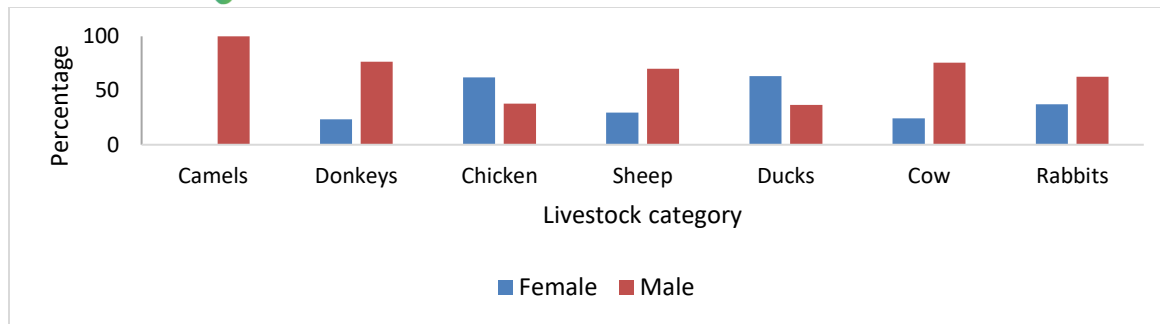


Figure 3: Proportion of household control of livestock in the eight counties by gender

In ownership of household assets, over 50% of households owned cell phones. Kericho County recorded the highest number of households owning the selected assets while Isiolo registered the lowest in all the assets. The high percentage of households who own various assets in Kericho could be attributed to access to income mainly from tea estates and milk which the dominant income earning activities in the area. Likewise, the low percentage of households who own various assets in Isiolo could be attributed to lack of access to income. Isiolo County lies in the arid zone which is not favorable to most agricultural activities.

The study also sought to assess the control of household assets by gender. Findings revealed that women and men are almost at par. However, more men, in comparison to women, were controlling Mobile phones (63% men vs 37% women); radios (69% men vs 31% women), and television sets (74% men vs 26% women). This can be attributed generally to inclination of men to current affairs in comparison to women especially in rural areas hence, ownership of such communication assets that provide news.

In landownership, on average, farmers in the eight counties owned 1.7 acres of cultivated land (annual and permanent crops) and 1.5 acres of uncultivated land (Grazing and homestead).

Farmers in West Pokot County had the largest pieces of land averaging 2.19 acres for the cultivated and 4.17 acres for uncultivated. The large tracks of land can be attributed to the fact that in this county (West Pokot), most farmers practice grazing and hence leave large pieces of land uncultivated. In Isiolo, most farmers did not record the land sizes since the land is communally owned.

3.2 Factors Influencing Access To Rural Financial Services By Households (Farmers)

The study sought to identify the factors influencing access to rural financial services by households. The results in Table 2 portray a positive and significant effect ($P < 0.001$) of gender of the household head on access to rural finance services. This means that male headed households were more likely to access rural finance services compared to their female counterparts. The marginal effects show that being male household head was 12.3% more likely to access rural finance services compared to being a female household head. This is attributed to the existing gender disparity in control of resources. The existing conditions to accessing rural finance are deemed stringent to most female household heads, especially those who are widows or divorcees that are limited in resources. It can be argued that most women lack acceptable collateral security such as land title deeds required by most financial institutions which precludes their access to financial services. In rural areas the traditional property rights are skewed against women which exerts difficulties in providing fixed-asset based collateral.

Likewise, rural women access to information is limited and therefore information on availability of formal financial products is partly lacking which drives women at best to access funds from informal sources of finance. Most rural women are leery of promises of mitigating financial constraints through formal financial institutions. The focus group discussions and key informants interviews revealed that

most rural women are more risk averse than men and thus restrained on the amount of financing to take wary of potential adverse effect on the household should they be unable to repay loans. This corroborates Manta (2019) who acknowledges that financial illiteracy can result in people making wrong choices, and becoming vulnerable to excessive financial risks. On the other hand, the male household heads who mostly control resources that are used as a collateral, or own assets of high liquidity find it easier to access rural financial services compared to their female counterparts. The results concur with Matere et al., (2022) who found that limited access to credit facilities constraint women participation in agricultural product value chains in Kenya.

Age of the household head positively and significantly ($p < 0.001$) influenced access to rural finance services. A 1 year increase in age of the household head increased the probability of accessing rural finance services by 0.6%. The plausible reason of the association of age with accumulation of wealth can be explained by findings from FGDs and KIIs, which further concurs with Kiplimo *et al.*, (2015). The older farmers tend to own land, have more livestock among other resources that can be used as collateral to get credit or insure their agricultural assets, crops and livestock against any calamity compared to the younger ones.

Education level of household head significantly ($p < 0.001$) influenced access to rural finance services. A unit increase in the years of education of household head increases the probability of accessing rural finance services by 3.7%. The result is plausible as education is a proxy to financial literacy and capital endowment, a leverage to access credit, savings and insurance. Farmers with higher level of education have better knowledge and perception of rural financial facilities. Credit application requires documentation which is easily understood by those with higher level of education as applicants are required to fill forms. In seeking assistance on paperwork, the illiterate farmers become more susceptible to be defrauded and reduces their privacy. The results on association of household head level of education and access to credit carries with Saqid *et al.*, (2018) and findings from FGDs.

There was a positive association of the marital status of the household head respondents and access to rural finance services. The marital status of the household heads between those who accessed rural finance services and those who did not were statistically different at 5% level of significance. The marginal effects reveal that a married household head was 2.4% more likely to access rural finance markets compared to one who was not married. Naturally, the married household head is a man while the unmarried household heads are either female headed or child headed. It therefore follows that both female and child headed households are limited in access to collateral and other productive resources.

Household size negatively but significantly ($p < 0.001$) influenced access to rural finance services. A unit increase in the household size reduced the probability of accessing rural finance services by 2.4%. Having a small household size significantly influenced access to rural finance services, it was expected that more household members increases household needs which would necessitate access to credit. A small family size means less strain on household's resources making it more credit worth than in large family size. The results are consistent with Samson and Obademi, (2018) and Kiros and Meshasha, (2022).

Membership in farmers' association significantly influenced access to rural finance services ($p < 0.001$). The marginal effects results indicate that a household head with membership in farmer group was 15.3% more likely to access rural finance services than with non-membership in farmer group. The finding concurs with the notion that social networks facilitate the flow of information, which tends to enhance access to rural finance services. Membership in farmers association accelerate capital accumulation and is also a channel of interactive knowledge exchange, sharing of crucial information about products, logistics, suppliers and technological innovations. Farmer groups are a social asset in rural areas. The focus group discussions revealed that most smallholder farmers access micro-finance through

membership in producers associations and self-help groupings. The groups are a guarantor unit/collateral to access credit. The result corroborates Masood and Keshav (2020). Nevertheless, ensuring farmers maintain their membership in credit groups under fluctuating farm returns that is mainly contributed by adverse climatic conditions among other factors like poor markets for both inputs and outputs could be a challenge to such organizations.

The coefficient for the number of months in the previous year that the household head resided on the farm was positive and significant in influencing access to rural finance market. One month increase in residence on the farm increased the household head probability of accessing rural finance services by 3%. The result suggests that the propensity of utilizing rural finance services increases with the number of years of residence in the village. This also provides evidence of the significance of accumulation of capital associated with the length of stay on the farm. Social capital in information sharing, trust and collective action that emanate from length of stay on the farm and one's character assessment are key in accessing to informal financial services.

The coefficient of household total asset value had a positive and significant effect ($p < 0.01$) on access to rural finance services. The asset value was coded in 10,000s. The marginal effects results indicate that an increase in the household asset value by KES 10,000 increased the probability of accessing rural finance services by 8.2%. A high asset value enables easy access rural finance services especially credit as they may be used as collateral, specifically where the actor can comfortably liquidate some of their assets to repay the credit irrespective of the performance of their agricultural activities.

The diagnostic test on the variables in the models showed that average variance inflation factor (vif) was 1.17, implying lack of multicollinearity in explanatory variables examined.

Table 2: Probit regression results on factors influencing household access to rural financial services

Explanatory variable	Marginal effects	Std. Err.	Vif
Gender of household head (0, 1: 1= male house head)	0.123***	0.025	1.37
Age of house head (years)	0.006***	0.001	1.28
Education of house head (6 levels)	0.037***	0.007	1.06
Marital status (0,1: 1= married)	0.024**	0.012	1.48
Household size (No)	-0.024***	0.006	1.33
Land size (acres)	0.042	0.019	1.02
House head labour on farm (0= part time, 1= full time)	0.026	0.024	1.06
Membership in farmers group (0, 1: 1=yes)	0.153***	0.025	1.04
House head stay on farm in previous 12 months (No. of months)	0.030***	0.005	1.04
Total asset value (KES'0000)	0.082*	0.043	1.18
Observation = 1621			
Log likelihood = -920.410 ***			
Pseudo R ² = 0.1186			

Note: ***, **, * denote statistical significance at the one percent, five percent, and ten percent levels, respectively

3.3 Factors Influencing Access to Rural Financial Services by Other Value Chain Actors (Agro-Transporters, Agro-Processors, Agro-Dealers, Agro-Aggregators).

The results in 3 reveal that female actors were more likely to access rural finance services compared to male actors. The marginal effects show that female actors were 9.2% more likely to access rural financial services compared to their male counterparts. This is plausible as particular credit needs of female actors differ from that of the male. Women's business activities require smaller amounts of capital than are customarily lent, and repayment and collateral requirements must be fairly flexible as those found in informal organizations. Female actors opt for informal institutions because of accessibility and less stringent terms of access. One of the requirements to access is group membership which is a strength associated with women.

Education level of the actor positively and significantly influenced access to rural finance services ($p < 0.01$). A unit increase in the level of education of the actor increases the probability of accessing rural finance services by 36%. The results suggest that higher level of education induces more understanding of various products of the rural finance markets, the procedures entailed in accessing the products and its leverage on growth of business. Education plays a pivotal role in drawing bankable business plans, keeping proper business records, and collateral which banks require. Capacity building of the rural communities to improve the technical knowledge on existing rural finance market products would increase access by the majority with low level of education.

The years of business experience by the actor significantly influenced access to rural finance services. One year increase in the years of experience in the business increased the probability of accessing rural finance services by 2.4%. Arguably, the actors with more experience are likely to have better relationship with other traders and money lenders. This is because it takes time to establish trust among borrowers and lenders. The business operators who had relatively long-term relationships with sources of credit are more likely to access such credit easily compared to relatively new business. In the case of access to credit from formal sources, years of operating the business also plays a key role because the experienced business person might have dealt with banks several times in the past, hence, have a better understanding of the terms, conditions and procedures. The results are in agreement with the findings of Oboh and Ekpebu (2011); Quartey et al., (2012) on a positive relationship between access to agricultural credit and farming experience.

The physical distance from the business operation point to the source of rural finance services negatively influence the business operator's access to rural finance services. One kilometer increase in the physical distance reduced the probability of access by 4.2%. The results suggest that close proximity to the service provider plays a pivotal role in access to financial services. Given that business operators are also farmers or engage in other activities, the opportunity cost of accessing rural finance services could be lower for those closer to the service provider than those far away. Businesses in remotely connected rural areas face high transaction costs that could reduce their incentive to seek financial services. Therefore initiatives to enhance utilization of rural finance services should consider bringing the services closer to the clients though, findings from key informants revealed that institutions are promoting more digital platforms as compared to physical ones.

Those operating business under partnership were 27.4% more likely to access rural finance services than sole proprietors. Partnerships pool economic resources together and synergy from different human capital. This enables circumvent the challenges of business financing and exploit opportunities related to access rural financial markets. There is need to strengthen the existing rural business associations and

facilitating small scale traders to organize themselves into formal partnerships in order to alleviate challenges in accessing rural financial services.

According to Kiros and Meshasha, (2022), age, gender, household size, income, group membership and sources of credit influence agricultural credit demand. Similarly, Namboka, *et al.*, 2017 found that age of the farmer, level of education, gross farm income, and experience in farming were significant in explaining access to credit. Moreover, Silong, and Gadanakis, (2020) established significant influence of education, group membership and household size on credit demand.

Table 3: Probit regression results of factors influencing other actors' access to rural financial services

Explanatory variable	Marginal effects	Std. err	Vif
Gender of actor (0, 1= male)	-0.092**	0.039	1.01
Education level of actor	0.361*	0.019	1.09
Years of business operation (No. years)	0.024***	0.004	1.08
Distance to products(km)	-0.001	0.017	1.05
Distance finance (km)	-0.042***	0.006	1.01
In partnership (0, 1: 1= yes)	0.274***	0.039	1.05
Observations	= 634		
Log likelihood	= -299.410***		
Pseudo R ²	= 0.24		

Note: ***, **, * denote statistical significance at the one percent, five percent and ten percent levels, respectively

4.0 Conclusion and recommendations

4.1 Conclusion

The proportion of household members with no formal education was high in Isiolo (76%) and West Pokot (63%) counties. The two counties also registered low attainment rates at primary, Secondary and tertiary levels. Research has shown that control of large Livestock, especially in semi-arid areas of Kenya, is largely by men while women control poultry which has less value. Large livestock has higher value in terms of sales, in comparison to small animals. This scenario is common in many African households where men generally control income, and thus, assets that generate higher income. The study noted that Kericho County recorded the highest number of households owning the selected assets while Isiolo registered the lowest in all the assets. Notably, in Isiolo and Taita Taveta County, the percent of women controlling household assets was lower than that of men. It can be argued that in most Kenyan households, women are generally marginalized especially in control of farm, as well as automobile assets. This may lead to women being less productive compared to men, yet, they (women) are actively involved in most of the productive activities. To make women more productive, there is need for gender mainstreaming at household and community level in order to bring consultative change where women as well as men can be included in assets control and use. Notably, in Isiolo, most farmers did not record the land sizes since the land is communally owned.

Findings from regression model showed a significant effect ($P < 0.001$) of gender, education level, marital status, household size, membership in farmers association, number of months household head resided on-farm in previous year, and household total asset value. Conversely, findings for rural finance actors

showed a significant effect ($P < 0.001$) on gender, education level, years of business experience, distance to financial institution and operation of business under partnership.

4.2 Recommendation

1. There is need for sensitization in Isiolo and West Pokot Counties on need for education and financial interventions that targets households in order to increase income for further education of their children e.g. group lending approach. This can be done by the ministry of education in collaboration with the financial institutions and the local leaders.
2. Ministry of social services in collaboration with local leaders need to empower households on importance of joint ownership which reduces the gender gap in access to household resources for the betterment of the society.
3. Ministry of agriculture in collaboration with financial institutions need to conduct financial interventions to unlock potential income sources in Isiolo while in Kericho and other Counties, interventions that promote savings are necessary.
4. There is need for gender mainstreaming in the rural households and at community level in order to bring transformative change on asset control and therefore enhance inclusion of women. This can be done by the ministry social services in collaboration with local leaders
5. Ministry of agriculture in collaboration with financial institutions need to carry out interventions that target land intensification in Isiolo County in order to increase farm income for improved savings.
6. In order to increase utilization of rural finance market services by various actors, following factors are key; Capacity building on both financial literacy and digital banking, locality of financial services should be closer to clients especially those in remote areas, a gender-transformative approach in order to increase women access to rural financial services while also alleviating the gender inequalities in socio-cultural norm.

5.0 References

- Abate, G.T., Rashid, S., Borzaga, C. and Getnet, K. (2016), "Rural finance and agricultural technology adoption in Ethiopia: does the institutional design of lending organizations matter?" *World Development*, 84:235-253.
- Abdallah, A.H. (2016). Does credit market inefficiency affect technology adoption? Evidence from Sub-Saharan Africa. *Agric. Financial Review* 76: 494–511
- Abate, G.T., Rashid, S., Borzaga, C. and Getnet, K. (2016), "Rural finance and agricultural technology adoption in Ethiopia: does the institutional design of lending organizations matter?" *World Development*, 84:235-253.
- Akmal, N., Rehman, B., Ali, A., & Shah, H. (2012). The impact of agriculture credit on growth in Pakistan. *Asian Journal of Agriculture and Rural Development*, 2(4): 579.
- Carrer, M.J., Maia, A.G., Vinholis, M.D.M.B., Filho, H.M.D.S. (2020). Assessing the effectiveness of rural credit policy on the adoption of integrated crop-livestock systems in Brazil. *Land Use Policy*, 92, 104468.
- Cochran, W. G. (1977). Sampling techniques. 3rd Ed. New York: John Wiley & Sons.
- Das, T. (2018) "Does credit access lead to expansion of income and multidimensional poverty? A study of rural Assam", *International Journal of Social Economics* <https://doi.org/10.1108/IJSE-12-2017-0592>
- FAO. (2015b). Barriers, incentives and benefits in the adoption of climate-smart agriculture Lessons from the MICCA pilot project in Kenya Background report 9
- FAO. (2015a). Climate change and food security: risks and responses. Rome
- Huyer S. (2016). Closing the Gender Gap in Agriculture. *Gender, Technology and Development* 20:105-116.
- Intergovernmental Panel on Climate Change (2018). Global Warming of 1.5°C. Special Report. <https://www.ipcc.ch/sr15/>
- Kenya Institute for Public Policy Research and Analysis (KIPPRA). (2019). Women's Access to Agricultural Finance in Kenya: Baseline Report.
- Kiplimo, J. C., Ngenoh, E., Koech, W and Bett, J. K. (2015). Determinants of access to credit financial services by smallholder farmers in Kenya. *Journal of Development and Agricultural Economics*, 7(9), 303–313

- Kiros, S and Meshesha, G.B. (2022). Factors affecting farmers' access to formal financial credit in Basona Worana District, North Showa Zone, Amhara Regional State, Ethiopia. *Cogent Economics & Finance*, 10:1-22. DOI: 10.1080/23322039.2022.2035043.
- Kirui, O.K., Okello, J.J., Nyikal, R.A., and Njraini, G.W. (2013). Impact of Mobile Phone-Based Money Transfer Services in Agriculture: Evidence from Kenya. *Quarterly Journal of International Agriculture* 52(2): 141-162
- Masaood, M and Keshav, L. (2020). Factors affecting farmers' access to formal and informal credit Evidence from rural Afghanistan. *Journal of Sustainability*, 12(1268), 1–16.
- Matere, S., Busienei, J.R., Irungu, P., Mbatia, O.L.E., Kwena, K. (2022). Gender in adoption of improved pigeon peas and its effect on food security in Kenya. *Development in Practice*, DOI: 10.1080/09614524.2022.2049705
- Namboka, V.M., Nyangweso, P. and Kipsat, M.2017. Analysis of factors influencing demand for agricultural credit among farmers in Kapenguria, West Pokot, Kenya. *African Journal of Agriculture and Environment*, Vol. 3 (1) – 2017, PP. 27-51
- Manta, A. (2019). Financial inclusion and gender barriers for rural women. *International Journal of Management* 10(5) doi:10.34218/ijm.10.5.2019.006
- Njeru, T. N., Mano, Y and Otsuka, K. (2016). Role of access to credit in rice production in Sub-Saharan Africa: The case of Mwea irrigation scheme in Kenya. *Journal of African Economies*, 25(2), 300–321. <https://doi.org/10.1093/jae/ejv024>
- Quartey, P., Udry, C., Al-Hassan, S and Seshie, H. (2012). Agricultural financing and credit constraints: The role of middlemen in marketing and credit outcomes in Ghana.
- Samson, A., & Obademi, O. (2018). The determinants and impact of access to agricultural credit on productivity by farmers in Nigeria; Evidence from Oyo state, Nigeria. *Advances in Social Sciences Research Journal*, 5(3), 252–265. <https://doi.org/10.14738/assrj.53.3588>
- Saqib, S.E., Kuwornu, J.K.M., Ahmad, M., Panezai, S. (2018). Subsistence farmers' access to agricultural credit and its adequacy: Some empirical evidences from Pakistan. *International Journal of Social Economics* 45(2):1-12 DOI:10.1108/IJSE-12-2016-0347
- Silong, A. and Gadanakis, Y. (2020). Credit sources, access and factors influencing credit demand among rural livestock farmers in Nigeria. *Agricultural Finance Review*, 80 (1): 68-90. ISSN 0002-1466 doi: <https://doi.org/10.1108/AFR-10-2018-0090> Available at <https://centaur.reading.ac.uk/85405/>
- Turvey, C. G., & Woodard, J. (2015). A field study for assessing risk-contingent credit for Kenyan pastoralists and dairy farmers. *Agricultural Finance Review*, 75(3):330-348.
- World Bank (2014a). General Principles for Credit Reporting. <http://www.worldbank.org/content/dam/Worldbank/Research/GlobalFindex/WB>
- World Bank (2017). Microfinance and economic development. Policy Research Working Paper 8252 Development Research Group Finance and Private Sector Development Team.