

Determinants of Market Facilitators Choice by Smallholder Farmers in Laikipia County, Kenya

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Abstract: Horticultural crop production is one of the major crops grown in arid and semi-arid lands especially in Laikipia County, Kenya. Market facilitators' help in linking smallholder farmers to high value market either in rural or urban markets. The underpinning factors in choice of market facilitators by smallholder farmers are not yet well understood. Therefore, this paper aims to determine those factors influencing choice of market facilitators by farmers while marketing their produce. A multi-stage sampling technique was used to select 396 farmers in Laikipia East district. Binary Logit model was used as the major analytical tool; it is applicable when analyzing binary decision or response. The results showed that, household size, age of household head and marketing through a group positively influenced choice of market facilitators by smallholder farmers. On the other hand, number of members in the group, access to market information, purpose of farming and amount of output produced negatively influenced choice of market facilitators. Based on these findings, policy was drawn to improve access to facilitators by farmers that linked them to high value output market.

Keywords: Logit Model, Market Facilitators, Smallholder Farmers, Market Access

I. Introduction

Agricultural sector in Kenya is characterized by existence of both large scale and smallholder farmers (GOK, 2010). Whereby in rural areas, nearly 80% of Kenya's population live and derive their livelihood from agriculture mainly for food and income (Kirimiet al., 2013) and is characterized by land holding of less than five acres (Omitiet al., 2009). This implies that agricultural sector will continue to play a key role in improving food security and poverty reduction mainly in rural areas and act as an overall main economic earning sector for the country. Horticultural crop production in arid and semi-arid areas is gaining acceptance especially by smallholder farmers due to its productivity with unreliable weather condition and gives higher returns compared to other cash crops (Minot and Ngigi, 2004). In addition, it has high market value hence suitable for farmers faced with resource constraint and those located in places with unreliable rainfall (Anderson, 2003) therefore, it is an important source of income in rural areas especially in arid and semi-arid lands. Access to market leads to more specialized production systems and exposure to new ideas through trading (Jaleta et al, 2009; Mathenge et al, 2010). It is acknowledged that involvement of farmers in output markets contributes to higher productivity and income growth, this in turn enhance food security and poverty reduction (Fafchamps, 2005; Barrett, 2008; Bernard and Spielman, 2009) and leads to an economic growth in a country. Although access to market is seen as an avenue of generating more household income, due to its comparative advantages over subsistence production, it should also be recognized that a shift from subsistence to commercial crop production may have an adverse consequences by exposing smallholder farmers to volatile market prices in cases where rural markets are not well-integrated. Market reforms and globalization have changed marketing opportunities in Kenya. These reforms mainly targeted large-scale farmers and neglected small-scale farmers thus reduce their linkage to market; leaving them with few financial sources (Kamara, 2004). A relative lack of access to market information by smallholder farmers further weakens the negotiating power of small production units. Furthermore, economies of scale in marketing and value added horticultural products tend to favour integrated producers over independent ones. Finally, even if some smallholder farmers would be able to produce objectively high-quality and reliable horticultural products, they find it hard to gain access to market premia for quality and reliability because of infrequent and small amounts sold and the difficulty of differentiating their output from the mass of smallholder producers. Most of the smallholder farmers are engaged in local markets that may not render much profit, while there are instances and opportunities for their participation in more profitable domestic and even export markets (Ashraf, Gine and Karlan, 2008). However, their successful involvement in markets is challenged by multiple barriers to entry, even though they have some competitive advantages over larger commercial producers, especially in their low transaction costs in accessing family labor and in their intensive local knowledge (Dorward, et. al. 2005).

II. Methodology

Study Area And Sampling Technique

Laikipia East district, in Laikipia County, is situated within the transitional zone from wetter to drier regime. The rainfall ranges between 280 and 1100 mm year⁻¹ and a mean annual temperatures range between 16 and 20°C (Berger, 1989). Economic activities in the area include; Agricultural farming (Food crops and Horticultural crops), Tourism and Livestock keeping. Farming practices in the district are strongly dependent on rainfall. The dominant crops grown by farmers are maize and beans. Other crops are potatoes, peas, sweet potatoes, cabbages, fruits, kales and peas.

Multi-stage sampling technique was used in selecting a representative sample. The first step involved purposive selection of Laikipia East District due to its high number of smallholder farmers' growing horticultural crops and is also located in ASALs of Kenya. Secondly, three divisions that is Segera, Daiga and Nturukuma Divisions were purposively selected due to its high number of smallholder farmers that grows horticultural products this formed a representative sample. Finally, 132 farmers in each of the three divisions were selected randomly to give 396 farmers who were interviewed. The data was then collected by administering semi-structured questionnaire.

III. Method Of Data Analysis

Binary logit model was used to analyze those factors influencing choice of market facilitators by smallholder farmers; the model is suitable in analyzing binary choice decision. Binary Logit model involving estimation probability of choice of market facilitators, where (Y) is a function of explanatory variables (X) can be expressed as follows;

$$P_y = \text{Prob}(\gamma = 1) = f(\beta'x_i)$$

$$P_y = \text{Prob}(\gamma = 0) = 1 - f(\beta'x_i)$$

Where γ is variable representing marketing choice with $\gamma = 1$ when marketing under market facilitator and $\gamma = 0$ when marketing independently. x_i is set of explanatory variables that influence choice of marketing by an individual where $i=1, 2, \dots, M$ and M being the number of variables.

We can then express those factors that influenced smallholder farmers' on their choice of marketing as;

$$Y_i = f(g_i)$$

Where Y_i represent response for i^{th} individual whereby the choice variables are binary. g_i is the latent factors influencing individual decision on their choice of marketing and f shows the functional relation between response of an individual and the latent factors (g_i) that determines the probability of an individual choice of marketing.

Therefore,

$$g_i = \sum_{j=1}^n b_o + b_j X_{ji}$$

There is a threshold level g_i for each individual; such that if $g_i < g_i^*$ the farmer is observed to have marketed his horticultural product independently, if $g_i > g_i^*$ the farmer will have marketed his product under a market facilitator.

Where b_o and b_j are unknown parameters, X_{ji} is observable characteristics for i^{th} farmers on j^{th} options where $i=1, 2, \dots, n$, n is the total sample size and $j=1, 2$; j is the number of options available. Binary logit model assumes that latent variables are normally distributed. Probability of using market facilitators in marketing is stated as;

$$\text{Prob}(\gamma = 1) = \frac{e^{g_i}}{1 + e^{g_i}}$$

Therefore, an individual farmer choice can be represented as;

$$g_i = \ln \left\{ \frac{P(\gamma = 1)}{[1 - P(\gamma = 1)]} \right\} = \alpha + \beta'x_i + \mu$$

Where,

$\ln \left\{ \frac{P(\gamma=1)}{[1-P(\gamma=1)]} \right\}$ is the log odds of choice of market facilitators, μ is a random error term, β' is a set of K parameters to be estimated and x_i is the number of parameters observed where $i=1, 2, \dots, n$, n is the total samples observed. The model was used to determine factors influencing smallholder farmers' choice to market under market facilitators in ASALs. The equation showing these factors can be represented as,

$$Y_i = b_o + b_1 X_1 + \dots + b_k X_k$$

Table 1: Descriptive of variables in Logit Model

Variable	Code	Description	Units	Expected sign
Dependent variable				
Marketing choice	Mktch	Marketing under market facilitator= 1 Independent =0	Dummy	
Independent variables				
Distance to the market	Dstmkt	In kilometers	Kms	+
Household Size	Hhsz	Number of household members	Numbers	+/-
Age of Household Head	Aghhhd	Number of years	Years	+
Extension Service Source	Extscr	Governmental=1 Non-Governmental =0	Dummy	+/-
Credit access	Crdt	Credit access=1 Otherwise=0	Dummy	-
Market information	Mktinfo	Access=1 Otherwise=0	Dummy	-
Group Marketing	Grbmt	Yes=1 No=0	Dummy	+/-
Number of Members in a Group	Nbgrbmb	Number	Continuous	+/-
Farming purpose	Frmppse	Main reason for farming	Description	+
Pay market levy	Mktlv	Yes=1 No=0	Dummy	+
Farm Size	Frmsz	Number of acreages	Continuous	-

IV. Results And Discussion

Factors influencing choice of market facilitators

The results showed that, household size, age of household head and marketing through a group were statistically significant at 1% significance level and positively influenced choice of market facilitators by smallholder farmers. Number of members in the group, market information access, purpose of farming and output produced were statistically significant at 1% significance level and negatively influenced farmers' choice of market facilitators.

Table 2: Logit model regression results for choice of market facilitators

Variable	dy/dx	Co-effi	t- value	P> z
Pay market levy	0.038	0.441 (0.434)	1.02	0.309
House hold size	0.015	0.165*** (0.060)	2.76	0.006
Age of household head	0.040	0.446*** (0.256)	-1.74	0.008
Distance to market	0.033	0.364* (0.196)	1.81	0.070
Number of members in the group	-0.005	-0.049*** (0.015)	-3.19	0.002
Farming purpose	-0.120	-1.342*** (0.319)	-4.21	0.000
Market information Access	-0.047	-0.498*** (0.302)	-1.65	0.001
Output	-0.037	-0.417*** (0.195)	-2.13	0.003
Group marketing	0.204	3.110*** (0.850)	1.10	0.000
Loan access	0.0317	0.354 (0.322)	1.10	0.272
Extension service source	0.076	0.851* (0.080)	1.75	0.080
Constant		-1.849 (1.364)	-1.36	0.175
Log likelihood= -146				
Number of observation= 396				
LR chi2 (11)= 109.63				
Prob>Chi2= 0.000				
Pseudo R2= 0.2732				
Standard errors are in parenthesis				

Note: *** P<0.01, ** P<0.05, * P<0.10 means 1%, 5% and 10% significant level, respectively.

Source: Survey 2013

The results indicate that, household size were statistically significant with 1% significance level and positively influenced choice of market facilitators. This implied that, an increase in household size increases the probability of smallholder farmers' choosing market facilitators as noted by 17.5% increase in output marketed. Economically size of household represent productive and consumption unit of a household whereby larger household provide cheap farm labour and produce more output in absolute term, such that proportion sold remains higher than the proportion consumed, this results were consistent with findings by Makhura (2001). Coeze, et al. (2003) added that having a bigger household would translate into an increased demand for market goods, therefore, transitively increasing the probability by smallholder farmers to choose to be facilitated to output market. Increased output sold to the market improves farm income margin and enable farmers to purchase other consumable goods.

Age of household head was noted to be statistically significant at 1% significance level and positively influenced choice of market facilitators by smallholder farmers. The results implied that, as age of household head increases the probability of choosing market facilitators increase. The mean age effect showed that, an increase in age of household head by one year increased the probability of involving market facilitators by 44.6%. This implies that, as the respondents grow old they tend to become risk averse and therefore involve market facilitators in order to avoid any loss. These study results conform to the findings by Nadezda and Urquieta (2009) and Bongiwe and Masaku(2013) where they noted that older farmers are more reluctant to invest in new technology and new ways of marketing activities.

Marketing through a group has been indicated by the result to be significant at 1% level with positive influence on choice of market facilitators by smallholder farmers. This implies that, marketing produce through a group would increase the probability of farmers involving market facilitators or third party facilitation. In addition, being in a group farmers are effective in pooling external inputs, lobbying for favorable marketing policies and dissemination of market information. Finally, members in a group have easy access to external organizations that are in a position to create links to output market for them. This result were consistent with findings by Owuor (2009), who revealed that farmer groups are formed for the purpose of service delivery but production is on individual basis hence the choice of third party facilitation. This indicated that, farmers who are in a group were likely to produce more of their produce individually due to joint skills and learning among members in the group than those members who are not in the group. In addition, Wollni and Zeller (2006) observed that, farmer groups especially marketing groups have become an entry point for non-governmental organizations and other organizations that promote agricultural value chain and marketing to reach many targeted farmers and reduce cost of operations while disseminating information on modern technologies, skills and input output markets.

Number of members in a group, was statistically significant and negatively influenced choice of market facilitators by smallholder farmers at 1% significance level. This implies that, as the number of members in a group increases the probability of individual farmers choosing market facilitators decreases as shown by negative coefficient sign, hence they prefer to market their produce independently. In addition, there is improved capacity to penetrate into output market and gain market power due to easy access of market information and information communication technologies (ICTs) as the group members increase. Moreover, access to credit, extension services and collective purchase of farm inputs and sale of farm output becomes easy. Due to collective sale of output they are able to meet economies of scale hence output price increase due to increased negotiation power from members in a group. The study also inferred that, transaction costs become less once the number of members in a group become large because they are able to meet economies of scale while marketing their output. The results conforms to the findings of Randelaet al. (2008) who revealed that individual farmers cannot enjoy economies of scale therefore, the number of members helps in filling out the gap and hence benefiting those farmers which results in independent marketing of output.

In terms of output, the results showed that farm output was statistically significant and negatively influenced choice of market facilitators by smallholder farmers. This implied that, as quantity of output produced increase, farmers will choose to market their produce independently rather than involve market facilitators. Economically, economies of scale is achieved once output produced becomes more and therefore, transaction costs become less this leads to farmers getting profit from their sale and motivates them to market their produce independently. This result were consistent with the findings by Renner and Pieniadz (2008) who noted that firms with more output level were more flexible due to their ownership of assets.

Market information access significantly and negatively influenced farmers' choice of market facilitator at 1% significance level. This implied that, access to market information by smallholder farmers regarding market conditions, the more they choose to individually market their produce. Market conditions are dynamic and bound to change frequently with regards to price, potential consumers' lifestyle, taste and preference change and government regulations. Farmers therefore, need to be informed of these market dynamics to help them in mitigating externalities through use of required current technologies of production in order to produce quality produce that meet market demands and quantity either voluminous or in small quantities. This result were consistent with the findings by Omitiet al., (2009) who observed that the use of informal market information channels contributed to an increased output marketed in rural areas and choice of marketing channel and choice of facilitation to output market.

Farming purpose was statistically significant and negatively influenced choice of market facilitators by smallholder farmers at 1% significance level. This implied that, the main purpose for smallholder farmers' production will influence them on their choice of market facilitators. In the study area it was noted that, higher percentage (53%) produce for subsistence purposes while 47% produced for commercial purposes. In addition, those farmers who engage themselves in commercial type of farming tend to be risk averse.

V. Conclusion

Different socio-demographic characteristics of both categories of farmers (those who involved market facilitators and those who sold independently) were determined. It was apparent that factors like, household size, age of household head and marketing through a group positively influenced choice of market facilitators by smallholder farmers. On the other hand, number of members in the group, access to market information, purpose of farming and amount of output produced negatively influenced choice of market facilitators. Based on the findings, the study recommends that there should be a holistic approach on market information access and market facilitators function in market linkage to smallholder farmers. The government agencies and policy makers should enact laws that will increase free flow of information through provision of extension services and farmer field days.

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