# Determinants of farmer participation in collective marketing and intensity of participation in indigenous chicken markets in Western Kenya

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**Abstract:** *With increasing globalization, expanding agribusiness and liberalization, there is a danger that smallholder producers may find it difficult to participate effectively in the growing market economy and subsequently become marginalized. Smallholder producers need to improve the quality of their competitiveness in order to survive. Formation of farmer marketing organizations has been one of the initiatives in Kenya to supplement public and private sector initiatives to promote active involvement of smallholder farmers participation in the markets. To this moment, such institutional, macro and trade policy interventions have failed to stimulate market participation by smallholder farmers and also agricultural and rural transformations. This study used a sample of 300 farmers in Kakamega county Kenya to investigate the socioeconomic and institutional factors that influence smallholder indigenous chicken farmer's decision to participate in collective marketing and the intensity of their participation in these markets. Heckman two stage regression results indicated that the decision and the intensity of smallholder farmers participation in collective marketing was significantly influenced by years of formal education of the household head, land size, accesibility of credit, distance to the extension service, average price per bird, age of the household head, decision making in groups and off-farm engagement. Land size had an inverse relationship with the decision to participate in farmer marketing groups implying the desire of majority of the farmers who owns small land sizes to increase their accesibility of productive resources through gropus that would assist them to improve their market participation through collective means. There is therefore need to promote the capacity of groups to assist farmers improve management practices at low cost within their small land sizes, motivate young farmers and reduce transaction costs.*
*Keywords: chicken, farmer, groups, participation, markets,*

## I. Introduction

Expanding agribusiness and liberalization poses a threat to smallholder producers capacity to effectively participate in the growing market economy and subsequently become isolated (Lapar *et al.,* 2009). This threat can however be mitigated if smallholder producers improve the quality of their competitiveness in order to survive. Its however noted that many constraints stand in their way to realize progress as a result of inferior technology in the supply chain, high transport and handling costs, insufficient information, and weak institutional arrangement.

The need for smallholder farmers to organise themselves to overcome the constraints is more emphasised since market participation is both a cause and a consequence of development (Boughton *et al.,* 2007). Households net position does not only depend on market prices but also on the ability of the households to access productive technologies and adequate public and private goods (Barrett, 2008). To this moment, macro and trade policy interventions have failed to stimulate market participation by smallholder farmers and also agricultural and rural transformations.

Formation of farmer marketing organizations has been one of the initiatives in Kenya to supplement public and private sector initiatives to promote active involvement of smallholder farmers participation in the markets (Shiferaw, 2009). Farmer marketing organizations are seen as a different way to gain bargaining power in the value chain and a mechanism to improve access to capital and information (Lapar *et al.,* 2010). Participation in collective marketing is more tied to household assets. A study by Obare *et al.,* (2009) showed that participation in producer marketing groups decreased with per capita farmland which suggests that households with small land holdings has a higher likelihood of participating in collective marketing. This forms the basis for which collective marketing is a solution tailor made for the resource poor farm households. The test of the effectiveness of a farmer organization is in understanding the extent the rules of conduct and activities are perceived as benefiting its members as an impetus to encourage more farmers to join more beneficial collective marketing. Though studies document the benefits of collective marketing, majority of the smallholder IC farmers in Kakamega county opt to market individually. This study aims at investigating the socioeconomic and institutional factors that influence smallholder IC farmer's decision to participate in collective marketing.

## II. Objective of the study

The overall objective of the study is to contribute towards attaining food security and poverty reduction in Kakamega County. Specific objective was to evaluate the determinants and intensity of smallholder farmers participation in Indigenous Chicken Producer Marketing Groups.

## III. Materials and methods

The purpose of the following estimation was to identify factors that drive participation in collective marketing and the extent to which farmers participate in Indigenous Chicken markets. Let ∩ be the true impact of household participation. Thus

$$\cap = l_{1i} - l_{01} \dots\dots\dots\dots\dots\dots (1)$$

Where $I_{1i}$ is income from eggs and chicken sales, if household *i* chooses to participate and $I_{0i}$ is income if the household *i*, chooses not to participate.

However since a household cannot be both a participant and non-participant at the same time, we cannot observe the true impact on participants' income. Instead, the observed income of household i is expressed as:

$$l_i = p_i l_{1i} + (1 - p_i)l_{01} \dots\dots\dots\dots\dots\dots (2)$$

Where $P_i$=1 if the household is a participant and zero if non participant. Given the importance of observing the true impact of participation on income, the goal is to get an unbiased estimate of *n* for the average household. The mean difference between participant and non-participant would be an unbiased estimate of *n* if households are randomly selected. However, this is not the case. This means higher income from indigenous chicken farming may not necessarily be attributed directly to the group participation.

Secondly, some of the factors that influence a household decision to participate may also determine the level of participation in markets. This might result in an overstatement of the estimator of the dummy of group participation in a linear dummy variable regression (Greene, 2000). Therefore, it is necessary to check for self-selectivity bias in the estimation of the effect of membership of the local association on gross margin.

Originally, such models were estimated using the Tobit model that accounts for the clustering of zeros due to non-participation. However, a major limitation with the Tobit model is that it assumes that the same set of parameters and variables determine both the probability of market participation and the level of transactions.

A two-step model however relaxes these assumptions by allowing different mechanisms to determine the discrete probability of participation and the level of participation. These models allow for a separation between the initial decision to participate and the decision of how much given. In this case, it was assumed that some right hand side variables would affect differently the decision to participate at all and the decision on the level of participation. In order to control for selectivity bias of households when participation is not random, a Heckman's two stage regression model was estimated. Firstly, the participation decision was modelled as a binary choice problem. Secondly, gross income from eggs and chicken sales was linearly regressed on explanatory variables including the Inverse of Mill's Ratio, which originates from the binary dependent variable model (Heckman, 1979). This approach follows Maddala (1983) and Greene (2000) and has been widely applied in other empirical studies on institutional arrangements (Masten et al 1991; Warning & Key 2000; Key &Mc Bride, 2001; D' Haese et al2003).

In the first step, a Probit model was estimated (selection equation) to identify factors driving participation. Assuming that the probability of choosing a market channel depends on a set of factors that affect the behaviour of chicken farmers, then a Probit model was developed as follows:

$$PART\ N = \beta iXni + Vi \dots\dots\dots\dots\dots\dots (3)$$

Where $X_{ni}$ = $i^{th}$ attribute of the $n^{th}$ respondent

$\beta i$ =the parameter vector to be estimated; and

$Vi$ = random error or disturbance term

The estimation of the Probit model allowed for calculation of a household specific selectivity variable (inverse of mills ratio, λ) which measures probability of the household being a participant. The λ was used to address self-selection bias that may result from participation being a voluntary choice exercised by the household.

$$\lambda = \frac{\theta(\beta`K)}{(1 - \emptyset(\beta`K)}\dots\dots\dots\dots\dots\dots (4)$$

Where *K* is set of variables explaining participation decision; θ and ∅ are the probability density and cumulative distribution of the error term respectively; while λ and $\beta$ are the parameter vectors.

In the second stage, the outcome equations are estimated by ordinary least squares, where the outcome equations include both the original *X* whose coefficients are the parameters of the population selection equation and the constructed value of the inverse of mill's ratio, λ. The regressions or observations are estimated as:

$$Y_1 = \beta X_{i1} + \beta \lambda_{i1} + \varepsilon_{i1} \dots\dots\dots\dots\dots (5)$$

$$Y_2 = \beta X + \beta \lambda_{i1} + \varepsilon_{i1} \dots\dots\dots\dots\dots (6)$$

Where, λ and $\beta$ are as earlier defined. While $Y_1$ is the outcome equation for the participants and $Y_2$ is the outcome equation for the non-participants sub-sample. Sample selection bias has been corrected by the selection

equation, which determines whether an observation makes it into the non-random sample. This estimator is consistent and asymptotically normal. The sign of the inverse of mill's ratio is often substantively useful information as it indicates the correlation between the unobservable in the selection and outcome equations.

The standard t-test of the null hypothesis that $\beta = 0$ is the test of the null that there is no selection bias, conditional on the assumption of the model. The sign of $\lambda$ indicates the correlation between the unobservable in the selection and outcome equations.

The Heckman's two-stage switching regression describing group participation choice by a sample of indigenous chicken farmers was then divided into selection and outcome equations. The selection equation of evaluating drivers of group participation was modelled as:

$$Pi(0\ 1) = B_0 X_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 \ldots \ldots \ldots \ldots B_n X_n + \varepsilon$$

$$Pi(0\ 1) = B_0 X_0 + B_1 X_{\text{FARM SIZE}} + B_2 X_{\text{CREDIT ACC} \sim S} + B_3 X_{\text{H}_{\text{EDU}}} + B_4 X_{\text{OFF FARM}_E \sim T} + B_5 X_{\text{DIST EXT}}$$
$$+ B_5 X_{\text{GenderHH}} + B_5 X_{\text{AGE HOUSEHD}} + B_5 X_{\text{HOUSEHOLD SZ}} + \varepsilon$$

Regression or outcome equation of extent of participation is modelled as:

$$Proportion\ of\ chicken\ sold\ (Yi)$$
$$= B_0 X_0 + B_1 X_{\text{OFF FARM}_E \sim T} + B_2 X_{\text{GenderHH}} + B_3 X_{\text{AGE HOUSEH} \sim D} + B_4 X_{\text{FARM SIZE}}$$
$$+ B_5 X_{\text{CREDIT ACC} \sim S} + B_5 X_{\text{H}_{\text{EDU}}} + B_5 X_{\text{HOUSEHOLD SZ}} + B_5 X_{\text{DIST EXT}} + \varepsilon$$

Age was described in this study as a composition of the effect of farming experience and planning horizon and one that can take either positive or negative sign. Young farmers may not have adequate experience required to make the right marketing decisions compared to the older farmers (Omiti et al2009) and therefore given a priori positive and negative sign.

Human capital reflects the social aspect of the farmer and is represented by education. It also determines the ability of the farmer to access and evaluate the information on markets (McBride, 2002). A farmer with more years of education has a higher likelihood of accepting new technologies and initiatives and therefore and therefore assigned positive sign.

Gender is presumed to be an important variable that influence a farmer's decision to participate in collective action. There are differences in male and female households in terms of access to and ownership of assets, education, credit and technology and which may influence market accessibility. Male headed households are expected to have a higher intensity of participation in markets but less likely that they participate in collective marketing as compared to female headed households who have a higher likelihood of participating in group marketing but low intensity of participation (Mathenge et al 2010).

Higher access to resources including credit and information key in making rational marketing decisions have been observed in male headed households (Kaliba et al 2000) and was therefore assigned a positive sign.

Previous studies have indicated unclear direction in regard to group membership as the farmers are observed to form positive or negative attitude towards an initiative through group contacts (Nkamleu, 2007). Group membership direction is not well defined.

Land size is given a negative and a positive sign as well managed large tracts of land have a higher likelihood of generating surpluses for the market (Martey et al 2012). Farmers with a bigger land size are likely to have a higher capacity to diversify their IC production system to for example scavenging which is more cost effective with limited application of management interventions thereby generating market surpluses (Owuor, 2009). The ability of farmers with small land sizes to diversify their IC enterprise is limited by land space and competition from other farm enterprise perceived to be more productive thus limiting surplus for sale (Genius et al 2006).

Land tenure has reported inconsistencies in previous studies in terms of its influence on group participation. Progress in groups may require members to adopt investments tied to land (Fernadez-Carnejo, 2002). In such a case, tenants may remain aloof to group membership or quit when such conditions comes in force.

Household size is linked to increased consumption and trade-off between consumption and sale (Mathenge et al 2010). Large household size is expected to have a positive influence on participation and extent of participation if the household provide labour greater than the household consumption demand.

Distance to the nearest market is use as a proxy for market accessibility. Longer distances are associated with increased transaction costs (Abdulai and Huffman, 2005) and therefore higher likelihood of joining farmer groups for cost share purposes and therefore given a positive sign.

**Table 1: Description of variables used in the heckman two stage model**

| Variable | Description | Unit of measurement | sign |
|---|---|---|---|
| *Dependent variables* | | | |
| Group membership | If a farmer is a member of an IC farmer marketing group | Membership in IC marketing group 1=Yes 0=No | |
| Sale proportions | Quantity of sale as a proportion of number kept | Extent of participation in markets: Number of birds. | |
| *Independent variables* | | | |
| Gender | Gender of the household head | 1=Male 0=Female | (+/1) |
| Farm size | Total land owned by the household | Acres | (+/-) |
| Education of the household head | Years of formal education of the household head | Completed years | (+/-) |
| Access to credit | Accessibility of credit by the household | 1=yes 0=No | (+) |
| Off-farm engagement | Engagement of household members in activities outside the enterprise | 1=yes 0=No | (+) |
| Household size | Number People in a household | Number of household members | (+) |
| Dist_extension | Distance to the nearest extension service | Distance in Kilometers | (+) |
| Average price per bird | Prevailing average market price per bird | Price in KES | (+/-) |
| Distance_market | Distance to the nearest extension service | Distance in kilometers | (+) |
| Land tenure | Land ownership system | 1=Leased 2=Owned | (+) |
| Decision making on sale | Decision making regarding sale | 1=Officials 0=Members | (+/-) |
| Cost_ production | Cost of production | Cost of feeds | (+) |

Off-farm engagement which is an indicator of household's income diversification is expected to have a positive influence on participation in farmer marketing groups. Farmers are likely to invest the extra income into the chicken enterprise hence increasing production. Lubungu et al (2012) observed that off-farm income increase marketable surplus and market participation if invested in farm technology to improve production volume.

When decisions regarding sale are made by the group officials, it is expected that the intensity of participation may improve compared to when the decisions are made by the group members. Officials are more networked and hence more likely to gather valuable information regarding the demand in other markets to facilitate more sales. Groups have a higher potential to access quality market information to facilitate making informed marketing decisions (Olwande et al 2010) and therefore given a positive sign.

It is expected that the more the farmers invest in the enterprise in terms of cost of production, the higher the intensity of participation. However, challenges in production such as diseases and relatively low prices can undermine the extent to which the farmers participate in the market as also observed by Agwu et al (2008) and therefore given a positive and a negative sign.

Land ownership is expected to have both positive influence on market participation and a negative influence on intensity of participation. Farmers on leased forms of ownership system can only invest in the enterprise up to a manageable risk. Land may have indirect market participation such as security for credit to promote adoption of improved technologies (Olwande and Mathenge, 2010).

## IV.    Results and Discussions
Step one of the heckman two stage regression was used to determine the factors influencing farmers participation in groups. The decision by the farmers to participate in group marketing is influenced by a variety of social economic factors. The variables included in the estimation were age, gender, , credit access, access to extension services, individual land tenure, farm size, household size, education level, decision making with regard to sale of birds, average price per bird, cost of production and off farm engagement (variable representing farming as main activity and that for combination of farming and businesses).

**Table 2: Descriptive statistics of variables used in heckman two stage regressions**

| Variable | Observations | Mean | Standard Deviation |
|---|---|---|---|
| Gender of the household head | 149 | 0.765101 | 0.425366 |
| Size of the farm | 149 | 5.234228 | 3.160242 |
| Education of the household head | 149 | 13.4698 | 6.117716 |
| Access to credit | 149 | 0.295302 | 0.457717 |
| Off-farm engagement | 149 | 0.657718 | 0.476074 |
| Household size | 149 | 5.90604 | 3.243168 |
| Distance to the extension service | 149 | 3.382886 | 2.986002 |
| Average price per bird | 149 | 317.9866 | 391.2257 |
| Distance to the market | 132 | 2.932121 | 5.31536 |
| Land tenure | 149 | 0.785235 | 0.412044 |
| Decision making on sale | 149 | 0.060403 | 0.239035 |
| Cost of production | 139 | 11785.04 | 15562.49 |

Multi-collinearity among the variables was tested before the model was estimated and therefore the Variable Inflation Factor was computed. All the variables in the model had a VIF of less than ten hence a confirmation that multi-collinearity was not observed. The results of heckman first stage regression are presented in Table 3. The significance of the inverse mills ratio confirmed that participation and extent of participation in Indigenous Chicken Farmer groups could be attributed to covariate fitted.

## V.    Estimating factors influencing farmer participation in IC markets.

Step one of the heckman two stage regression was used to determine the factors influencing farmers participation in groups. The decision by the farmers to participate in group marketing is influenced by a variety of social economic factors. The variables included in the estimation were age, gender, credit access, access to extension services, individual land tenure, farm size, household size, education level, decision making with regard to sale of birds, average price per bird, distance to the market and off farm engagement (variable representing farming as main activity and that for combination of farming and businesses).

**Table 1: Heckman maximum likelihood estimates for factors that influence participation in collective marketing**

| Variable | Coefficients | Standard error | P>|Z| |
|---|---|---|---|
| Gender of the household head | 0.361 | 0.280 | 0.198 |
| Age of the household head | -0.00871 | 0.0101 | 0.393 |
| Size of the farm | -0.0204 | 0.0347 | 0.557 |
| Education of the household head | 0.0346* | 0.0141 | 0.0141 |
| Credit access | 0.471* | 0.248 | 0.0582 |
| Off-farm engagement | -0.0156 | 0.244 | 0.949 |
| Size of the household | -0.0433 | 0.0371 | 0.242 |
| Distance to extension | 0.0891* | 0.0474 | 0.0629 |
| Average price per bird | 0.000412* | 0.000232 | 0.0377 |
| Distance to the market | 0.0177 | 0.0115 | 0.124 |
| Wald chi2 (10) | 118 | | |
| Prob chi(2) | | 0.000** | |
| Lambda | | 0.077** | |
| N | 146 | | |

**Source:** Field Survey data 2013
[1] ***Significant at 1%, **5% and *10%

The intensity of participation in the market increased with age, off-farm engagement and the decion to sell but reduced with increased farm size, and years of formal education of the household head.

Age of the household head was a highly significant determinant of the extent of farmer participation in collective IC Marketing. Older farmers have more experience and networks that helps them gather reliable information on better market in terms of prices compared to young farmers. This is consistent with the findings by Omiti et al (2009) who found out that older and experienced farmers are more likely to make better marketing decisions and develop better contacts thus allowing trading opportunities to be discovered. Better contacts are more realised at collective level than at a group level and therefore more preffered in terms of attracting better prices.

Education was found to have a negative effect on the extent of farmer participation in the market at 10% significance level. Education places a farmer in a more better position with regard to access and synthesis of market information translating to more marketing options with better prices. These results are consistent with findings by Martey et al (2012) who found education as an essential requirement for utilization of market information resulting to enhanced understanding of market dynamics and informed market participation decisions.

Engagement of the farmer in off-farm activities had a significant positive effect on the extent of participation in the market. This means that farmers engaged in off farm activities invested income earned from the activities in the IC enterprise hence higher production enabling them to participating more in the market. These results coincide with findings by Lubungu et al (2012) that off-farm income is likely to increase marketable surplus and market participation if invested in farm technology to improve production volume.

The results showed that participation in IC marketing groups increases with reduction in farm size. An increase in the size of the farm by one acre, reduced the intensity of participation in IC marketing groups. This contradicts findings by Mathenge et al (2010) who observed a higher potential of large farms to increase arket

participation. This inverse relationship can be explained from the fact that farmers with small land sizes are likely to depend more on income from IC enterprise compared to those with large land sizes who are likely to diversify their investment to other forms of livestock and crop enterprise. This is consistent with the findings by Olwande and Mathenge (2011) who observed small land sizes as coupled with limited assets and access to credit and therefore unable to generate surpluses for the market. They therefore opt to market collectively to cost share and reduce on transaction costs and ultimately manage to generate higher revenue from the little they offer in the market.

Increased distance to the nearest market was observed to insignificantly increase the likelihood of farmers joining farmer IC marketing groups as shown in the table below. This is attributed to the increased need to reduce on the transport cost through collective marketing in the face of poor road networks as observed in chapter four. Sindi (2008) indicated that selling at the farmgate was less profitable and therefore the preference for selling directly in the livestock market. To achieve this, farmers therefore opt to market collectively to benefit from reduced costs of transportation to the market.

Distance to the extension service had a significant positive influence on participation. Longer distances to the extension service translates to poor accesibility to information on input and output demand and prices to make informed marketing decisions. This result to the increased need by farmers to join groups to widen their opportunities to access quality information on markets. These results are cosistent with findings by Olwande and Mathenge (2010) that distance to the extension service captured the travel time and associated costs that influence market participation.

Credit access had a positive influence on participation. This means that household heads who accessed financial credit over the period 2012/2013 were more likely to participate in collective marketing. Households that are poor face challenges with regard to compliance with group membership demands and therefore improved access to credit puts them in a more better financial capacity to particpate in collective action. This result coincide with findings by Lerman, (2004) who observed credit playing a crucial role in enhancing and linking farmers to networks that facilitate access to information, modern technology and essential inputs in production.

## VI.  Estimation of factors influencing the extent of farmer participation in IC markets.

Step two of the heckman two stage regression was used to determine the factors influencing the extent of farmers participation in groups.

**Table 4: Heckman OLS estimates of factors influencing the extent of farmer participation in IC markets**

| Variable | Coefficients | Standard error | p>|Z| |
|---|---|---|---|
| Age of the household head | 0.00956** | 0.00312 | 0.00226 |
| Size of the farm | -0.0535*** | 0.0103 | 0.00119 |
| Education of the household head | 0.00714* | 0.00412 | 0.0816 |
| Off-farm engagement | 0.129* | 0.0641 | 0.0434 |
| Distance to the nearest extension service | -0.00471 | 0.00943 | 0.614 |
| Gender of the household head | 0.0146 | 0.0712 | 0.837 |
| Size of the household | 0.0154 | 0.0109 | 0.157 |
| Land tenure | -0.0673 | 0.0663 | 0.309 |
| Decision making on sale | 0.599*** | 0.132 | 0.00115 |
| Cost of production | 0.454 | 0.121 | 0.972 |
| Wald chi2 (10) | 118 | | |
| Probchi(2) | | | 0.000** |
| Lambda | | | |
| | | | 0.0779* |
| * | | | |
| N | 146 | | |

**Source:** Field Survey data 2013
[1] ***Significant at 1%, **5% and *10%

The extent to which farmers participate in markets is influenced by a variety of social economic factors. Age and gender of the household head, credit access, access to extension services, land tenure, farm size, household size, education level, decision making with regard to sale of birds, average price per bird, distance to the market and off farm engagement (variable representing farming as main activity and that for combination of farming and businesses) are the variables included in the estimation.

Years of experience in the enterprise was positively significant at 1%. This result implies that as the age of the farmer increases, the probability for increased intensity increases. Advanced in age results in increased knowledge and techniques involved in the enterprise as also observed by Agwu (2009). The farmer accumulates more networks with advance in age that helps him to fetch more markets for his produce.

Decision making with regard to sale of birds positively influenced the intensity of participation in the IC markets. Majority of the decisions at 93.96% were made by the group officials who are more networked and have more information on markets. Olwande (2010) observed that groups have relatively higher potential of increased access to information that is important in making informed marketing decisions leading to increased intensity of participation by the members.

Off-farm engagement positively influenced the extent of farmer participation in IC markets at at 10% significant level. This is consitent with findings by Agwu and Ibeabuchi (2011) who observed off-farm income increasing with expansion of farm enterprises and quantity traded. Enete and Igbokwe (2009) also observed increased commercialization probabilities with increased incomes.

Size of the farm was negatively significant at 1% level. This means that as farm size increases, the probability of increased intensity of participation reduces. This contradicts findings by Martey et al., (2012) who observed increased levels of commercialization with increased land size. Farmers with large farm size have the capacity the capacity to diversify to other farm enterprises reducing dependence on IC enterprise.

Education of the household head positively and significantly increased the intensity of farmer participation in the market. More years of formal education translates to opportunities for utilization of market information to realise more market opportunities for farm produce. These results are consistent with those of Lubungu et al., (2012) who observed education as a factor that improves understanding of market dynamics resulting into informed market participation decisions.

## VII. Conclusion and Recommedations

The decision by smallholder farmers to participate in collective marketing of indigenous chicken through farmer marketing groups was significantly influenced by a variety of factors including years of formal education of the household head, accesibility of credit, distance to the extension service and average price per bird. The extent of farmers participation was influenced by age of the household head, size of the farm, decision making in groups, off-farm engagement and years of formal education of the household head. Land size had an inverse relationship with the decision to participate in farmer marketing groups though the influence was insignificant.

This imply the desire of majority of the farmers who owns small land sizes to increase their accesibility of productive resources that would assist them to improve their market participation through collective means. There is therefore need to promote the capacity of groups to deliver benefits to farmers in terms of improved housing and better management practices within their small land sizes to improve their stock of birds and ultimately manage to produce surplus for the markets. This would work as an incentive for other individual smallholder farmers to participate in more beneficial collective marketing.

Age of the households positively influenced the decision to participate in group marketing. This indicate the need to motivate young farmers (the youth) to market collectively. Evidence show that years of experience is linked to making of rational marketing decisions indicating how the youth stand to benefit from group marketing. Incentives such as involvement of youth in group leadership and improvement of group management practices through capacity building and training should be more aggresively addressed. It should also involve county level policies in exploring opportunities for young farmers within the devolved systems of governance on issues such as improved accessability of credit which also influenced group participation. The positive relationship between rural credit and group participation indicate the need to avail information and awareness among the youth on such government funded financial packages such as the Uwezo Fund for women and youth and how they can manage the fund to improve the effectiveness of groups in addressing market accessibility and participation.

Road networks need to be improved as an impetus for impoved efficiency of farmer marketing groups in promoting market participation. The high transaction costs incurred and that forms a major determinant of group participation can greatly reduce with improved road networks to facilitate accesability of markets especially during the rainy season.

The failure of gender to influence participation in group marketing is an indication of improved accesability of productive resources by women and female headed households and also their voice in making marketing decisions.

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