Youth Agripreneurship in the Horticultural Value-Chain: The Case of Small-Scale Mango Farmers in Southern Ghana

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Abstract

Developing partners are promoting and encouraging participation in agriculture or entrepreneurship in agriculture by the youth in Sub-Saharan Africa which is popularly known as youth agripreneurship. While participation in the production and marketing of food crops by youth has received a lot of attention on both policy and academic fronts, the low level of involvement of youth in the horticultural value-chain has received little attention. To this end, this study conducted a comparative analysis of youth and the elderly in mango production and marketing in Southern Ghana and assessed the factors that influence participation of youth in horticultural value-chain considering high-value mango markets. Using the multistage sampling technique and semi-structured questionnaire, primary data for the empirical analysis done in the study were collected from 224 mango producing households in Southern Ghana. Data were analyzed using descriptive statistics and the binary logit model. The study found that there exists differences between the youth and the elderly in terms of socioeconomic factors including education of household head, household size, resource endowment (income); and their access to institutional and support services including certification, credit, extension services and group membership. The findings of the binary logit model indicate that household size, being a youth, mango land size, access to storage facilities, ownership of a tricycle, and the interaction terms age and access to credit and age and certification influenced participation in high-value mango markets. The implication of these findings are that development partners should pay attention to the provision of credit and the promotion of certification among youth mango farmers in Southern Ghana. Access to credit can be provided through the provision of loans and financial literacy by financial institutions to ensure access to resources by the youth. Also, certification can be promoted through the provision of extension services and regular agronomic trainings.

Keywords: High-value markets, market participation, mango, youth

1. Introduction

In Ghana, agriculture is a predominant activity that makes a significant contribution to the economy in terms of its contribution to the country's gross domestic product (GDP) (18 percent) (Ghana Statistical Service, 2018), foreign exchange earnings, food security, social reconstruction and reduction of youth unemployment (Kidodo et al., 2016). Moreover, while the extractive industries, Ghana's fastest growing sector, employs only a small fraction of unskilled labor, the agriculture sector is the highest employer of unskilled labor and a source of livelihood for about 70 percent of the rural population and the poorest households in Ghana (World Bank Report, 2017). Despite the benefits of agriculture to the Ghanaian economy, the sector faces some serious challenges including ageing labor force, price fluctuations, pests and diseases infestations, limited access to finance, inadequate infrastructure, insufficient access to markets and low productivity (Asafo-Adjei & Buabeng, 2016). These challenges coupled with the negative perceptions of youth about agriculture being less lucrative, labor and capital intensive, and an activity with low self-esteem make agriculture unattractive to the youth, hence their low participation in agriculture (Mangal, 2009). Meanwhile, youth engagement in agriculture has been found to increase agricultural productivity considering that this group are in their physical and mental primes of their lives, are flexible and dynamic, and are relatively more educated than the elderly population (Mangal, 2009; Naamwintome & Bagson, 2013). Furthermore, youth participation in agriculture is important in replacing the elderly population in agriculture which averages 55 years, decrease imports of staple food such as rice and frozen foods, reduce the poor image of agriculture, reduce rural-urban migration and social problems, and reduce youth unemployment particularly in rural areas (Naamwintome & Bagson, 2013; Twumasi et al., 2019). The benefits of the engagement of youth in agriculture can help achieve the Sustainable Development Goals (SDGs) 1 of no poverty; 8 of decent work and economic growth and; 10 of reduced inequality.

The Government of Ghana (GoG), in recognition of the potentials of the youth in agriculture, has made efforts to increase participation of youth in modern agriculture and to provide resources to enhance the participation of youth in modern agriculture through its Youth in Agriculture Programme (YIAP) (GoG, 2011). However, the YIAP focuses on the production and commercialization of food crop and livestock. The engagement of youth in the horticultural

value-chain has received little attention even though this sector offers entrepreneurial opportunities with a positive perception by the youth as compared to the food crop subsector (Hivoc, 2014). The sector also offers high returns considering the continuous increase in the demand for nutritious foods (Joosten et al., 2015).

Considering the contribution of horticulture to non-traditional export earnings of Ghana and to the country's GDP which stands at 2.2 percent (Ghana Export Promotion Authority, 2017), the involvement of youth in this sector is necessary to the growth of the sector as the country can reap the benefits of its youth dividend to develop its horticultural sector. It has been established that relative to the elderly, young people have desirable characteristics including their ability to adopt new and better agricultural practices (Kimaro et al., 2015). This capability can increase productivity and enhance the participation of youth in remunerative markets in the horticultural value-chain through their ability to meet the requirements of these remunerative markets. Further, this enhanced participation will in turn increase the incomes of youth.

Pineapple is the leading commodity in Ghana's horticultural sector; however, mango has the potential of becoming Ghana's key horticultural export (Zakari, 2012). Mango production and marketing in Ghana has been found to have high prospects as Okorley et al. (2014) found that there is ready market for mangoes in both low-value (such as the local traders) and high-value market chains (such as the export and the industrial processors) which offer high prices. Despite the profitability and opportunities offered in this subsector, participation in mango production as well as high-value market participation in Ghana has been dominated by the elderly who account for over 70 percent of mango producers (Eghan, 2017; Okorley et al., 2014). This is a threat to the mango subsector and an indication that the mango value-chain has also not been spared from the low participation by youth in Ghana. However, the factors that influence this low participation by youth in the mango value-chain in Ghana is largely unknown. Although participation in agriculture by youth has been extensively studied, these studies have mainly focused on prospects and challenges to participation of youth in agriculture as well as the determinants of participation of youth in agricultural programmes (Adesina & Eforuoku, 2016; Afande et al., 2015; Auta et al., 2010; Cheteni, 2016; Naamwintome & Bagson, 2013) and perceptions of youth about agriculture (Jean-Philippe et al., 2017; Njeru, 2017; Sumberg et al.,

2017). To date, no study has specifically examined participation of youth in the mango value-chain in Ghana. Meanwhile, information on youth participation in the mango value-chain is essential in ascertaining the limitations to youth participation in the value-chain and in devising appropriate policies to enhance youth participation in the mango value-chain and in the horticultural sector at large. To this end, a study of this nature is necessary to assess differences that exist between youth and elderly mango farmers in terms of socioeconomic factors and access to institutional and support services; and examine youth mango farmers' participation in high-value markets.

2. Materials and Methods

2.1. Study area and data collection

The Southern Belt of mango production is situated in Southern Ghana. The regions that have relatively high levels of mango production in Southern Ghana are the Greater Accra, Eastern and the Volta Regions. The Greater Accra Region is bordered by the Eastern Region on the north, the Volta Region on the East, the Central Region on the west and the Gulf of Guinea on the south. Though the second most populated region, the total land area of the Greater Accra Region is 3,245 square kilometers. Mango is majorly produced in the Shai Osudoku District. The district has a total land area of 1,442 square kilometers, low annual rainfall and a warm temperature. The major agricultural economic activities in the district include tree crop farming (mango farming), maize farming and rice farming (Akotsen-Mensah, 2017). The Eastern Region of Ghana has a tropical vegetation with tree crop, food crop and animal production as the main agricultural activities. The rural parts of the region record the highest economic activities. The tropical nature of this region allows for mango production which forms part of the major tree crops of high economic value. The high production of mango in the region has led to the establishment of pack houses through the Millennium Development Agenda (MiDA) to serve mango producers in the region (Zakari, 2012). The high level of mango production in these regions form a good basis for the analysis of youth participation in the mango value-chain in Ghana.

A three-stage sampling procedure was used to select participants for the study. The Shai Osudoku, Yilo and Manya Krobo Districts were purposively selected due to their relatively high levels of mango production. Eight villages (Agomeda, New Somanya, Somanya, Akuni, Asitey,

Dzogbe, Odumase, and Kpong) in these districts were randomly selected and 224 mango farmers were randomly selected using the systematic sampling technique. Primary data were collected using a semi-structured questionnaire from these farmers.

2.2. Methods of analysis

The study used descriptive statistics to assess differences that existed between youth and elderly mango farmers in terms of socioeconomic factors and access to institutional and support services. The significance of these differences was tested using t-test for continuous variables and chi-square test for categorical variables.

The binary logit model was used to examine youth mango farmers' participation in high-value markets. This model was used because market participation in high-value market chains by young mango farmers was captured as a binary dependent variable where the farmer decides whether to participate in a high-value market or not; that is, to participate in a high-value or low-value market.

Following Gujarati (2009), the logit model is specified as:

$$L_i = ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 X_i + U_i$$

Where;

P_i = 1 if the farmer participates in a high-value market and 0 if otherwise

β_1 represents the constant term

β_2 represents the coefficients of the explanatory variables

X_i is a vector of explanatory variables

Description of Explanatory Variables

The study expected a positive relationship between gender and participation in high-value markets by mango farmers in Southern Ghana. This is because agroforestry in Ghana is male-dominated (Okorley, 2014) which implies that men make the major production and marketing decisions and also have access to resources (Gabrowski et al., 2017) which can enhance their participation in high-value markets. Age influences participation in high-value markets as it is a measure of experience and availability of resources. According to Martey et al. (2012), older farmers have greater contacts and make better productive and marketing decisions which allows trading opportunities to the discovered at a lower cost relative to younger farmers. Education was

expected to positively influence participation in high-value markets because education enhances managerial skills and the implementation of good agricultural practices (Marenya & Barret, 2007). Household size was expected to positively participation in high-value mango markets due to availability of labor which increases productivity (Mirie & Zemedu, 2018). Total annual income was expected to enhance participation in high-value markets because wealthier farmers are able to afford farm inputs that are needed to produce mangoes that meet the standards of high-value markets (Nyaga et al., 2016). Mango land size was expected to improve participation in high-value markets because farmers with large farm sizes are able to reduce tree density which increases the tendency to have quality mangoes. Access to storage facility was expected to improve participation in high-value markets because Akurugu et al. (2016) found that access to storage facilities reduces post-harvest losses in terms of quantity and quality. Ownership of a tricycle was expected to increase participation in high-value markets because the tricycle reduces transaction costs (Segei et al., 2013). The study interacted age with access to credit and certification. The study expected that being a youth and having access to credit increases participation in high-value markets because with credit, the young farmer would be empowered to acquire inputs that can enhance their ability to meet the requirement of the high-value markets. Also, when the youth has certification, they can increase their participation in high-value markets because certification significantly influences productivity and quality of horticultural produce (Lee et al., 2012). A table of the description of variables and their expected signs is presented in Appendix 1 below.

3. Results

3.1. Comparative analysis of youth and elderly in mango production and marketing in Southern Ghana

Table 1 below presents a comparison between youth and elderly mango farmers in terms of their socio-economic characteristics and access to institutional and support services in mango production and marketing. Regarding the categorization of farmers into youth and the elderly, the study found that 20.09 percent of the mango farmers in Southern Ghana are youth with an average age of about 31 years whereas almost 80 percent of mango farmers from Southern Ghana are elderly with an average age of about 52 years. This finding is in line with findings of Eghan (2017) and Okorley (2014) who found that mango farming in Southern Ghana is

dominated by the elderly. On education, the study found that the youth in mango farming are more educated with an average years of schooling of 10.67 years than the elderly who recorded an average years of schooling of 8.37 years. This indicates that the youth engage in mango farming after completion of senior secondary school education. Difference in years of schooling between the youth and the elderly is statistically significant at 1 percent significance level. The elderly involved in mango farming had an average household size of 5.63 which is larger than the average household size of the youth which was 3.47. This finding is intuitive because the older one becomes, the more children one is likely to have. Difference in household size between the youth and the elderly is statistically significant at 1 percent significance level. On household income, the study found that the elderly in mango farming were wealthier with an average income of GH¢12774.78 than the youth in mango farming who had an average income of GH¢7,318.44. Considering mango farming as the main source of income to mango-producing households in the study area, the relatively high income of the elderly in mango farming could stem from the relatively high mango sales they made during the last harvest season which was an average of GH¢9,477.10 as compared to lower mango sales made by young farmers which was an average of GH¢6262.89. Also, the elderly had more non-mango income which averaged GH¢3409.64 whiles the youth made less which averaged GH¢1055.56. This indicates that the elderly engaged in activities other than mango farming which were more remunerative than the activities in which the youth engaged. Differences in household income, mango sales and non-mango income among youth and elderly are statistically significant at 1 percent, 5 percent and 10 percent significant levels respectively. Though not statistically significant, older mango famers had a bigger land under mango production which was an average of 5.27 acres than young mango farmers which was an average of approximately 4 acres. This implies that access to land is not so much of a challenge to participation of youth in mango farming as it is in the case of food crops as found by (Naamwintome & Bagson, 2013). In fact, table 2 showed that while 97 percent of the elderly farmed mango on their own land, 96 percent of the youth farmed mango on their own land.

Regarding access to institutional and support services in the mango subsector in Southern Ghana, the major institutional and support services for mango found in the study area are GlobalGAP certification, group membership, access to storage facilities, access to mango market

information, access to credit and access to extension services. The GlobalGAP standard which gives rise to the GlobalGAP certification is the most important standard in the export of horticulture goods in the international market. Lee et al. (2012) argue that compliance with these standards is associated with increased productivity and quality of produce. The study found that most of the older mango farmers (53 percent) were certified mango farmers while only a few young mango farmers (38 percent) had certification. This could be because the older mango farmers are able to afford approved inputs and the cost of certification which most of the youth are not able to afford. Despite the benefits of being a member of a farmer group including training services and collective action in terms of negotiations of contracts (Maina et al., 2015), only a few young farmers (31 percent) were members of mango farmers' associations whiles almost half of the older farmers were members of mango farmers' associations. Regarding access to storage facilities, the study found that more young farmers (33 percent) had access to storage facilities as compared with the older farmers (25 percent). This implies that young farmers are in a better position to reduce post-harvest losses in terms of quantity and quality. On access to mango market information, more young farmers (93 percent) had access to mango market information relative to the older farmers (82 percent). This finding could be explained by the dominant use of information communication technology (ICT) including the cellphone, radio, television and the internet among the youth in Southern Ghana relative to the older farmers (Afful & Akrong, 2019). The exposure to ICT gives the farmers access to information on prices and remunerative marketing channels. Hence, young people are in a better position to participate in high-value markets. The study found that access to credit was more among the youth (40 percent) than the elderly (35 percent). This could be because youth need credit more than the elderly, hence there is a higher tendency that they would apply for credit from both formal and informal sectors. However, credit access is still low among the youth in the study area considering that less than half of them have access to credit despite that almost every youth need credit. On access to extension services, the study found that almost none of the youth (7 percent) had extension contact while 31 percent of the elderly had extension contact. This finding indicates that the youth in the study area have been deprived of extension contacts which is needed to integrate good agricultural practices that will enhance high-value participation among the youth.

Table 1. Socioeconomic attributes of mango farmers in Southern Ghana

Variables	Youth (N = 45) Mean	Elderly (N = 179) Mean	Difference
Age (Years)	30.61	51.86	-21.19***
Years of schooling	10.67	8.37	2.30***
Household size	3.47	5.63	-2.16***
Total household income	7318.44	12774.78	-5456.34***
Mango sales	6262.89	9477.10	-3214.21**
Non-mango income	1055.56	3409.64	-2354.09*
Mango land size	3.96	5.27	-1.31

*, ** and *** indicate 10%, 5% and 1% significance levels respectively

Table 2. Distribution of categorical variables across age groups

Variables	Category	Youth (N = 45) Percent (%)	Elderly (N = 179) Percent (%)	χ^2
Own land	Yes	96	97	0.724
	No	4	3	
Certification	Yes	38	53	0.070*
	No	62	47	
Group membership	Yes	31	49	0.030**
	No	69	51	
Access to storage	Yes	33	25	0.267
	No	67	75	
Access to market information	Yes	93	82	0.055*
	No	7	8	
Access to credit	Yes	40	35	0.502
	No	60	65	
Access to extension services	Yes	7	31	0.001***
	No	93	69	

*, ** and *** indicate 10%, 5% and 1% significance levels respectively

3.2. Regression results

Analysis of factors that influence youth participation in high-value mango markets

The results of the logit model indicate that 7 out of 10 explanatory variables used were statistically significant at 1%, 5% and 10% significant levels. The chi-square value of -103.9008 show that likelihood ratio statistics were highly significant ($p < 0.000$) indicating that the model had a strong explanatory power.

As expected, the age of a farmer significantly influenced participation in high-value markets ($p = 0.002$). Being a youth reduces the probability of participation in high-value mango markets by up to 60 percent. This is because the youth are less resource endowed and do not have better contacts and experience that can enhance their commercialization in remunerative markets (Martey et al., 2012). This will cause them to sell to low-value markets such as the local traders who offer relatively low prices, hence lower income.

Household size was found to significantly influence participation in high-value markets ($p = 0.031$). An increase in household size by one person reduces the probability that a farmer will participate in a high-value market by 4 percent. This is because having a larger household size increased the cultivation of food crops and decreased the cultivation of cash crops (Murithi & Matz, 2015). Another reason could be that having a large household size reduces investments in farming because a greater percentage of household income will be channeled to fulfilling other household needs.

As expected, mango land size influenced participation in high-value markets ($p = 0.095$). An increase in mango land size by 1 acre increases the probability that a farmer will participate in a high-value market by 2 percent. This is because, buyers from the high-value markets such as the export market prefer larger farm size (Muthini et al., 2017). Another reason could be that having a larger farm size allows a farmer to have the proper spacing, thereby reducing competition among trees for nutrients. This further increases the quality of the fruits produced, making farmers to be able to meet the quality requirements of high-value markets.

Access to storage had a significant influence on participation in high-value markets (p = 0.000). A transition from not having access to a storage facility to having access to a storage facility increases the probability that a mango farmer would participate in a high-value market by up to 49 percent. In the study area, some of the farmers stored mangoes by heaping them on the ground. This process causes damages to the mangoes which makes the mangoes to lose the physical qualities (Akurugu et al., 2016). These farmers among others who do not have access to storage facilities are less likely to meet the requirements of the high-value markets, thus their inability to participate in high-value markets.

Ownership of a tricycle positively influenced participation in high-value mango markets (p = 0.048). A transition from not having a tricycle to having a tricycle increases the probability that a farmer will participate in a high-value market by up to 24 percent. This is because a means of transportation is a transaction-cost-reducing tool; thus, ownership of means of transportation reduces transportation costs of outputs and inputs, making farmers to realize higher gross margins (Shammah et al., 2017). Farmers with personal means of transportation are able to access high-value markets like the processors and the supermarkets. Access to these markets is often limited by poor transportation.

The interaction term age and access to credit (AGECRED) positively and significantly influenced participation in high-value mango markets (p = 0.059). A youth who has access to credit has an increased probability of participating in a high-value mango market by approximately 36 percent. This finding indicates that access to credit facilities enables the youth to afford both fixed and variable inputs that can ensure the adoption of good agricultural practices (Ngenoh et al., 2019). This can further enhance productivity and quality of mangoes that can meet the stringent requirements of high-value markets.

The interaction term age and certification (AGECERT) positively and significantly influenced participation in high-value markets (p = 0.013). A certified youth has an increased probability of participating in a high-value mango market by approximately 41 percent. This finding implies that when the youth are able to meet the GlobalGAP standards, they are more likely to have

increased productivity and the quality of mangoes that meets the stringent requirements of high-value markets (Lee at al., 2012). This will ensure their participation in high-value markets.

Table 3: Maximum likelihood estimates of youth participation in high-value mango markets

Variables	Marginal effects	Coefficients	Standard error	p-values
Gender (1 = Male)	0.254	1.038	0.845	0.219
Age (1 = Youth)	-0.595	-2.840	0.906	0.002***
Income	7.14e-06	3.00e-05	1.84e-05	0.103
Schooling years	-0.008	-0.0318	0.0370	0.390
Household size	-0.044	-0.185	0.0858	0.031**
Mango land size	0.020	0.0843	0.0504	0.095*
Storage (1 = Yes)	0.490	2.720	0.575	0.000***
Ownership of tricycle (1 = Yes)	0.236	1.137	0.576	0.048**
AGECRED	0. 359	2.250	1.191	0.059*
AGECERT	0.408	3.019	1.217	0.013***
Constant		-0.813	0.986	0.410
Pseudo R^2	0.3269			
Prob > Chi^2	0.0000			
Log likelihood	-103.9008			
LR Chi^2	100.94			
Observations	224			

4. Conclusions and Policy Recommendations

The study found that there exists significant differences between the youth and elderly involved in mango farming in terms of socioeconomic attributes and access to institutional and support services in mango production in Southern Ghana. The variables that exhibited these differences include years of schooling, household size, total household income, mango sales, non-mango

sales, mango land size, certification, membership to a farmer-based organization, access to mango market information and access to extension services. Most of the variables used in the model significantly influenced youth participation in high-value mango markets. A large family size and being a youth reduced a farmer's chances of participating in high-value mango markets whereas high-value mango market participation was encouraged by large mango farms, access to storage facilities, ownership of a tricycle, and the interaction terms age and access to credit and age and certification. This shows that certification and access to credit empower the youth to access remunerative markets which will increase their incomes and consequently, their livelihoods. Thus, through certification and access to credit, mango production and marketing offer great livelihood opportunities to the youth.

Based on the findings, the study recommends that the Government of Ghana and development partners make efforts to bridge the gaps that exist between youth and the elderly mango farmers. This will ensure that the youth are at par with the elderly and their participation in high-value mango markets will be enhanced. Further, financial institutions should provide the youth access to credit both in cash and kind and also financial literacy. This will ensure that young farmers will be able to acquire resources including increasing additional farm lands and tricycles and also cover necessary costs such as cost of accessing storage facilities and other farm inputs that are required to participate in high-value market. Also, the Government of Ghana and stakeholders in the mango value-chain should build the capacity of young farmers through agronomic trainings and regular extension visits to ensure that these farmers meet the GlobalGAP standards for certification so as to be certified. This will ensure that young farmers fully benefit from certification including increased productivity and quality produce, hence increased high-value market participation and improved livelihoods. This will further make the horticultural sector attractive to the Ghanaian youth.

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Appendix 1. Table of expected signs of explanatory variables

variable	Description of variable	measurement	Expected sign
Gender	Gender of household head	Dummy (1 = male 0 = female)	+
Age	Age category of household head	Dummy (1 = youth 0 = elderly)	-
Income	Total annual household income in Cedis	Continuous	+
Schooling years	Number of years of schooling of household head in years	Continuous	+
Household size	Total number of people in the household	Continuous	+/-
Mango land size	Total land under mango production in acres	Continuous	+
Storage	If household head has access to a storage facility	Dummy (1 = yes 0= otherwise)	+
Ownership of tricycle	If household head owns a tricycle	Dummy (1 = yes 0= otherwise)	+
AGECRED	If household head is a youth and has access to credit	Dummy (1 = accessed credit 0 = otherwise)	+
AGECERT	If household head is a youth and has GlobalGAP certification	Dummy (1 = has certification 0 = otherwise)	+