



Challenges of and Opportunities for Market Access by Pineapple Agripreneurs in Rangwe Sub County, Homa Bay County, Kenya

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Authors' contributions

This work was carried out in collaboration among all authors. Author WAN designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JL, HB and FO managed the analyses of the study. Author JKL also managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Pineapple farming is among the fastest-growing agricultural sub-sectors in Homa Bay County, Kenya specifically Rangwe sub-county. However, limited attention has been given to the market access of this produce. Evidenced by vast quantities of pineapples harvested from the farms and stacked along main highways without targeting a specific market. This result to a small portion being sold and the rest deteriorating, consequently reducing returns for pineapple agripreneurs. Therefore, this paper sought to determine those factors that influences access to formal market by pineapple agripreneurs and as well as find out challenges of and opportunities for accessing formal markets by the Rangwe pineapple agripreneurs. The survey was undertaken in Rangwe Sub-county, and multisampling method was used to select a sample of 183 pineapple agripreneurs from

the study area, primary data was collected using a semi-structured survey tool. Data was analyzed by descriptive analysis and Logistic regression model. Results indicated that pineapple agripreneurs were faced with numerous challenges in accessing pineapple market, also there existed several market access opportunities for pineapple agripreneurs. The results of logistic regression analysis revealed extension contacts, education level and price of pineapple as factors that were positively and statistically significant in influencing access to formal markets. While those that were statistically and negatively influencing access to formal market comprised of; age of household head, household size, and type of road. The study recommends; improvement of road infrastructure in pineapple producing areas so as to improve on their market access; development of policies that encourages capacity building of pineapple agripreneurs in Rangwe sub-county

Keywords: Opportunities; challenges logistic regression; market access; pineapple agripreneurs.

1. INTRODUCTION

Agribusiness plays an important role in the development of the economy since it provides the rural and rising urban population with food, employment, and raw materials. Consequently, higher economic growth is experienced by smallholder farmers due to improvement of their welfare [1,2]. Agriculture is essential since it provides food security, enhances economic growth as well as alleviate poverty in society and furthermore, it acts as a pillar to many African economies [3]. Agriculture also provides livelihood to many people [4]. According to research, a projected 86 percent of people living in rural parts depend on agriculture as there only livelihood, agriculture provide employment to 1.5 billion landless workers and smallholders [5]. In Kenya, agriculture remains the backbone of the economy with a great potential for growth and transformation. In the year 2019 the sector accounted for 34.1% of the Gross Domestic Product (GDP), employed more than 40% of the entire populace, and about 70% of those engaged were from rural regions [6]. Kenyan agriculture is predominantly carried out by the smallholder farmers who owns farms of an average sizes of 0.2-3 hectares (ha), the small-scale production results to 75 percent of the aggregated agricultural output and 70 percent of the marketed agricultural produce [7]. The Kenyan government identifies smallholder agriculture as the major subsector for realizing accelerated annual economic growth rate to attain country's vision 2030, commercializing smallholder agriculture is critical to achieve this growth [8]. Pineapple farming in Kenya is undertaken by small-scale and large-scale producers. The small-scale production is concentrated at the Coast, Central, and Western Regions of the country, characterized by small farms with low input use. In contrast, large scale production is practiced in the Central region of

the country where intensive inputs are used. Pineapples are either sold as fresh fruit or processed into several products like squash, jam, vinegar and alcohol [9]. Pineapple farming in Kenya is predominantly carried out by smallholders who encounter several marketing constraints such as; information asymmetry, low education levels, nonexistence of storage facilities, poor access to formal markets, high transactional costs, little financial support, and lack of bargaining power [10]. In Homa Bay County, pineapple farming is emerging as an important economic activity with lots of potential to improve income of households. Consequently, the County government has put strategic measures in place to accelerate growth of pineapple industry through pineapple enterprise collective action initiative [11]. The measures resulted to most of small scale farmers engaged in pineapple farming thus increasing pineapple production. However, less attention has been given to address market failures in the pineapple industry, which affects both viability plus productivity of the enterprise. The market access problem is evidenced by vast quantities of pineapples harvested from the farms and stacked along the county's highways without targeting a specific market. The result is that only a small portion is sold at throwaway prices, and the rest goes to waste, this affects viability of pineapple enterprise. Thus, this study aims to identify and understand challenges of and opportunities for market access, and determine factors influencing access to formal markets by pineapple agripreneurs in Rangwe Sub-County, Homa Bay County. The study also determines factors influencing pineapple agripreneurs to access formal market, specified value chain and dynamic markets. The study product is vital for policymakers by; acting as a point of reference during development of pineapple agripreneurs marketing programs to exploit changing demands, providing them with a better

understanding of the available opportunities in the sector. Further, it acts as reference material for researchers and academicians whose focal point is smallholder market access in Kenya and improve the stock of prevailing limited knowledge. Most prominently, the results gives a better view of the role of pineapple market access in reducing poverty and enhancing the welfare situation of pineapple agripreneurs.

2. LITERATURE REVIEW

2.1 The Concept of Market Access

Economy of Sub-Saharan African countries' has integrated more with the global economy due to the ambush of globalization and liberalization. With the gradual fading of the defensive shield, international competition has been opened for the domestic market. Consequently, the African agribusiness role in national economies and global markets has profoundly changed. Hence, in both urban and rural areas, livelihoods have become increasingly commercialized. Rural agripreneurs are altering their social relations as well as reorganizing the ways they manage their economic activities. [12]. Better access to the market is a significant element for cumulative income and cultivating agriculture-based economic growth through enhanced returns from agricultural production. According to arguments from various people, farm household's participation in different markets can be limited by other causes of market imperfection and transaction costs despite the demand being considered crucial in the course of agricultural commercialization. The transformation of the agricultural market into a vertical coordinated structure helps farmers withstand the market pressures [13]. Market access has been identified as one of the key factors influencing the performance of smallholders' in unindustrialized nations, and in particular, least developed countries [14]. Access to markets and agricultural support by smallholder famers remained to be a major concern for Kenyan policy makers since independence. Market access is vital for growth of smallholders because it creates the necessary demand, offers remunerative prices, thereby increasing smallholder incomes [15]. Smallholder farmers often face challenges when accessing formal markets or when they want to improve on their competitiveness. Market access and competitiveness relate to the options farmers have to sell their products and purchase inputs [16]. The issue of market access may usefully be

considered according to three dimensions: Physical access to markets; structure of the markets; and producers' lack of skills, information and organization. Physical access to markets like, distance to markets - and lack of roads to get to them (or roads that are impassable at certain times of the year) - is a central concern for rural communities throughout the developing world. However, for agri-enterprises to sustain sufficient market access, various production and marketing constraints must be overcome. It has been observed that most of the small-scale agri-enterprises are entirely inefficient and underdeveloped due to lack of access to suitable marketing facilities [17].

2.2 Strengths, Weaknesses, Threats, Challenges and Opportunities for Accessing Markets among Smallholder Farmers

In an attempt to improve competitiveness in the market, smallholder farmers regularly face constraints in accessing the market. In order to achieve competitiveness and easy market access, farmers have two options which are sale of products and purchase of inputs [17]. Smallholder farmers often face challenges when accessing formal markets or when they want to improve on their competitiveness. Market access and competitiveness relate to the options farmers have to sell their products and purchase inputs [16]. The issue of market access may usefully be considered according to three dimensions: physical access to markets; structure of the markets; and producers' lack of skills, information and organization. Physical access to markets like, distance to markets - and lack of roads to get to them (or roads that are impassable at certain times of the year) - is a central concern for rural communities throughout the developing world. However, for agri-enterprises to sustain sufficient market access, various production and marketing constraints must be overcome. It has been observed that most of the small-scale agri-enterprises are entirely inefficient and underdeveloped due to lack of access to suitable marketing facilities [18]. Market limitations are as a results of several issues such as; lack of knowledge and skills in marketing operations, unaware of market information, inability to access high-value and reliable markets, high transactional costs, long distance to marketplaces, poor quality of products, nonexistence of storage facilities, low educational levels, little access to extension services and limited financial support [12,19].

Other marketing challenges include socio-economic factors associated with the smallholder farmer such as; capacity building, farming skill, age, level of education and household size, lack of access to decent roads, price risk and uncertainty, electricity, poor communication, information regarding prices, inadequate local markets, lack of bargaining power, excess of intermediaries [13,10]. These marketing constraints becomes barrier to small-scale farmers when it comes to accessing formal markets, and at the same time hinders their decision of participating in a market [20,21]. Smallholder farmers substantially face vast constraints in accessing markets and this ranges from; Lack of continuation on savings by the smallholder farmers, inadequate management of farms by small-scale farmers, coordination challenges from farmers themselves, Lack of business skills and poor negotiating experience [4]. These constrains limit them with the power to cooperate on equivalent terms with stronger market chain players.

2.3 Factors Influencing Market Access among Pineapple Agripreneurs

Market access by pineapple agripreneurs is affected by numerous factors, including socioeconomic factors, institutional factors, market factors and external factors which include natural disaster and political stability. These factors can have negative or positive impacts on pineapple agri-enterprises. Social-economic factors include: age, gender, education, experience, household size and land size [5]. Farmer's age may have a negative or positive impact on market access. The positive impact resulting from the fact that older farmers may take their decision more easily than the young farmers, because the older people might have accumulated capital or a long term relationship with their clients or might have preferential access to credit due to their age, availability of land, and or family size [1]. Additionally, institutional factors such as infrastructure, group membership, and access to credit facilities influence access to market. For instance membership of the farmers' organization has a positive impact on markets access since it enables acquiring of marketing knowledge during capacity building session, and through this it cultivates and promotes abilities of farmer to participate in markets [22]. Agripreneurs in least developed countries are located in distant areas with poor infrastructure, thus failing in market participation due to high transaction costs;

therefore, poor infrastructure has a negative result on the market contribution [11]. Group membership on market participation has both positive and negative impacts. For instance, an increase in households' access to dynamic information on invention and promotion impact positively on the market contribution [23]. Positive influence on market access could also be experienced through possession of transport equipment such as trucks, motorcycles, and bicycles, since they enhance a reduction of cost involved in transporting the produce from farms to the market [1]. Consequently, access to better road infrastructure counts in as a feature that positively impacts the decision to contribute to the market and the volume of rice sold by smallholder farmers in the market [22].

2.4 Theoretical Framework

The study was based on two theories: Theory of New Institutional Economics and theory of random utility.

2.5 New Institutional Economics

The study was founded on the theory of New Institutional Economics (N.I.E.). This is a multidisciplinary field that has several components, such as economics, sociology, business organization, and law. The theory was important in analyzing value chains because of its emphasis on the important role of institutions in agricultural marketing. The N.I.E. explains the determining factor of institutions and their development over time as well as evaluating their efficiency, distribution, and impact on economic performance [24]. The theory operates on two levels: the macro level and the micro-level. The macro-level of N.I.E. explains the institutional environment that impacts the behavior and performance of economic actors and the transactions that these actors are involved in. The micro-level of N.I.E. addresses the institutional arrangements concerned with governance.

The three key benefits of using N.I.E. theory for the study were: First, since the N.I.E. framework is concerned with the institutional analysis, to explain the cost of transactions between people who engage in economic activity. The framework helped understand the reasons behind market failure and what incentives needed to be changed to ensure efficient production. Secondly, N.I.E. was useful in determining the types of institutions desirable to improve the

economic performance of pineapple markets, either formally or informally. Finally, N.I.E. was used to understand the best agreement/contract for producers in very uncertain business environments that have weak (institutional) enforcement regimes. The N.I.E theory provided an insight into how the behavior of pineapple farming economic agents was influenced by the social and institutional environments in which they operate. N.I.E. was also used to explain how the institutional environment influences pineapple agripreneurs: rule, regulations, and incentives, created and enforced by public and private sector stakeholders. The institutional environments in the agriculture sector had a huge influence on smallholder farmer's ability to overcome the challenges in accessing markets successfully. It is important to note that the institutional environment also guides the behavior of value chain players, and also help in supporting smallholder farmers in overcoming the market access challenges.

2.6 Random Utility Theory

The study assumed that the decision to access the formal pineapple market is prejudiced by the expected utility, which increases if one accessed the formal market and decreases for those who sold produce in the informal market. The decision on whether or not to access a formal market is preferred under profit maximization or the general framework of utility. The welfare of a household is reflected by the outcome of the decision to access the market. The utility is assumed from the choices that economic actors and agents make because it cannot be observed directly. In this case, the decision by smallholder farmers to access formal markets attracts higher utility compared to those who sell their products in an informal market.

Every smallholder farmer is considered as a coherent decision-maker, who maximized utility relative to his choices. Assuming that U_i and U_k represented a household's utility for two choices namely those who accessed formal market (i) and those who did not access market (k), the linear random utility model for the two options was presented as;

$$U_i = \beta_i X_i + \epsilon_i \quad \text{and} \quad U_k = \beta_k X_k + \epsilon_k \quad (i)$$

Where U_i and U_k were expected utility from those accessing market, choices i, and k, β_i and β_k were estimated parameters, ϵ_k and ϵ_i were error terms assumed to be independently identically

distributed. Those households who choose option i was perceived to have derived higher utility compared to those who choose option k, and this was illustrated in equation (ii).

$$U_i = \beta_i X_i + \epsilon_i > U_k = \beta_k X_k + \epsilon_k \quad (ii)$$

The probability that a household who chooses to access the formal market, which is option i, can be illustrated as follows;

$$P(Y=1|X) = P(U_i > U_k)$$

$$P[\beta_i X_i + \epsilon_i - (\beta_k X_k + \epsilon_k) > 0|X] \quad (iii)$$

$$P[\beta_i X_i + \epsilon_i - \beta_k X_k - \epsilon_k > 0|X] \quad (iv)$$

Where P is the probability function for U_i and U_k as defined above, ϵ_i ϵ_k is a random error term, β' is a vector of unknown parameters. This is interpreted as the net influence of the independent variables on the decision to access the market. This theoretical framework explained household choice decisions and their implementation of market access.

3. MATERIALS AND METHODS

3.1 The Study Area

Rangwe sub-county in Homa Bay County that lies between latitudes 0°15 south and 0°52 South, and between longitudes 34° East and 35° East.

3.2 Sampling Technique and Method of Data Collection

Multi-stage sampling technique was used in the identification and selection of representative sample. The first step involved purposive selection of Rangwe sub-county among the eight sub-counties in Homa Bay County. The sub county was selected purposively based on quantities and the numbers smallholder pineapple farmers. Sample size of 183 pineapple agripreneurs was determined using Cochran's proportionate to size sampling methodology. Finally the respondent were selected randomly by simple random sampling technique and ultimately interviewed. Primary data were collected from sample households by well-trained research assistants (data enumerators) using a semi structured questionnaires.

3.3 Data Analysis

To ensure uniformity, accuracy and consistency data from the field was coded, cleaned and

edited. Data was recorded into computer software for analysis. The computer programs used to process data include both STATA and SPSS. Econometric and descriptive analysis were used to analyze the collected data.

3.4 Descriptive Analysis

Descriptive and inferential statistics such as means, percentage and frequency distribution were calculated. The Descriptive research design was used to identify and analyze challenges of and opportunities for accessing markets by pineapple agripreneurs in Rangwe sub-county. This design was preferred because it allows for thorough analysis, presentation and interpretation of qualitative data

3.5 Econometric Analysis

The binary logistic regression model was used to find out factors influencing access to formal market by pineapple agripreneurs in Homa Bay County. The probability of response from pineapple agripreneurs on market access was assumed to be binary, since only two market options were considered that is formal markets and informal markets. The dependent variable represented the choice of market which was either formal or informal. On the other hand, a set of independent variables were derived from marketing and institutional factors, farm characteristics and farmer demographics.

The empirical model measuring the probability that a farmer accessed formal market or informal market was expressed as follows:

$$P_i = F(FMA_i) = F(\beta + \varepsilon_i) = \frac{1}{1 + e^{-FMA_i}} = \frac{1}{1 + e^{-(x_i\beta + \varepsilon_i)}} \quad (v)$$

- P_i = Probability function
- FMA = access to formal markets
- 1 = Indicates that smallholder pineapple agripreneur is accessing formal markets.
- 0 = Otherwise
- X_i = A vector of observed socio-economic, institutional and market factors.
- β = It is a vector with the corresponding estimated variables' coefficients.
- ε_i = The error vector which consists of unobservable random variables.

4. RESULTS AND DISCUSSION

4.1 Challenges of and Opportunities for Accessing Markets by Pineapple Agripreneurs in Rangwe Sub County

The results displayed in Table 1 and 2 represent opinion of pineapple agripreneurs in Rangwe Sub County, in relation to challenges of and opportunities for market access.

When the results were ranked according to perception of those respondents who strongly agree then; use of ICT ranks the highest at 69.9% followed by growth of pineapple formal sector at 65.6% and the third rank perception is the increased demand of consumption at 60.1%. These findings were in agreement with those who found that usage of ICT tools acts as a business opportunity for smallholder agripreneurs since it aids in the provision of pineapple market information [25]. Additionally, in terms of growth in the pineapple formal sector the findings were similar to the studies undertaken in India that found increased level of value addition on pineapple in India resulted to increased production of pineapple since the enterprise was attractive to both domestic and export markets [26].

The findings indicated that 79.2% were in agreement that there are poor infrastructure and inaccessible transport facilities in the production areas, resulting to challenge in accessing the pineapple market. Proper road infrastructure and access to transport facilities such as vehicles and motorcycles play a crucial role in lowering the transportation cost as well as boosting the volume of goods to be transported thus increasing the sales of pineapple to the market [27]. Access to inputs plays an important role in agricultural production and marketing [1]; however, 70.5% of the agripreneurs reported that there was poor access to quality inputs and services such as planting materials and extension. Furthermore, 61.7% reported that there was weak governance and management capacity of farmers' groups, thus contribute negatively to agripreneurs accessing markets that require consistency in the supply of pineapple fruits. Studies have revealed that collective action help farmers meet minimum frequency, quality, and quantities as required by market [24].

4.2 Factors influencing access to informal or formal markets by pineapple agripreneurs

Result presented in Table 4, shows estimation of factors that influence access to formal market by pineapple agripreneurs using binary logistic regression model.

Amongst the explanatory variables: age, education level, household size, type of road, extension contacts, and price of pineapples were found to be statistically significant in determining access to formal markets. However, gender, distance to market, use of ICT in marketing, group membership, market information, land

size, and transport cost were not statistically significant. The variable 'age of farmer' was found to have a direct impact on access to markets. The beta coefficient was - 0.1151, with an associated p-value of 0.004. The effect of age on access to formal markets was negative. These results show that an additional year to the age of the household head is associated with less probability of selling to formal markets. The older the household head perhaps would be less likely to sell their pineapples to formal markets such as nearest towns and supermarkets because of the logistics associated with such markets. It is more convenient for them to use informal markets like a farm gate.

Table 1. Description and expected sign of the variables

List of variables	Descriptions	Measurement	Sign
Age	Age of household head	Number of years	+
Educ	Education level	Number of years	+
Hhsz	Household size	Number of individuals	+
Fsize	Farm size	Acres	+
Offinc	Off-farm income	Dummy 1=yes, 0=no	+
Acc	Credit access	Dummy 1=yes, 0=no	+
Dist	Distance to output market	Distance in kilometers	-
Contracts	Availability of contractual agreement	Dummy 1=yes, 0=no	+
Econt	Access to extension contact	1 if access, otherwise 0	+
UseICT	Use ICT in marketing	Dummy 1=yes, 0=no	+
Agritrain	Training in pineapple production	Dummy 1=yes, 0=no	+
Supermkt	Sell to supermarkets	Dummy 1=yes, 0=no	+
Value	Perform value addition	Dummy 1=yes, 0=no	+
Grpmbr	Membership to producer organization	Dummy 1=yes, 0=no	+
Contracts	Availability of contractual agreement	Dummy 1=yes, 0=no	+
Mktinfo	Access to market information	1 if access, otherwise 0	+
Grds	Expertise on grades and standards	1 if access, otherwise 0	+
Rdinfra	Road infrastructure	1 if good, 0 if poor	+
Trans	Market transport	1 if have own transport, otherwise 0	+
Stor	Storage facilities	1 if good, otherwise 0	+

Table 2. Perceptions of agripreneurs on pineapples market access opportunities

Opinion statements	SD%	D%	N%	A%	SA%
There is growth in formal processors with incentives for pineapple suppliers	0	0.5	8.2	25.7	65.6
This is a relatively well-established sector with diverse input and services markets	1.6	0	9.3	42.6	46.6
There is widespread market distribution network for pineapple	4.4	0	9.8	34.4	51.4
Presence of co-operatives and farmer group contributes to sense of ownership and trust	0.5	1.6	13.1	35.0	49.7

Opinion statements	SD%	D%	N%	A%	SA%
Usage of ICT options has enhanced data collection and record keeping	2.2	1.1	4.9	21.9	69.9
There is growing domestic and regional markets for pineapples	1.6	1.6	4.9	48.1	43.7
There is increased demand for consumption of fruits	2.2	2.7	2.2	32.8	60.1

Note: SD-strongly disagree, D-disagree, N-neutral, A-agree, and SA-strongly agree

Table 3. Perceptions of agripreneurs on pineapples market access challenges

Opinion statements	SD%	D%	N%	A%	SA%
There is poor access to and quality of inputs and services.	0.5	0	5.5	23.5	70.5
There is low bargaining power of smallholder farmers	0	8.7	8.2	53.6	29.5
The processors in this industry are oligopolistic	4.4	7.1	14.2	41.5	32.8
Weak governance and management capacity of farmers groups	0	2.7	3.8	31.7	61.7
Poor negotiating position of smallholder producers	0.5	11.5	14.8	31.7	41.5
There is poor road infrastructure, transport facilities not up to par in all areas.	0	0.5	7.7	12.6	79.2
Cheap pineapple imports from countries threaten market for domestic pineapple	3.3	2.2	13.1	43.2	38.3

Note: SD-strongly disagree, D-disagree, N-neutral, A-agree, and SA-strongly agree

Table 4. The binary logistic regression results

Variables	Coefficients (B)	dy/dx	S.E.	P>z
Gender	0.1717	0.0397	0.7152	0.810
Age	-0.1151	-0.0266	0.0399	0.004***
Education	0.9952	0.2299	0.3753	0.008**
Household size	-0.4353	-0.1006	0.2222	0.050***
Distance to market	0.0026	0.0006	0.1261	0.984
Type of road	-2.0495	-0.4734	0.7413	0.006***
Use of ICT in marketing	-0.2744	-0.0625	0.7889	0.728
Group membership	0.0003	0.0001	0.7590	1.000
Extension contacts	0.9034	0.2087	0.2697	0.001***
Market information	0.9973	0.2142	0.7921	0.208
Land size	0.3724	0.0860	0.3113	0.232
Price of pineapples	0.0821	0.0190	0.0219	0.000***
Transport cost	0.0030	0.0007	0.0049	0.536
Constant	-2.3007		3.6705	0.531
Number of observations	183			
Log likelihood	-37.21			
Chi square (13)	178.35***			

Note: dy/dx-marginal effects; S.E -standard error;

[Sig - significance value *** Significant at the 1% level; ** Significant at the 5% level; *Significant at the 10% level]

The level of education had a positive effect on access to formal markets. The beta coefficient was 0.9952, with a significant P-value of 0.008. These findings indicate that as the years of schooling increase for agripreneurs it results in households shifting from selling through informal markets to formal markets. More educated farmers were expected to possess a clear understanding of; marketing and business aspects, production process, the marketing and

business aspects included issues like supply requirements and price negotiations [22].

The higher number of people living in household had a negative significant effect on formal market access. The outcome showed that the coefficient -0.4353 had a significant P-value of 0.050. The negative sign indicates that an increase of members of a household results to a lower likelihood of pineapple agripreneurs in accessing

formal markets. This could be due to households with large family size were likely to be under pressure to get cash to fulfill their needs and demands. Therefore, the larger the households size the more likelihood of selling to an informal markets such as farm gates and village markets [16].

The results also showed that un-tarmacked road had a negative significant influence on market access. The coefficient value of this variable was -2.0495, with the significance level (P-value) of 0.006. The negative relationship indicates an increase in corrugated roads versus tarmac roads reduces the likelihood of accessing formal markets. Access to the tarmac road provide farmers with opportunity of accessing markets that are more formal and at the same time increases their participation [28]. Therefore, the more pineapple agripreneurs can access tarmac roads, the more it increases their chances to access formal markets in nearby towns and sell the products at a better price. The number of contacts with extension service providers had a positive significant contribution on market access with a coefficient of 0.9034 and a P-value of 0.001. This implies that an increase in extension contact by one visit on marketing information increases the likelihood of accessing formal markets from informal access. This could be because agripreneurs who have access to extension services were able to get market and price information from these agents. Besides, extension agents popularize innovation by making farmers exchange ideas, experiences, and make it cheaper to source market information [18].

In relation to the price of pineapples, the variable had a positive effect on access to formal markets. The beta coefficient of this variable was 0.0821, with a significant P-value of 0.001. These findings indicated that a rise in the price of pineapples increased the likelihood of selling or accessing informal markets. This is because formal markets like supermarkets channel offer better prices to smallholder farmers and increases participation in such markets [19].

5. CONCLUSION AND RECOMMENDATION

From the findings, market access opportunities includes: source of occupation, value chain support, possibility of diversification, collaboration among actors in the chain, emerging prospective markets and attracting

youths in agriculture. While the challenges include; lack of proper governance, lack of empowerment, lack of capacity building and competitive business environment. Finally, the factors influencing access to formal markets by the pineapple agripreneurs were: education level, extension contacts, and price of pineapples were positively and statistically significant in determining access to formal markets. Whereas those factors such as; age of household head, household size and type of road were statistically and negatively influencing access to formal markets.

Based on the findings the study recommends awareness creation among the pineapple agripreneurs about the opportunities highlighted in the study. In addition, an integrated approach needs to be developed to mitigate the challenges faced by pineapple agripreneurs, this could be through involvement of all the stakeholders in the pineapple value chains in order to offer proper support services. In relation to factors influencing access to formal markets, the study recommends need to develop policies that encourage pineapple agripreneurs to build their capacity through training schools. This will enhance the knowledge and skills of pineapple agripreneurs which could help them to produce better quality pineapples and increase productivity that can enable them to sell to high value markets. Another recommendation relates to encouraging and strengthening collective action through farmer groups/cooperatives. These institutions could help agripreneurs to share market knowledge and information thereby strengthening their market position by accessing formal markets.

CONSENT

As per international standard or university standard, participants' written consent has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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