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## **Decision Making in the Presence of Transaction Costs –evidence from Smallholder Banana Farmers in Murang’a County, Kenya**

*Rebeccah Wanjiru<sup>1\*</sup>, Owuor George<sup>1</sup>, Job Lagat<sup>1</sup>*

<sup>1</sup>Department of Agricultural Economics and Business Management, Egerton University;

P.O. Box 536-20115, Egerton, Kenya

\*Corresponding author: Egerton University, Department of Agricultural Economics and Business Management. Kenya, e-mail: wairimuwanjiru@gmail.com

### **Abstract**

Agricultural marketing in Kenya, just like other developing countries, is characterised by long transaction chains, poor access to appropriate and timely information, high transport and transaction costs. In Murang’a County the banana is an important horticultural crop in terms of its present and potential contribution to income enhancement of smallholder farmers. Farmers can opt to sell their bananas through various marketing outlets. The main outlets include sales to local traders and brokers at the farm gate, direct marketing to consumers and to a lesser degree, through producer marketing groups. Among the factors influencing choice of marketing outlet used to sell bananas by a farmer, are the transaction costs embedded in each outlet. However, the effect of transaction costs on choice of marketing outlet for bananas has not been extensively explored in Kenya, thus the purpose of this study. Primary data was obtained from a survey of 120 smallholder farmers in Murang’a County. A multinomial logit analysis was used to analyse the factors influencing choice of marketing outlet. The study draws imperative findings that could guide policy towards reducing transaction costs in banana marketing. Particularly, results indicate that farmers make a decision on choice of outlet based on the market information cost, hours of information search, road condition, trust in buyer, negotiation time, distance to the market and transport costs associated with that outlet. Encouraging group marketing and

provision of timely and reliable market information are some of the key recommendations from this study which could help to improve banana marketing, so that smallholder farmers can benefit from high value markets.

Bananas have emerged as a major income earner and food item especially among the rural population of Kenya. Smallholder farmers owning less than 0.5 hectares of land produce nearly 83.5% of total banana output (AHBFI, 2008). The crop is used for cooking and dessert and is the most affordable fruit both in rural and urban households. It far outweighs any other fruit in terms of area and production shares (Sindi, 2008). Although the country has made significant strides in the production frontier with development of tissue culture bananas which are high yielding, farmers are still constrained by a poor marketing system. Unlike other major cash crops produced in Kenya for which cooperative marketing exists, banana marketing in Kenya uses middlemen who buy bananas directly from the farmers at the farm gate and then transport them to a collection centre where they can be transported to Nairobi on hired trucks (Nzioka, 2009).

In addition, the banana value chain is characterized by the following inefficiencies: large number of intermediaries, policy and institutional failures, high costs in the chain and inconsistencies in supply (Kinyua, 2008). These inefficiencies in the marketing chain may be attributed to hidden costs often referred to as transaction costs. Key *et al.* (2000) categorized these costs into fixed and variable transaction costs. Fixed transaction costs are independent of the volume of output traded and affect market participation decisions of smallholder farmers. They include the costs of: searching for a trading partner with whom to exchange or searching for a market, negotiation and bargaining especially when there is imperfect information regarding prices and screening, enforcement of contracts and supervision particularly when credit sales are involved; as the sellers have to screen the buyers for reliability and lower the likelihood of defaults (Kirsten and Vink, 2005). Variable transaction costs on the other hand vary with the volume of output a smallholder farmer is trading in the market and may affect the market participation decision as well as quantity traded. These include costs associated with transferring the output being traded such as per unit transportation costs and time spent to deliver the product to the market.

Banana production and marketing have become major economic activities in Murang'a County. Income from bananas is mainly used to pay for health care, children's school fees, procurement of food and home improvement (Mbaka *et al.*, 2008). Smallholder farmers in this region often have a



number of marketing outlets available when selling bananas. Typically, these include sales to local traders and brokers at the farm gate, direct sales to consumers at the market, and sales through producer marketing groups. Farmers can choose to sell all or a proportion of their bananas through any one of these outlets. However, majority of the farmers sell their bananas at the farm gate where prices are low as compared to urban markets. The factors affecting the choice of marketing outlet have not been satisfactorily addressed in Kenya. One explanation for a banana farmer's choice of marketing outlet may be the transaction costs that alternative outlets impose on the seller. However, it is not clear which transaction costs farmers are faced with when marketing their bananas and whether transaction costs affect the choice of the outlet to use. This study therefore aimed at addressing these issues and in so doing contribute to the existing body of knowledge on transaction costs in banana marketing.

## Materials and Methods

### Data source and analytical approach

This study uses primary data collected through household survey in three key banana producing locations in Murang'a County namely: Ichagaki, Nginda and Kamahuha locations. One hundred twenty banana producing households were considered for this study. Data on the different marketing outlets used by farmers, distance from market, road conditions, trust in buyers, negotiation time, market information, extension service contact, transport facilities and transport costs, was collected.

The multinomial logit model was used to assess the effect of transaction costs on the choice of marketing outlets. Multinomial logistic regression can be used to predict a dependent variable, where the unordered response has more than two outcomes (Woodridge, 2002). In this study all farmers were assumed to be participating in the market at different levels and the most important marketing decision they had to make was on the marketing outlet to use, either selling to local traders, brokers, direct individual sales to the market or selling through producer marketing groups. This decision was made based on the option, which maximizes their utility, subject to transaction costs associated with each outlet. The multinomial logit can be modelled as:

$$\Pr(Y = j) = \frac{e^{\beta_j x_i}}{\sum e^{\beta_k x_i}}, j = 0, 1, \dots, j \quad (1)$$

The estimated equation (1) leads to a set of probabilities for  $J+1$  choices for a decision maker with the vector  $x_i$  describing each individual transaction characteristics and the vector of coefficients  $\beta_j$  associated with the  $j^{\text{th}}$  marketing outlet (Greene, 2002).

$$\Pr(Y = 0) = \frac{1}{1 + e \sum e^{\beta_k x_i}} \quad (2)$$

Normalization is achieved by setting  $\beta_0 = 0$ . We thus obtain vector  $\beta_j$  for each probability except for the first which is the normalized alternative. The empirical model for the study can thus be summarized as follows:

$$M_{ik} = X_i \beta_k + e_{ik} \quad (3)$$

where  $M_{ik}$  is a vector of the marketing choices ( $j = 0$  for local trader outlet, 1 for broker outlet, 2 for direct individual sales to the market and 3 for producer marketing groups) of  $i$ th farmer,  $X_i$  is a vector of transaction cost characteristics,  $\beta_k$  are parameters to be estimated, and  $e_{ik}$  is the error term assumed to have a distribution with mean 0 and variance 1. For a better and more reliable interpretation of the relationship between the transaction cost characteristics and the marketing outcome, marginal effects which are the probabilities of observing a particular outcome were computed as shown in equation 4 by differentiating the coefficients at their mean.  $\delta_{ji}$  gives the probability of individual  $i$  using outlet  $j$  as a result of transaction costs associated with that outlet.

$$\delta_j = \frac{\partial P_j}{\partial X_i} = P_j [\beta_j - \sum_{j=1}^4 P_j \beta_j] = P_j [\beta_j - \bar{\beta}] \quad j = 0,1,2,3 \quad (4)$$

## Results and Discussions

### Effect of transaction cost characteristics on choice of marketing outlet

Table 1 presents the multinomial logistic results for the effect of transaction costs characteristics on choice of marketing outlet. Seven out of eight covariates used in the model were statistically significant at 5% and 10% levels. The log likelihood chi-square value of 168.88 was significant at 1 % level ( $p$ -value = 0.0000) indicating that together all the explanatory variables have a significant effect on the choice of marketing outlet used. The pseudo-R square which was 0.5440 showed a good fit for the market outlet choice.

### **Market information**

The number of hours spent searching for market information (Infosrch) had a negative and significant effect on the use of individual marketing outlet at 10 % significance level. This means that a one hour increase in the time spent looking for market price information leads to a 1.09 % decrease in banana sales through this outlet. On the other hand, the cost of acquiring information (Infocost) on price and market for bananas had a significant negative and positive effect on the choice of broker outlet and local trader outlet respectively at 5 % significance level. Thus a one Kenyan shilling increase in the cost of calling decreased the probability of selling to brokers by 0.14 % and increased the use of local traders by 0.15 %. This could be explained by the fact that farmers made calls to brokers and at times negotiated prices over the phone. These results indicate that farmers were more likely to sell at the farm gate to buyers located near them than those who were far from them, to avoid risks and uncertainties associated with cost of market information search. These results concur with the findings of Getachew and Nuppenau (2009) which also concluded that access to information influenced marketing choices of smallholder farmers.

### **Road condition, transportation costs and distance**

The condition of road infrastructure (Roadcon) was expected to have an influence on choice of marketing outlet. Poorly developed infrastructure generally discourages farmers from using it because of increased crop transportation costs. The results in this study show that access to good road conditions increased sale through individual marketing by 1.25 %. This is because individual marketing involves transportation of bananas to the market and thus farmers would prefer to transport if the road is accessible and in good condition. The findings also show that as the cost of a single trip to the market (Transp) increases by one Kenyan shilling, the probability that smallholder farmers were likely to sell at the farm gate to local traders increased by 1.97 %. However, a one Kenyan shilling increase in the cost of transporting bananas reduces the probability of participation in individual marketing by 0.28 %. An increase in distance to the market (Distmkt) by one kilometre increases the probability of selling to local trader and brokers by 4.74 % and 5.45 % respectively. This is because as distance increases, the cost of transporting bananas to the market increases and thus farmers opt to sell at the farm gate to buyers who are willing to cater for these costs. These findings concur with those of Ohajianya and Ugochukwa (2011) and Okoye *et al.* (2010) which found out that poor state of road infrastructure high transport costs and longer distance to the market increased farm gate sales and reduced off farm market participation among smallholder.



### **Negotiation and Monitoring costs**

Another important aspect of transaction costs are the negotiation costs (Negotime) involved during the transaction. The time spent with a buyer negotiating on price significantly influenced the use of individual and group marketing of bananas. Accordingly a one hour increase in the time spent transacting with a buyer leads to a 0.9 % and 8.22 % increase in individual and group marketing participation respectively. Trust in buyer (Trustbyr) was used as a proxy for monitoring costs since farmers who had high trust in buyers were likely to spend less time screening their transacting partners or following up on payments because they had confidence that the buyer would pay in time. The results for trust in buyer confirm that the variable was significant at 5 % level in the choice of group marketing outlet. Thus high trust in buyer increased the probability of farmers selling through groups by 22.96 %. This could be due to the fact that in group marketing outlet, farmers made use of contracts which guaranteed them a market for their produce and reduced the cost of seeking information on reliability of buyers. These findings concur with those of Getachew and Nuppenau (2009) which illustrated that as the opportunity cost of waiting for the transaction to be completed increased farmers were more likely to opt for institutions that reduce such transaction costs.

**Table 1: Results of the Multinomial logit regression**



Variable	Marginal effects			
	Local trader outlet	Broker Outlet	Individual marketing outlet	Group marketing outlet
Infosrch (Hours)	0.0107 (0.0060)	-0.0009 (0.0001)	-0.0109* (0.0001)	0.0012 (0.0005)
Infocost (KES)	0.0015** (0.0006)	-0.0014** (0.0007)	-0.0002 (0.0000)	0.0001 (0.0000)
Roadcon (1=Good)	-0.0197 (0.0032)	-0.0041 (0.0012)	0.0125** (0.0037)	0.0112 (0.0019)
Transp (KES)	0.0017** (0.0009)	0.0011 (0.0002)	-0.0028** (0.0017)	0.0001 (0.0001)
Negotime (Hours)	-0.0721 (0.0500)	-0.0191 (0.0074)	0.0090** (0.0074)	0.0822** (0.0158)
Trustbyr (1=High)	-0.0105 (0.1091)	0.0347 (0.1746)	-0.2539 (0.0632)	0.2296** (0.0027)
Distmkt (Kms)	0.0474* (0.0274)	0.0545* (0.0285)	-0.1022 (0.0096)	0.0003 (0.0009)
Extmkg (1=Yes)	-0.1163 (0.3236)	-0.0771 (0.3334)	-0.0369 (0.1003)	0.2304 (0.1631)

**Model Summary**

<b>Model Chi square</b>	168.88
<b>Model significance</b>	0.0000
<b>Pseudo R-squared</b>	0.5440
<b>Number of observations</b>	120

\*p<0.1, \*\*p<0.05; Standard errors in parentheses

**Conclusion and Policy Implications**

According to this study smallholder farmers in Murang'a County sold bananas through four distinct marketing outlets: local traders, brokers, individual marketing and group marketing. While group marketing has emerged in the smallholder banana sector, the use of the other three marketing outlets is still dominant.



The choice of marketing outlet is significantly influenced by certain transaction costs characteristics especially hours spent looking for market information, cost of acquiring marketing information, transportation costs, trust in buyer, negotiation time, road conditions and distance to the market.

The study has drawn imperative findings that can guide policy towards reducing transaction costs of selling bananas. One major source of transaction costs is lack of information. Therefore government and other stakeholders should come up with avenues of providing adequate and timely information so that farmers are well aware of the prices in different markets. The provision of market information will strengthen farmers' negotiating ability during transactions with opportunistic buyers, and consequently prevent the possible exploitation due to information asymmetry between the farmers and buyers. This will reduce the transaction costs related to information search and improve smallholder farmers' access to formal banana markets.

The study has also established that farmer groups play a key role in economizing on transaction costs and taking advantage of collective bargaining power. There is thus need to promote formation of more banana marketing groups and support the few existing ones so that they can perform their role of developing market linkages more effectively.

According to the results access to extension does not play a significant role in choice of marketing outlet used. This may be due to the fact that extension providers focus on production rather than marketing. There is therefore need to incorporate market oriented extension services in the country's extension system so as to link farmers to more remunerative markets and empower the farmers in identification of farmer based solutions to their marketing problems.

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