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Analysis of Marketing Margins for Cassava Farmers and Traders in Siaya County, Kenya

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Abstract
Cassava is one of the crops being promoted in response to climate change in different counties in Kenya. Siaya County in particular, has received support from various bodies because of cassava's economic importance to the region. However, there is limited information on marketing margin analysis of cassava value chain. This paper computed the marketing margins as well as analysed the determinants of the margins of cassava farmers and traders. Marketing margins were computed by comparing the differences between prices received by and paid for by actors. Multiple regression analysis was performed to identify determinants of cassava marketing margin. The findings revealed that the margins for traders were positively influenced by age, purchase times and experience of the household head. Transport and storage costs had a negative influence. Marketing margin for farmers was positively influenced by access to extension services and quantity sold. However, distance to the market had a negative influence. The study concludes that transport and storage costs reduce marketing margins of the actors.

Keywords: Efficiency, marketing margin price spread, smallholder farmer, value chain

Introduction

The agricultural sector is the main driver of the Kenyan economic performance as it accounts for about 60 percent and 65 percent of employment opportunities and exports respectively (World Bank, 2018). Majority of the Kenyan farmers are small-scale holders who form three quarter of the total population. Most of the small-holder farmers are rural dwellers who mainly rely on rain fed agriculture (World Bank, 2008). In Kenya, about 70 percent of the land lies in the arid and semi-arid land areas. These areas receive inadequate rainfall and experience high temperatures which are not suitable for most major crops such as maize and beans. In fact, there has been a decline in maize yield since 2014 (Wiggins, 2018). Changes in the variability of rainfall due to climate change has majorly contributed to the low yields. This has therefore led to the rediscovery and adoption of underutilized crops such as cassava (*Manihot esculenta Crantz*) as a way of reducing climate risks. Cassava is a drought tolerant crop and can perform favourably in arid and semi-arid regions. It is one of the most important tuber crops mainly used as a staple crop in some parts of Africa (FAO, 2009), even though it has potential industrial uses. As a food crop, cassava is used for subsistence and commercial purposes. A great proportion of production is consumed

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within the households while the remaining proportion of the output is for commercial purposes (IIATA. 2013).

Production of cassava is mainly concentrated in a few geographical zones in Kenya which include; Western, Eastern and Coastal regions (Karuri et al., 2001). Cassava production quantity has been increasing even though the increment has not been stable (FAOSTAT, 2018). Farmers from other regions apart from the production zones have also started embracing cassava production (Githunguri et al., 2017). It is evidenced that production is mainly done by smallholder farmers on less than an acre plot (Opondo et al., 2017). Majority of these farmers produce cassava mainly for household consumption with the available surplus marketed in the nearby local markets. The tuber crop remains among the least exploited crops in Kenya both as a food crop and for industrial uses. On the food side, cassava is used as human food mainly in raw form or low value-added forms which include; boiled cassava, cassava chips, cassava crisps and cassava flour which is used to prepare cassava *chapati*, *mandazi* and porridge. As an animal feed, cassava is mixed with other concentrates to feed livestock such as pigs, cattle, poultry and sheep. Other than that, cassava starch is used as a derivative in most industries. Even though the cassava sector appears to have enormous business potential, there exist limited marketing activities. Most of the products are marketed mainly to the local consumers or traded in the nearby markets with limited inter-county/country trade. Furthermore, cassava marketing chain is underdeveloped with very few players along the chain and minimal commercialization (Githunguri et al., 2017; Opondo et al., 2017).

A number of studies have been conducted on the performance of the actors along cassava chain in Africa; however, these studies have been mostly done in West Africa especially in Nigeria and Ghana (Adebayo et al., 2013; Tarawali et al., 2012; Angelucci, 2013; Obetta et al., 2020). The studies have exhaustively addressed the performance of actors along various value chains and demonstrated that the value chains of cassava in these countries are developed with a number of actors actively participating along the chain (Sewando et al., 2012; Angelucci, 2013; Kabiti et al., 2016). Considering the case of Kenya, research studies on market margins, market efficiencies and price-spreads are scarce, especially for cassava marketers. There are few intermediaries participating along the marketing chain. Furthermore, most of the value chain activities are poorly coordinated and weakly linked (Mutuku et al., 2013). This could be explained by the fact that cassava is not a staple food in Kenya. In fact, it is perceived to be grown by poor households as a famine-reserve crop. Based on the prevailing opportunities, limited attention has been paid on the performance of cassava marketing actors mainly farmers and traders in Kenya and more so in Siaya County. As a matter of fact, a number of interventions have been directed towards cassava sector with an intention to increase commercialization. Still, there are low marketing activities recorded along the cassava marketing chain.

Marketing margin analysis is very paramount as it reveals the efficiency levels among the actors in the value chain and points out gaps that can possibly lead to the failure of marketing activities. Analysing economic performance of farmers and traders can be done by computing marketing margins. According to Mogaji et al. (2013), margins reveal problems that affect the availability and affordability of cassava products in the markets. Besides, it is a reflection of an aggregate processing and retailing behaviour as well as the benefits that are derived by participants along the value chain. In Kenya, cassava is mostly marketed in raw form especially at the farm gate and local markets. A few value-added products such as flour, chips and crisps are also marketed at the local and urban markets (Githunguri et al., 2017). Marketing margins vary across the cassava value chain depending on a number of factors including; prices, demand of the products, supply, and costs incurred among others. Studies on marketing margins of different

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agricultural crops have yielded different findings regarding the determinants of marketing margins (Quaye, 2004; Nganga, 2010). Other studies related to cassava marketing chains have equally revealed that the determinants differ for the different actors (Chiazor & Chinwuba, 2017; Toluwase & Abdu-Raheem, 2013). The inconsistent results and arguments therefore triggered further research to establish the factors that influence marketing margins among farmers and retailers in Kenya, particularly Siaya County. It is envisaged that analysing the determinants of marketing margins would help understand the gains made by farmers and retailers and whether they are commensurate with the effort directed towards cassava value chain as echoed by (Chiazor & Chinwuba, 2017).

The Concept of Marketing Margin

Marketing margin refers to the difference between the price paid by consumers and the price obtained by marketers, considering other costs incurred along the value chain (Adeniji et al., 2013). Marketing efficiency is critical to the management of costs along the cassava value chain. According to Wohlgenant (2001), margins arise owing to the demand for marketing services. It is signified by the minimum cost of services offered by the actors over the normal profits gained. Thus, marketing margin is fundamental as it provides a measure of the actors' well-being as well the economic performance of marketing activities. In addition, it is used to examine the performance of a value chain in order to point out opportunities which can enhance cassava commercialization. By analysing levels of marketing margins and their cost components, it is possible to evaluate the impact of the structure and conduct analysis of the various characteristics on market performance (Mogaji et al., 2013). Additionally, it points out the profitability and cost-effective measures that can be developed to enhance the performance of cassava farmers and traders. Adejobi and Adeyemo (2012) recognize that minimization of marketing costs improves the levels of efficiency. In that case, an efficient value chain is one that allows technological progress, utilizes resources efficiently and transmits prices that reflect costs common indicators of performance. These may include retail prices, level of stability of farm prices and income spread of marketing margins, marginal propensity to consume, farmers' share of the consumers shilling spent on agricultural product, middlemen profit and parity farm prices.

Measurement of Marketing Margin

Margin analysis for smallholder farmers has been a challenge for many researchers for the reason that smallholder farmers rarely have proper records for the activities they undertake on the farm. Furthermore, it is difficult to delineate certain costs, especially the fixed costs, which are most commonly shared amongst many other value chain activities. This makes it difficult to collect relevant information that can necessitate the computation of costs and margins as evidenced by (Lokshin, 2004). Toluwase and Abdu-Raheem (2013) also encountered similar a challenge in their study on costs and returns analysis of cassava production in Ekiti state, Nigeria. They found that farmers use indigenous ways of record keeping and various costs are shared across the units making it difficult to apportion costs. In this case, proper identification of determinants of marketing margins could give more information on the most influential costs and the potential growth of the cassava value chain.

Margin analysis helps decision makers to choose potential investments which yield higher profits with the limited available resources. According to Cobb-Douglas production function, when the marketing costs are increased, the marketing margins are likely to be reduced. Value chain actors can achieve higher gross margins by minimizing the level of price efficiency of

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resources. For instance, gross margin of cassava farmers measures the contribution of cassava production to the farms total profit. Therefore, an increase in gross margin can be achieved by efficient utilization of resources which further yields higher level of profit (Heino, 2015). Traders can also benefit from cassava trade; however, they must ensure quality and aptness of supply of cassava products while trying to understand the supply and demand needs to be addressed (Odongo & Etany, 2018).

Market performance varies based on a number of factors. For instance, an increase in the number of market participants is likely to lower prices and markups. This is because market margins decrease with an increase in competition. In most African countries, cassava marketing chain has not yet fully developed. The cassava marketing chain is fairly short since most farmers sell their cassava products to a few traders. Notably, not many farmers especially in Kenya are involved in production for commercial orientation. Therefore, the market chain is less competitive with some actors and this can lead to market inefficiencies (Enete, 2009).

According to Wohlgenant (2001), there are a number of factors that influence marketing margins of different market participants along cassava value chain. Major factors identified include; prices, tradable quantity, the location of the market, marketing and transportation costs, the forms of products, and the frequency of purchase. Ojogho and Alufohai (2009) investigated the effect of price and income changes on cassava marketed surplus. The study revealed that farmers are price and income responsive especially when the demand for the products increases subsequently increasing the quantities being marketed. A different study by Reuben Mshelia (2011) on price variation and decomposition of yam markets in Nigeria used a time series model to decompose the prices of yam. The study suggested that marketing infrastructure should be developed in order to respond to seasonal fluctuations which are inevitable. Tiri et al. (2012) assessed factors affecting marketing efficiency of orange markets in Nigeria. The study revealed that household size, cost of labour, purchase price and collective action strongly influence marketing efficiency. Maria and Oppen (2004) in their study, concluded that marketing margins differ by agricultural commodities and those with similar structures are most likely to be influenced by common factors. In that context, approaches of analysis may vary slightly.

Yakasai (2010) applied farm budgeting and regression analysis to explore the economic contribution of cassava production in Abuja, Nigeria. The study found that cassava production is a profitable venture. However, it is labour intensive since most of the work is done manually or by use of rudimentary methods. This view is also supported by Chiazor and Chinwuba (2017) in their study on factors affecting wholesalers and retailers marketing margin of yam. Similarly, they analysed the costs and returns using a marketing margin and multiple regression analyses. The study concluded that many factors account for the variation of marketing margin including the amount of cassava production. Both studies recommended that farmers should utilize their resources efficiently if they were to maximize on revenues. Conversely, Ibekwe et al. (2012) analysed the socio-economic characteristics that influence the marketing margin of garri processing actors in Nigeria where both budgetary and profit function methods were used. The study established that age, education, marital status, household size and experience positively influenced the profitability of cassava.

Methodology

The study was conducted in Siaya County, Kenya. The County lies in the south west part of Kenya characterized by low attitudes and rainfall thus suitable for drought resistant crop varieties. The County receives an annual rainfall of between 1,170 mm and 1,450 mm and experience

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temperatures ranging between 15-30^{0}C. There are two planting seasons which fall between April-June and August-October. Cassava is one of the underutilized crops that has great potential to perform well in the marginal areas such as Siaya County. Many interventions have been directed towards the cassava sector in order to rediscover the potentials of the crop in the area. Still, there are limited activities along the cassava value chain. Administratively, Siaya County is divided into six sub-counties; namely, Gem, Ugunja, Ugenya, Alego-Usonga, Bondo, and Rarieda. Out of the six sub-counties, two of them, specifically Ugenya and Alego-Usonga were identified for the study. These are the traditional growing areas of cassava crop and there is a lot of support from the government and non-governmental organizations that has been directed to promote cassava production and commercialization in the areas. Furthermore, these areas have well-established cassava processing factories which were established by Red Cross in order to promote value addition and strengthen cassava value chain, yet, they are underutilized.

Two different sampling procedures were used in the collection of data from farmers and traders. A multistage sampling method was used to sample farmers. In the first stage, Alego-Usonga and Ugenya sub-counties were purposively selected while in the second stage, two locations were randomly sampled from each sub-county. The third stage involved selecting a random sample of six villages from the locations. In total, 184 farmers were sampled for the interviews. On the contrary, traders were identified through a clustered sampling procedure. This method was found appropriate because the population of traders was not properly known. The first step involved clustering of markets into market centres. These are markets that have high trading cassava activities. Eight clusters were then identified and six respondents were drawn from each cluster totalling to 52 respondents.

Data was mainly collected from primary source. The primary data was collected from both farmers and traders through interviews using well-structured questionnaires. Different questions were designed for the different actors. Data was collected between May-June 2015 from farmers who had produced cassava in the previous year and traders of cassava products. The data collection instrument was pretested in a few selected cassava growing locations and marketing centres that were not sampled in the main study. The questionnaire was filled through personal interviews which were conducted by well-trained enumerators. Questions of interest ranged from demographic information, socio-economic characteristics and cassava marketing aspects.

Different approaches and techniques can be used to analyse the marketing margin. Carambas (2005) suggests that a complete set of equations should be used to perform a comprehensive analysis of the marketing margin. Regarding the retailer margin, this study considered a relative price margin which is expressed as a percentage of the consumer price. On the other hand, the marketing margin of farmers was computed as the difference between the selling price and the product price. The functions are as expressed below:

$$(MM)MarketingMargin = \frac{Selling\ \ Price - Buying\ \ Price}{Selling\ \ Price} \times 100 \qquad (1)$$

$$(MM)MarketingMargin = Selling\ Price - Buying\ Price \qquad (2)$$

A multiple regression analysis was used to estimate the marketing margin function and analyse factors that influence the price differences from one market level to another or buying point and selling point. A logarithmic transformation of the variables was considered necessary in order to address the non-linearity challenge as well as skewness of the variables into approximately normality (Keen, 1995). In order to identify the determinants of marketing margin, two models;

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namely, linear and double-log were fitted and a comparison of the results made. Interpretation was based on the model that made economic sense. The general linear regression function and double log functions for traders are expressed as follows:

$$MM = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \ldots\ldots\ldots + \beta_9\chi_9 + \varepsilon \quad (3)$$

The linear model is specified as follows:

$$MM = \beta_0 + \beta_1 Age + \beta_2 Educ + \beta_3 Qtysold + \beta_4 PurchaseT + \beta_5 Experience + \beta_6 Transcost + \beta_7 Labourcost + \beta_8 MarketCharge + \beta_9 Storagecost + \varepsilon \quad (4)$$

While the double log model is expressed as:

$$InMM = \beta_1 InAge + \beta_2 InEduc + \beta_3 InQtysold + \beta_4 InPurchaseT + \beta_5 InExperience + \beta_6 InTranscost + \beta_7 InLabourcost + \beta_8 InMarketCharge + \beta_9 InStoragecost + \varepsilon \quad (5)$$

Where: MM = Market margin of traders

Comparably, factors influencing marketing margin for farmers were identified by use of multiple regression method which is specified below.

The reduced forms of the linear and double log models are expressed as follows:

$$MM = \beta_0 + \beta_1 Gender + \beta_2 Extension + \beta_3 Qtysold + \beta_4 Marketcosts + \beta_5 Labourcost + \beta_6 Distance + \beta_7 Schoolyrs + \beta_8 Hhsize + \beta_9 Valueaddexp + \beta_{10} Valueaddindex + \varepsilon \quad (6)$$

$$InMM = \beta_1 InGender + \beta_2 InExtension + \beta_3 InQtysold + \beta_4 InMarketcosts + \beta_5 InLabourcost + \beta_6 InDistance + \beta_7 InSchoolyrs + \beta_8 InHhsize + \beta_9 InValueaddexp + \beta_{10} InValueaddindex + \varepsilon \quad (7)$$

Results of the Study

In the presentation of results, various considerations were made. These included marketing characteristics of traders, determinants of marketing margins of traders in Siaya, results of multiple regression analysis for traders, and the marketing margin analysis of farmers in Siaya County. The marketing margin analysis further included determinants of prices for cassava products and analysis of factors affecting marketing margin of farmers.

Marketing Characteristics of Traders

Descriptive analysis was performed and the results of socio-economic characteristics of traders is presented in table 1. The findings indicate that female respondents are the majority by 86.8 percent in Siaya County. Also, majority of the traders were in the age category of 51 years and above. This is contrary to the assumption that middle age traders are economically active and should actively engage in cassava marketing activities. Additionally, a large proportion of traders in Siaya (84.9%) had attained primary level education and below while a smaller percentage (15.1%) represents the respondents with secondary and tertiary education. With reference to the marketing experience, a large proportion of traders (84.9%) had experience ranging between 0 and 10 years with the rest having more than 10 years' experience.

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Table 1: Socio-Economic Characteristics of Cassava Traders in Siaya

Variables	Percentage
Gender	
Male	13.2
Female	86.8
Age	
18-30	26.4
31-40	26.4
41-50	17.0
51 years and above	30.2
Marital Status	
Married	64.2
Single	9.4
Divorced	3.8
Widowed	22.6
Education level	
None	15.1
Primary	69.8
Secondary	15.1
Tertiary and College	0
Others	0
Years of Experience	
0-10	84.9
11-20	15.1
21-30	0

Source: Survey Data, 2015

The study identified various constraining factors that hinder performance of marketing activities. These have been summarized in table 2. It is clear that 37 percent of the traders from Siaya County responded that inadequate demand for cassava products was the principal challenge which greatly led to low marketing activities experienced in the area. Other marketing challenges experienced by traders from Siaya County include; distance to the market (24.5%), lack of storage facilities (15%), and fear of poisonous cassava varieties (13.3%).

Traders obtain cassava products from different sources, ranging from marketing their own products to purchasing directly from farmers as well as other traders from the local markets. This study established five possible sources of cassava products. These include; local traders, traders from other markets, trader groups, farmers and self-production. Table 2 shows that majority of the respondents from Siaya County sourced their stock mainly from local traders (50.9%). Other than that, 22.6 percent purchased directly from farmers and 18.9 percent purchased from traders in other markets. In relation to price determination, 62.2 percent of Siaya traders majorly relied on market rates. This result has a close link with the sources of cassava products. Traders also considered some quality features when purchasing cassava products. Some of these features include; moisture content and cleanliness. These are represented by 54.7 percent and 32.1 percent respectively. From the findings, formal contractual arrangements for cassava products are almost non-existent in the county. Most of the purchases were made informally without any binding contracts with unarranged purchases taking the lead at 69.8 present.

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Table 2: Distribution of Cassava Traders by Marketing Characteristics

Marketing Challenges	**Percentage (%)**
Poor prices	9.4
Distance to the market	24.5
Inadequate demand	37.8
Lack of storage facilities	15.0
Fear of poisonous varieties	13.3
Bulkiness	0
Sources of cassava Products	**Percentage (%)**
Local traders	50.9
Traders from other markets	18.9
Trader groups	0
Farmers	22.6
Self- production	7.6
Price Determination	**Percentage (%)**
Market rate	62.2
Farmer price	13.3
Negotiable	11.2
Group decision	13.3
Purchase considerations	**Percentage (%)**
Moisture content	54.7
Maturity	9.4
Cleanliness	32.1
Size of cassava	3.8
Contractual arrangements	**Percentage (%)**
Formal contracts	0
Informal contracts	30.2
None	69.8

Source: Survey Data, 2015

Determinants of Marketing Margins of Traders in Siaya

Marketing margin is influenced by a number of factors which could either transactional or physical (Yakasai, 2010; Wohlgenant, 2001). They include; quantity of cassava products sold, purchase times, transport costs, cost of labour, market charges, and cost of storage. Different crops have different unique characteristics which causes variation in the outcome of the determinants. A summary of descriptive statistics of some of the possible determinants of marketing margins fitted in the regression model is presented in table 3 where the statistics indicate that on average, the mean quantity of cassava products sold by traders weighed 444.23 kg while average weekly purchases of cassava products is presented by 28.75 times. On the transport side, it was observed that the mean transport cost was Kes 1264.91 which is higher than other transaction costs.

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Table 3: Summary Statistics of Variables used in the Regression Model

Variables	Min	Max	Mean	Std Dev.
Marketing Margin	0	100	26.95	22.85
Age (Years)	18	58	12.75	39.19
Education (Years)	0	13	5.25	3.25
Quantities Sold (Kg)	60	2400	444.23	377.26
Purchase no.(Weeks)	4	48	28.75	16.77
Years of Experience	0	40	7.18	6.83
Transport Cost (Kes)	0	7200	1264.91	1578.26
Cost of labour (Kes)	0	5200	804.15	1521.93
Market charges (Kes)	0	3200	833.69	857.11
Cost of storage (Kes)	0	6000	730.19	1211.29

Note: Kes stands for Kenya shillings (1USD = Kes 121)

Source: Survey Data, 2015

Results of Multiple Regression Analysis for Traders

In this study, two different multiple regression models; namely, the linear and double-log models were fitted. The models were compared and the best fit model that made economic sense was used for interpretation. According to Keene (1995), there are various ways of identifying the best fit model. These could be based on the coefficient of determination (R-squared) and economic considerations such as the conformation of the estimated coefficients to the *a priori expectation* of research. In addition, relevant diagnostic tests were performed before fitting the model. A multicollinearity test was performed using Variance Inflation Factor (VIF). As a rule of thumb, multicollinearity exists if the largest VIF is greater than 10 (Chatterjee & Hadi 2012). No evidence of multicollinearity was revealed in this study hence the model was suitable for analysis. Interpretation was based on the double log model presented on table 4.

Table 4: Regression Coefficient Estimates of Determinants of Cassava Marketing Margins of Siaya Traders (Double Log Model)

Independent variable	Coefficient	T-ratio
Constant	-7.361	-1.270
Age of the trader	0.882	0.375**
Education of trader	0.631	1.270
Quantity of cassava sold	0.916	1.160
Purchase times	1.085	1.710*
Experience of household head	0.760	1.840*
Transport cost	-0.644	-3.590***
Labour cost	-0.198	-1.540
Market charges	-0.041	-0.230
Storage cost	-0.291	-2.210**
R (Coefficient of determination)	0.542	
F-Stat	6.42	
Sample size	52	

***=Significant at 1%, ** Significant at 5% and * Significant at 10%
Note: Dependent variable is marketing margin

Source: Survey Data, 2015

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It is inferred from table 4 that 54.2 percent of the variation in the marketing margin is explained jointly by the explanatory variables. Out of the nine variables that were fitted in the model, three of them had a positive significant influence on the marketing margin. These include; age, purchase times and experience of the household head. On the other hand, transport and storage costs had a negative influence on the marketing margin.

Marketing Margin Analysis of Farmers in Siaya County

In the marketing of margin analysis of farmers in Siaya County, two issues given consideration include determinants of prices for cassava products and analysis of factors affecting marketing margin of farmers.

Determinants of Prices for Cassava Products

Price is ultimately one of the attributes of marketing margins for agricultural products. Prices are normally set differently by different actors. However, it is expected that the forces of supply and plays a pivotal role during price settings. Factors which include; cost of production, marketing costs as well as understanding the products prices at other outlets ordinarily inform the pricing decisions undertaken by farmers. This study focused on a few determinants of prices for cassava products and the findings have been summarized in Figure 1.

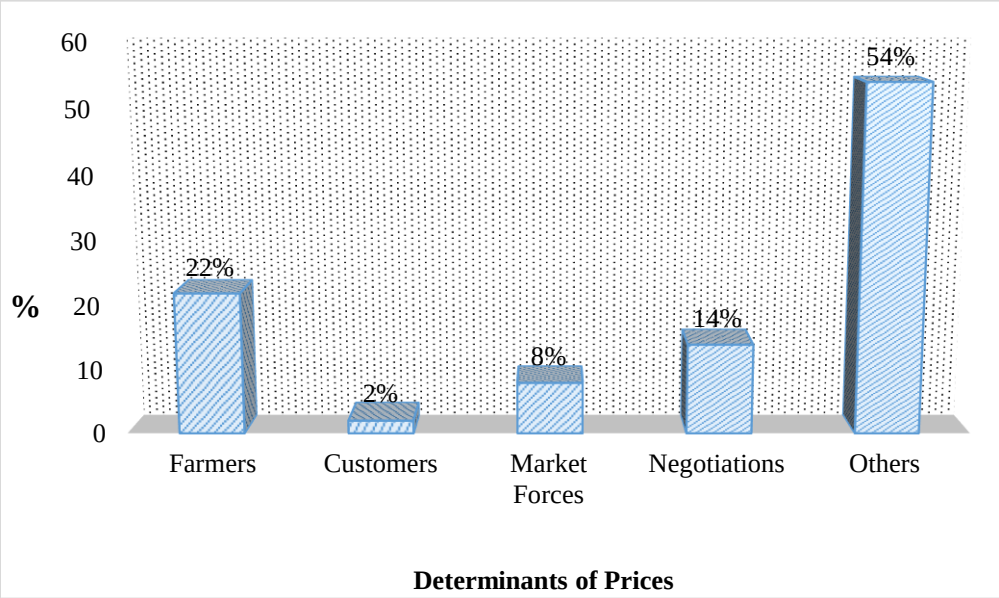

Fig. 1: Determinants of Cassava Prices

Source: Survey Data (2015)

The findings in figure 1 show that the prices of cassava products were primarily determined by other factors (54%) and farmers (22%). Other factors include; quality of the products, seasonality, demand for the products and the availability of cassava products.

The respondents were asked to give their opinion concerning the price variations of fresh cassava and value-added cassava over the past five years between 2010 to 2015. As expected, prices of agricultural products vary across the year and this could be attributed to the fact that

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agricultural products are perishable and seasonal in nature. The responses regarding price variations are as revealed in Figure 2.

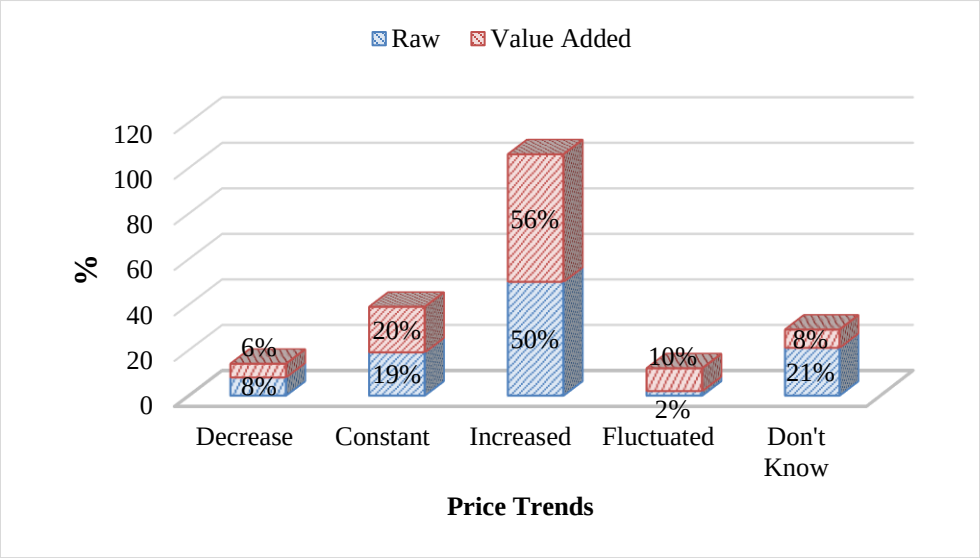

Fig. 2: Price Trend for Value Added and Raw Cassava Products from 2010 to 2015 (Siaya County

Source: Survey Data (2015)

According to Figure 2, prices of cassava products have increased from 2010 to 2015. The prices are expected to increase because of the interventions which have been directed towards the sub-sector further stimulating production and demand for cassava products. Farmers from Siaya County observed that prices of value-added cassava increased more than for raw cassava indicating that there is demand for value-added cassava. Because of the low production, the available surplus was not enough for both consumption and value-addition and only a small share of value-added cassava was available for marketing.

Analysis of Factors Affecting Marketing Margin of Farmers

Several determinants of marketing margins for farmers in Siaya County were empirically identified. The determinants were regressed on the marketing margin and mixed outcomes on the estimated coefficients were revealed as shown in table 5.

Access to extension services and quantity sold had a positive influence on marketing margin at 5 percent and 10 percent significant levels correspondingly (table 5). This implies that farmers who had access to extension services reported higher marketing margins than their counterparts.

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Table 5: Estimation of Factors Affecting Marketing Margin of Farmers in Siaya County

Variables	Coefficient	T-value
Constant	0.325	0.730
Gender	0.329	1.270
Access to extension services	0.501	2.260**
Market charges (Cess and license)	-0.023	-0.870
Labour cost	0.017	0.560
Value addition index	-1.49	-1.100
Distance to market	-2.412	-14.070***
Quantity sold	0.074	1.680 *
Schooling years	0.088	0.880
Household size	-0.056	-0.360
Value addition Experience	-0.132	-1.110
R^2 (Coefficient of determination)	0.648	
F – Stat	61.54***	
Sample size	179	

Note: The dependent variable is the marketing margin and interpretation of data was on the double log functional form. Figures in parenthesis present the t-values.
***Significant at p<0.01, **Significant at p<0.05 and * Significant at p<0.10

Source: Survey Data (2015)

Regarding quantity of cassava products sold, the results show that marketing margin increased as the quantity sold increased. A rise in the demand for cassava products increases the quantity of marketed products. However, when production is low and the quantity of cassava demanded is high; expectedly, farmers will price their products slightly high. This is however contrary to the arguments of Carambas (2005) that economies of scale should lower marketing costs and hence reduce marketing margins.

The findings in table 5 further indicate that distance to market was negative and statistically significant (p<0.01). The interpretation is that a one percent increase in distance to the nearby market decreased the marketing margin by 2.41 percent.

Discussion

Female dominated the cassava value chain which was represented by 86.8 percent. This points to the fact that the cassava business is a women-oriented venture. This is similar to the findings of Okoye et al. (2016) and Olukunle (2016) that revealed that women participate in most of the activities along cassava value chain which include production, processing and marketing. Similarly, this corresponds with a study by Andersson et al. (2016) on gender dynamics in cassava leaves value chains. The study reveals that cassava value chain is dominated by women, especially in production role and marketing of cassava at the farm gate level.

Concerning education, 69.8 percent of the respondents had attained primary level education. The results indicate that there is low level of education among cassava traders in Siaya County. Education is associated with the ability to acquire and perceive information leading to rational decision making. The low level of education among traders could probably mean that those with high levels of education are perhaps engaged in off-farm activities perceived to be more

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lucrative and well-paying. This is not surprising since it is an expected norm amongst the well-educated household members.

Age of the respondents was statistically significant at 5 percent level which indicate that an increase in age by one percent increased the marketing margin by 0.88 percent. This could be explained by the fact that as age increases, traders gain more experience which empowers them to handle marketing activities in an efficient manner. This finding is also supported by the descriptive statistics analysis where majority of traders were 51 years old and above. Similar outcome was noted by Mogaji et al. (2013) who found that age positively contributes to marketing margin since aged traders have strong social networks and this reduces market imperfections such as information asymmetry. The explanation however contradicts the arguments of Tiri et al. (2015) as well as Apata and Apata (2003) who posited that younger traders are more innovative than the older traders and they are likely to devise innovative marketing methods and develop efficient ways of marketing activities. We, however, find that these studies are mostly conducted in Nigeria and since scenarios differ, then contrary results are expected. Also, the number of times traders made purchases had a positive significant influence on the marketing margin. The frequency corresponds with the demand for cassava products. When the demand for cassava products is high, more supplies are needed and restocking has to be done more frequent. This then leads to increased sales which subsequently increases marketing margin. Frequent purchases could also imply that the products being sold have a short shelf-life and hence must be marketed faster. Ojogho and Alufohai (2009) examined the association between purchase frequencies and marketing margin. The study established that increasing frequency of purchases is realistic when the products are perishable in nature and the demand is elastic.

Marketing experience had a positive influence on the marketing margin. The interpretation is that an increase in the year of experience by one percent improves the marketing margin by 0.76 percent. It can be argued that a more experienced trader is likely to make a rational decision which can influence the profitability of cassava products. Besides, they have better bargaining skills because they are empowered with information as echoed by Nganga et al. (2010). Experience is also associated with efficiency. It can further be debated that a more experienced trader is likely to be more efficient in the marketing operations unlike a less experienced trader. The finding is in line with that of Okoye et al. (2016) who found a positive relationship between marketing experience and sales of cassava products. They argued that a more experienced marketer has proper knowledge of the marketing activities and can bargain for better prices for their products besides making rational decisions.

Costs also had implications on the marketing margin. Transport cost ($p<0.01$) and storage cost ($p<0.05$) had a negative significant influence on the marketing margin implying that they lowered the marketing margins. Transportation cost is a major cost component in marketing agri-food products. High transportation costs lead to market inefficiencies hence lowering the profitability of cassava business (Emokaro et al., 2010; Okoye et al., 2016; Dinesh & Sharma 2019). According to Tiri et al. (2015), direct marketing to consumers by producers would limit costs. This is because costs are in most cases passed on to consumers at the end of the transactions. This sometimes influences the reaction of buyers forcing traders to lower the prices hence lowering the margins.

Odongo and Etany (2018) and Obetta et al. (2020 also made similar observation in their study on assessment of cassava marketing margin in Northern Uganda. They concluded that transport cost is one of the main components of marketing costs which greatly reduces the net revenue earned by traders. In their study, they found that most traders do not incur costs related to

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transportation to and from the market since these activities are mainly undertaken by producers. This contributes to the high margins that traders obtain. In this study, a closer examination at the results shows that the proportion of transportation cost to the overall cost was 20 percent. Comparing the cost variables, the coefficients for transport (3.59) was greater than storage (2.21) further indicating the impact of transportation cost on cassava marketing behaviour.

The study revealed that prices were not fixed since they varied from one actor to another. FAO (2004) acknowledges that pricing primarily involves a mutual agreement between a seller and a buyer even though other characteristics such as quality of the products, cleanliness, and maturity amongst others drives pricing decisions. Notably, access to extension services and quantity sold had a positive and significant influence on marketing margin. This implies that farmers who had access to extension services reported higher marketing margins than their counterparts. Extension officers offer advice to farmers which enables them to make rational decisions while undertaking production activities in an efficient and effective manner (Chiazor & Chinwuba, 2017). Furthermore, farmers who make frequent contacts with extension officers are less likely to incur costs of engaging experts and this would enable them to maximize on marketing margin.

Distance to market was negative and statistically significant at a 99 percent confidence level. This reflects the inference that distance increases transportation costs especially in the rural areas where road networks are in poor state (Zulu, 2015). Additionally, distance to the market influences market accessibility and this is likely to influence market prices. Farmers located far away from the markets are likely to incur high transaction costs compared to their counterparts who are located near the market centres. According to Ebata et al. (2015) and Graubner et al. (2011), distant markets would lower farmer prices hence influencing marketing margins. Consistent with the findings, Okoye et al. (2016) suggest that policies which include improving rural infrastructure should focus on lowering transportation costs. Most farmers from Siaya County complained of poor road networks that hindered smooth transportation of cassava products to the markets where they could fetch better prices.

Conclusion

Marketing margin analyses the efficiency and performance of a marketing chain. In Siaya County, there is no evidence of a study conducted on the determinants of cassava marketing margin for the farmers and traders. This study, therefore, filled the gap by comparing the determinants of the two actors. The study revealed that factors which influenced marketing margins for traders differed from that of farmers. This was however expected to vary since there are unique dimensions that of the two types of markets. From the statistical estimations, marketing margin responded to changes brought about by marketing factors with low relationship existing between household characteristics and marketing margin. The low profit margins for traders were attributed to the high cost of transactions incurred on transport and storage. Age, purchase times and experience of the household head positively influenced cassava marketing margin. Regarding the determinants of marketing margins for farmers, there was a slight difference in the outcome. Factors such as access to extension services and quantity sold had a positive influence on marketing margin while for traders, distance to the market negatively influenced marketing margin. Also, prices for both value-added cassava products and raw cassava had increased in the past years, indicating that the demand for cassava products was on the rise. Even though, this study did not conduct a thorough analysis to establish the scale of the price variations, the simple analysis revealed that different forms of cassava products fetch different prices. Higher levels value-added products attracted

better prices compared to raw or dried cassava products and this further contributed to the margin share difference.

In future, a more robust study should be undertaken to examine the effect of different value-added products on marketing margins. Secondly, there are various input costs and risks that could probably influence marketing margins. There is need to understand these costs and risks and establish their influence on marketing margins. Based on the above findings, this study recommends that different policies that favour the different actors of cassava value chain in order to improve performance of cassava value chain should be formulated. There is need to lower transaction costs such as transport and storage by having good infrastructural facilities in place. Also, extension officers should interact with farmers more often in order to minimize search costs for information that could influence market decisions.

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