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RELATIONSHIP BETWEEN INCOME AND LAND ACCESS AMONG WOMEN CASSAVA ENTREPRENEURS IN SOUTHWEST NIGERIA

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Abstract

The study analysed the level of income among women cassava entrepreneurs in Southwest Nigeria, using Ogun and Ondo State as the focal study areas. Primary data were obtained through structured questionnaire from 300 women cassava farmers selected through multistage sampling technique. Descriptive statistics and Quantile Regression (QR) analysis were used to analyse the primary data obtained from the field. Results revealed that respondents had a mean age of 47.4 years old while 82.0% had at least primary school education. Also, 85.3% were married with a mean household size and farming experience of 5 persons 15.4years respectively, as well as mean farm size of 1.4ha and mean annual income (from cassava production) of ₦143, 602.00. The QR model results revealed that educational status ($p < 0.05$), access to farmland ($p < 0.05$) and labour cost ($p < 0.05$) were the major factors that affected the income level of respondents in q25 category. While the major factors affecting income level of respondents in the q50 category were educational status ($p < 0.05$), number of extension visits ($p < 0.05$) and labour cost ($p < 0.05$). Also, amount of credit obtained ($p < 0.05$), number of extension visits ($p < 0.05$) and farming experience ($p < 0.05$) and access to land ($p < 0.10$) were the major factors that affected the income levels of q50 category of respondents. The study recommended that improved income earnings would be enhanced among the women cassava entrepreneurs if the state governments introduce scheme that improves land ownership (among other factors) to encourage more women to have access to large cultivable land.

Keywords: Income, Women cassava entrepreneurs, Southwest Nigeria, Quartile regression

Introduction

The majority of the people in Nigeria earn their income directly or indirectly from farm related economic activities because agriculture is an integral part of everyday life in Nigeria because it is a precursor of industrial growth and development (Oduntan *et al.*, 2015 and Iheke *et al.*, 2019). The involvement of women in agricultural production cannot be overemphasised. Women play a central role in cassava production, processing and marketing, contributing about 58 percent of the total agricultural labour in Southwest, 67 percent in Southeast and 58 percent in the Central zones of Nigeria (Onyemauwa, 2012). Agricultural productivity figure in 2010 by Food and Agricultural Organization (FAO, 2011) showed that women constitute over 50% of agricultural labour force in sub-Saharan Africa including Nigeria (FAO, 2011; Nweke *et al.*, 2012).

As formidable farmers, women are principally limited by poor access to agricultural land, as they mostly lag behind under the land rights schemes (Balogun and Akinyemi, 2017). Land rights are often vital element when rural households balance their capabilities and assets, and determine their resulting strategies to cope with their daily production, food security and income (Iheke *et al.*, 2019). However, right to land is not just a source of economic structure as stated earlier, but also a basis for social relationship and cultural values as well as a source of prestige and power (Odoemelam *et al.*, 2013). Land access and tenure security influence income decisions as they affect the motivation to engage in

subsistence or commercial agriculture. Deininger *et al.* (2008) noted that property rights to land that are secured and easily transferable have long been identified as key element to bring about higher levels of investment and access to credit, facilitate reallocation of production factors to maximise allocative efficiency in resource use as well as allow the development of an off-farm economy.

Land is fundamental to the lives of poor rural people. It is a source of food, shelter, income and social identity. Secured access to land reduces vulnerability to hunger and poverty. But for many of the world's poor rural people in developing countries, access is becoming more tedious than ever. Pressure on land is increasing as a result of rising world population, climate change, declining soil fertility and the need for global food and fuel security. Women are particularly vulnerable because their land right may be obtained through kinship relationship with men or marriage if those links are severed, women can lose their rights (Onyemauwa, 2012). The overall feature of Nigerian women is essentially that of marginalisation, which is best explained within the context of productive relations (Echebiri, 2008).

Women who are empowered in cassava production and processing play major roles such as: planting of cassava cuttings, weeding, harvesting etc. Traditionally, the bulk of cassava products are processed by the women at village level, working independently or organised into informal groups or cooperatives. Cassava processing is a rural enterprise which adds value to the product and increases the marketing opportunities for small and semi-subsistence farmers (Food and Agricultural Organisation, 2010). Apart from the issue of land access, Nigerian women are expected to perform their traditional roles efficiently, run their homes, and be good wives and step-mothers (Ezeigbo, 1990). Despite this, they are also expected to contribute to their family income, cater for the extended family members and perform efficiently in their jobs or businesses (Safiya, 2011).

The study conducted by Odoemelam *et al.* (2014) evaluated women access and rights to land and its implications on rural household food security in selected rural communities of Abia State, Nigeria. Data generated through the use of focus group discussion and participatory observation from 180 respondents using multistage sampling technique revealed that 34.0% of the respondents earned between ₦160,000-₦180,000 per annum. Furthermore, 39.0% women acquired land for cultivation through matrilineal ties, 34.0% by purchase, and 29.0% by other farming ties while 24.0% rented or borrowed their lands. It was also found out that women were unable to access credit facilities from bank due to their incapacitation to acquire land for collateral. The foregoing implies that adequate access to land and favourable use right to women is expected to improve their leverage as active players in agricultural development.

Feder (2017) worked on the impact of land ownership security on farmers' input use and output value. The study used farm level data from three provinces in Thailand to test the propositions that farmers with secure legal ownership will have more incentives and better ability to invest, due to a lower perceived risk and a favourable access to institutional credit. The results confirmed that the provision of secure ownership in less developed countries (LDCs) can increase productivity and income significantly.

This study hence, focusses on the relationship between income land access of women cassava entrepreneurs in the Southwest Nigeria. The specific objectives of the study are to:

- a) describe the socioeconomic characteristics of respondents;
- b) describe the income level of the women cassava entrepreneurs and
- c) determine the factors that affect the different level of income of the women cassava entrepreneurs in the study area.

Methodology

Study Area:

This study made use of cross-sectional survey with the study population drawn from Southwest, Nigeria which is one of the six geo-political zones. The zone comprises Ogun, Osun, Ondo, Oyo, Lagos and Ekiti States. The area has a land mass of 76,852 square kilometres and population of 25.2 million (NPC,

2006) and lies between longitude $2^{\circ} 31'$ and $6^{\circ} 00'$ East and Latitude $6^{\circ} 21'$ and $8^{\circ} 37'$ North with three main agro-ecological zones which are the swamp (on the Atlantic coast), tropical rainforest (in the middle) and the Guinea savannah (in the North). The study area is mainly agrarian, and agriculture is the main occupation in the study area; providing employment for over 70 percent of the population. The prominent crops cultivated include; oil palm, cocoa, citrus, plantain, banana, cassava, yam, vegetables, maize, rice, Kolanut and cashew. Ogun State was created on 3rd February 1976. It shares border with Lagos State in the North, Ondo State to the East and Republic of Benin to the West. Abeokuta is the capital and largest city in the State. The state has a population of 3,751,140 (2006 census). The State has a land area of 16,980.55km²(6,556.23 sqm). The State is notable for having high concentration of industrial estates and being a major manufacturing hub in Nigeria. The State has twenty local government areas and the major occupations of its citizens are civil service, trading, artisanship and farming. Ondo State was created on 3rd February 1976 from the former western state. Akure is the State capital. The State has a land area of 15,500km² (6,000 sq mi) and a population of 3,460,877 (2006 population census). Ondo State borders Ekiti State in the North, Kogi State in the East, Delta State in the South East, Ogun State in the South West and Osun State in the North West. The state has eighteen local government areas. The major occupation of the people in the state are civil service, trading, artisanship and farming.

Sampling Technique:

Multistage sampling procedure was used for this study. Stage one was the purposive selection of two States (Ogun and Ondo States) out of six States in Southwest zones of Nigeria, due to their ranking as the highest cassava producing states in Southwest Nigeria and also for the significant presence of women involvement in cassava production (FAO, 2018).

Stage two involves the classification of the study areas according to agroecological zones from each of the States through simple random sampling technique. In this stage, the agroecological zones selected in the two states were the Rainforest and Savannah zones. The third stage featured a simple random sampling technique to select one Local Government each from the two main agro-ecological zones in each state chosen for the study. In this respect, Imeko Afon and Ijebu North Local Government Areas were selected in Ogun state; which represent savannah and rainforest zones respectively, while in Ondo State, Akoko North-West and Akure North Local Government Areas were chosen from the savannah and rainforest agroecological zones respectively.

In the fourth stage, a total of 300 respondents were sampled (proportionate to size) in the study area using simple random sampling technique. The sampling frame was the list of names and addresses of the women cassava farmers in each village (cell), which was obtained from Ogun State Agricultural Development Programme (OGADEP) and Ondo State Agricultural Development Programme (OSADEP). The schedule of sampled respondents is shown in Table 1.

Analytical Technique:

The data collected were analysed using descriptive statistics and quantile regression analysis. The descriptive statistics (which include use of frequency and percentage tables, mean values, standard deviations and charts) was used to describe the socio-economic characteristics of the respondents while the Quantile Regression (QR) analysis was used to analyse the factors that affect the level of income of the women cassava farmers across different quantiles of respondents' income. Table 2 shows the descriptions and measurement of explanatory variables employed for QR models.

Quantile regression, introduced by Koenker and Basset (1978) is a method that analyses the conditional quantiles of the dependent variable using covariates. The QR analysis estimates the regression function for different quantiles of the conditional income distribution, not just at the conditional mean (Buchinsky, 1994). This regression has the potential to give a clearer picture of the effect of the explanatory variables on the dependent variable. The diverse responses may be interpreted as differences in the response of the dependent variable to changes in the regressors at different points in the conditional distribution of the dependent variable (Montenegro, 2001 and Fanoro, 2018). The QR models assume that the conditional quantile of a random variable Y is linear in the regressors (Xs). The

notational expression of the model is generally given by the equation:

$$Y_i = X_i \alpha_q + E_{qi} \text{ with } Quant_q \left(\frac{Y_i}{X_i} \right) = X_i \alpha_q \dots\dots\dots (1)$$

Where:

X_i (i ranges from 1....n) is the vector of explanatory variables as stated in Table 2 and α_q is the vector of parameters.

$Quant_q(Y/X)$ is the q^{th} conditional quantile of Y given X. The estimation of the quantile parameters is done as:

$$\left(\min_{(q \in R^k)} \left(\sum_{(i:Y_i > X_{iq})} q \right) \left| Y_i - (X_i \alpha_q) \right| + \sum_{(i:Y_i > X_{iq})} (1 - q) \left| Y_i - X_i(\alpha_q) \right| \right) \dots\dots\dots (2)$$

Results and Discussion

Socio-economic Characteristics of Women Cassava Entrepreneurs in Southwest Nigeria:

The results of the socio-economic characteristics as indicated in table 3 shows that the mean age of 47.4 years old for the women cassava farmers which is an indication that majority of the respondents are still within the economically active age. The results is in agreement with Olayemi (2004) who opined that for farmers to be productive in farm chores, they must be young and active in order to contribute meaningful labour input into all the stages of production for efficient output realization which in turn results in consumptive and income opportunities with proportional household welfare. Majority (42.0%) of the respondents had at least primary school education which implies the respondents are educated and would easily adopt innovations that would enhance their productivity. This is in support of studies by Oduntan *et al.* (2015) who posited that majority of farmers (73.3%) had one form of formal education or the other. The average household size of the respondents was 6 persons. This aligns with the findings of Balogun *et al.* (2017) who reported a mean household size of 6 persons in their study carried out among cassava farmers in Southwest, Nigeria. Thus, majority of the sampled farmers had moderate family members that could be of assistance if they are willing to help in the production process thereby reducing labour wage bill and production cost in the long run.

The farmers had considerable farming experience with a mean of 15.4 years and standard deviation of 6. The distribution of respondents by method of land acquisition as shown in Table 9 revealed that 45.3% of the respondents in cassava enterprises got their farm land through inheritance. This could infer that the land is inherited by virtue of their affiliation to their husbands. The implication of this as stated by Oparinde *et al.* (2014) is that it reduces the costs incurred in the production processes since the farmers are not going to pay rent on inherited lands. However, there is a tendency of having land fragmentation on the inherited plots of land as family size increases. About 15% acquired their land from the community, 9.7% purchased the land, 11.7% rented the land, and nearly 18.3% acquired their land by leasehold. The women who acquired their land through purchase could be as a result of insecurity in most of land gotten from other means.

Annual Farm Income of Respondents from Cassava Production:

The distribution of respondents by annual farm income from cassava production as indicated in Table 3 shows that about 40.0% of the respondents earned more than ₦100,000 , 22.7% earned ₦101,000 - ₦200,000, 20.3% earned ₦201,000- ₦300,000, 7.7% earned ₦301,000- ₦400,000, 5% earned ₦401,000- ₦500,000 and 4.3% earned ₦500,000 and above. The mean annual farm income for the cassava farmers was ₦143,602.00. The variation in income generated is associated to size of land holdings that were used for cassava production and variation in land fertility which is an indication that cassava farming is a lucrative farming enterprise.

Table 5 presented the results of Quantile Regression (QR) and the tool shows the factors affecting

income level of cassava farmers at different income strata. The results of QR reveals that R^2 for q25, q50 and q75 were 0.5912, 0.6742 and 0.5132 respectively and this indicated that variations in farmer's income under q25, q50 and q75 were explained by about 59%, 67% and 51% of all the explanatory variables under each quantile in the model respectively. There was positive relationship between farmer's income and marital status of the farmers under q50 and q75, while negative relationship was observed in the q25. The coefficient of the marital status was statistically significant under q25 and q75. This implied that marital status of the farmer in the q25 category reduce the income accrued by ₦1,291.77. The coefficient of educational status was negative in all the cases. The result implies that change in the educational status of the cassava farmers had negative relationship with women cassava farmer's income under q25 and q50 by ₦2,311.73 and ₦3,318.82 respectively. The coefficient of access to credit was positive in all the categories but statistically significant under q25, q50 and q75. This indicated that 100% change in the amount of credit obtained increases income of the cassava farmers among q25, q50 and q75 by ₦4,705.90 ₦6,737.90 and ₦3,351.59 respectively. The coefficient of access to extension service was positive in all the categories but not statistically significant under q25. The result showed that 100% change in the access to extension service will increase income under q50 and q75 by ₦3,702.43 and ₦4,382.11 respectively. Furthermore, the coefficient of farming experience was positive in all the categories except q25. The result was statistically significant under q75. This indicated that 100% change in the year of farming experience increases income of the cassava farmers in q75 by ₦2,360.34. The coefficient of access to farmland was positive in all the cases and statistically significant in all the categories except under the q50. The result implies that on the average, 100% change in the size of farmland accessed by farmers under q25 and q75 increases farmer's income by ₦1,406.67 and ₦2,306.19 respectively. The coefficient of social group belonged to had negative relationship with income accrued by the cassava farmers except q25 with positive relationship. It indicates that belonging to a social group such as farmers group, cooperative society market unions etc., will statistically reduce farmer's income by ₦2,681.34 in q75. Similarly, cost of labour had positive and significant relationship with farmer's income. It implies that 100% change in labour cost increases income by ₦458.19, ₦590.99 and ₦587.51 under q25, q50 and q75 respectively. This result concurs with the findings of Taphee *et al.* (2015) and Oseni *et al.* (2018) who stated that labour cost is positive and significant at 1% level with the cocoa producer's income as well as their profit.

Conclusion and Recommendations

The results of the Quantile Regression (QR) shows the estimates for factors affecting income level of cassava farmers in the study area. The results of q25 shows that access to credit, access to farm land, labour cost, and educational status were the significant factors affecting farmers' income in this category. The outcome of the q50 reveals that access to credit, access to extension service, labour cost, transportation cost, educational status and membership of social group were the significant factors that determined the income level of the farmers in this category. Moreover, the results of q75 shows that access to credit, access to extension services, farming experience, access to farmland, labour cost and transportation were factors responsible for the income of the farmers in this quantile in the study area. In conclusion, the level of income of the farmers are determined by their level of education, access to credit, access to extension agents, access to farmland, labour cost, and transportation cost in the area. This study therefore, recommends that improved income earnings would be enhanced among the women cassava entrepreneurs if the state governments introduce scheme that improves land ownership (among other factors) to encourage more women to have access to large cultivable land, Government should also facilitate availability and affordability of credit facility, to women cassava farmers at affordable interest rate. More so, women cassava entrepreneurs should be encouraged to engage in or diversify into other income generating activities such trade, apprenticeship, or diversifying into production of other crops and animal husbandry as a way of earning additional income to support their earnings from cassava production in order to enhance and sustain their livelihood.

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Table 1: Schedule of sampled respondents in the study area

Ogun State (No of People)				Ondo State (No of People)			
Savannah		Rain forest		Savannah		Rain forest	
Afon	45	Ijebu-Igbo	40	Arigidi Akoko	45	Iju/Itaogbolu	40
Ilara	30	Omu	35	Ogbagi Akoko	30	Oba-Ile	35
Total	75		75		75		75

Table 2: Descriptions and measurement of explanatory variables employed for QR models

Codes	Description of explanatory variables	Type and Measurement of variables	<i>A priori</i> signs
Y	Income	Continuous: Measured in Naira (₦)	
X ₁	Age of the respondents	Continuous: Measured in years	-/+
X ₂	Marital status	Dummy: Married =1 and 0, otherwise	±
X ₃	Household size	Continuous: Number of people	-/+
X ₄	Educational status	Dummy: Educated =1 and 0, otherwise	+
X ₅	Access to credit	Dummy: Yes = 1, No = 0	+
X ₆	Cost of equipment	Continuous: Measured in Naira	-
X ₇	Access to extension services	Dummy: Yes = 1, No = 0	-/+
X ₈	Cassava output	Continuous: Quantity of cassava produced (Kg)	+/-
X ₉	Farming Experience	Continuous: Measured in years	+
X ₁₀	Access to farmland	Dummy: Yes = 1, No = 0	+
X ₁₁	Membership of Social group	Dummy: Yes = 1, No = 0	+
X ₁₂	Labour cost	Continuous: Measured in Naira	-
X ₁₃	Transportation cost	Continuous: Measured in Naira	-

Table 3: Description of socio-economic characteristics of women cassava entrepreneurs in Southwest Nigeria

Socio-economic variables	Frequency	Mean	Percentages	Standard deviation
Age (Years)				
< 30	6	2.0	47.4	8.8
30-39	50	16.7		
40-49	12.5	41.7		
50-59	76	25.3		
60-69	42	14.0		
>70	1	0.3		
Household size				
1-5	207	69.0	5.8	5.8
6-10	66	22.0		
11-15	27	9.0		
Farming experience (years)				
01-10	117	39.0	15.4	6.0
11-20	118	39.3		
21-30	51	17.0		
31-40	14	4.7		
Farm size (Ha)				
0.01-0.09	109	36.3	1.04	0.6
1.0-1.99	151	50.3		
2.0-4.0	40	13.4		
Access to adequate farm land				
Yes	164		54.7	
No	136		45.3	
Method of Land Acquisition				
Inherited	136		45.3	
Communal	45		15.0	
Purchase	29		9.7	
Rent	35		11.7	
Leasehold	55		18.3	
Total	300		100.0	

Source: Computed from Field Survey Data, 2019

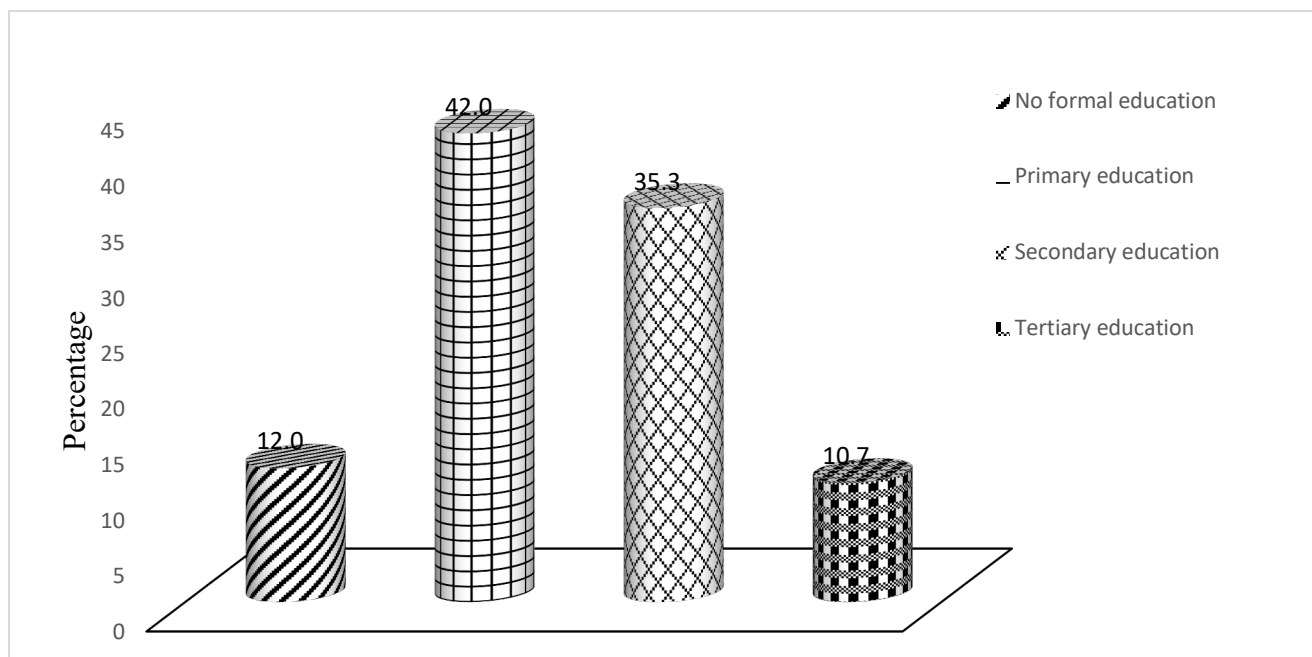


Figure 1: Distribution of Respondents by Level of Education

Source: Computed from Field Survey Data, 2019

Table 4: Distribution of respondents by total annual income from cassava production

Average Production Income (Naira)	Frequency	Percentage
≤ 100,000	120	40
101,000 – 200,000	68	22.7
201,000 – 300,000	61	20.3
301,000 – 400,000	23	7.7
401,000 – 500,000	15	5.0
> 500,000	13	4.3
Total	300	100.0
Mean Income	143,602	SD=35.03

Source: Computed from Field Survey Data, 2019

Table 5: Quantile Regression (QR) analysis of income levels among women cassava entrepreneurs

Explanatory Variable	Quantile Regression		
	q25 Coefficient	q50 Coefficient	q75 Coefficient
Age of the respondents	-420.58 (0.738)	-962.34 (0.518)	197.52 (0.875)
Marital status	-1291.77 (0.580)	1661.36 (0.447)	3927.07* (0.076)
Household size	1046.16 (0.175)	726.74 (0.488)	-815.13 (0.332)
Educational status	-2331.73** (0.040)	-3318.82** (0.046)	-2995.56 (0.152)
Amount of credit obtained	4705.90** (0.060)	6737.90** (0.056)	3351.59** (0.037)
Cost of equipment	274.49 (0.551)	236.47 (0.412)	-67.15 (0.928)
Number of extension visits	2026.81 (0.118)	3702.43** (0.034)	4382.11** (0.052)
Farming Experience	-400.95 (0.630)	956.45 (0.297)	2360.34** (0.047)
Access to land	1406.67** (0.050)	1210.35 (0.111)	2306.19** (0.067)
Membership of Social group	281.69 (0.717)	-2681.34* (0.067)	-1801.36 (0.255)
Labour cost	458.19** (0.050)	590.99** (0.042)	587.51 (0.927)
Transportation cost	209.19 (0.106)	494.20 (0.106)	633.45 (0.843)
Constant	2521.80 (0.680)	853.90 (0.887)	-2092.88 (0.738)
R ²	0.5912	0.6742	0.5132

Note: ***, **, *, means significant at 1%, 5% and 10% respectively.

Source: Computed from Field Survey Data, 2019