

Assessment of Crop Commercialisation among Smallholder Farming Households in Southwest Nigeria

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ABSTRACT

Nigerian agriculture is dominated by smallholder farmers and commercialisation of smallholder agriculture by bringing the farmers to markets is taking place all over the country. This study therefore assessed the current level of crop commercialisation, analyzed variation in the level of commercialisation among households and examined the determinants of crop commercialisation among smallholder farming households. Primary data were collected from 400 selected smallholder farm households in the study area with the aid of structured questionnaire using multistage sampling procedure. Analysis was done using descriptive statistics, Household Commercialization Index (HCI) and tobit regression model. The assessment of the current level of commercialisation among the smallholder farming households showed that average HCI was 0.83. Farmers with low, medium and high HCI were 6.44%, 9.65% and 83.91%. The tobit regression analysis further showed that, age, gender, level of education, household size, membership of an association, farm size, access to credit, market distance, farm and off farm income, were associated with increase in the extent of crop commercialisation. It was recommended that farmers should increase farm size while government should provide support such as credit facilities and input subsidy to enable smallholder farmers increase the level of agricultural production.

Keywords: Agriculture, Crop, Smallholder, Farming households, Commercialisation

I. INTRODUCTION

Nigerian agriculture is dominated by smallholder farmers who produce the bulk of food in the country. Despite their unique position, smallholder farmers belong to the poorest segment of the population and therefore, they cannot invest much on their farms (Asogwa, 2012). These farmers constitute about 80% of the farming population in Nigeria (Awoke and Okorji, 2004). Food crops dominate production and include cereals (sorghum, millet, maize and rice), tubers (cassava, yam and cocoyam), vegetables, tree crops, horticultural products, livestock, fisheries and wild forest products. These are produced in less than 50% of the 79 million hectares of available arable land area (Ojehomon *et al.*, 2009).

As in other developing countries, subsistence agriculture on small plots of land is a way of life for the vast majority of Nigerian farmers; however, there is gradual transformation from subsistence type of farming/agriculture to commercialized agriculture taking

place all over the country (Dahiru Hassan *et al.*, 2011). According to Kunze (2003) the process of agricultural commercialisation has been identified to take place in four dimensions by producing a marketable surplus of traditional crops and livestock's; increased post-harvest activities and transformation of produce at household level (adding value to traditional crops/livestock prior to sale; the production of new crops and livestock especially for the market and introduction of new income generating enterprise.

Agricultural commercialisation refers to the process of increasing the proportion of agricultural production that is sold by farmers (Pradhan *et al.*, 2010). Furthermore, transition from subsistence to commercial agriculture is often referred to as the commercialisation of agriculture, which has long been considered an important part of the agrarian transformation of low income economies and a means of ensuring food security, enhanced nutrition, and enhanced incomes (Kurosaki, 2003). Agricultural commercialisation can broadly be looked at from two perspectives; a rise in the share of marketed output or of

purchased inputs per unit of output (Jaleta et al., 2009). In essence, agricultural commercialisation can occur on the output side of production with increased marketed surplus, or on the input side with increased use of purchased inputs. On the output side, commercialisation is measured as a ratio of the value of agricultural sales to the value of agricultural production while it is measured as a ratio of the value of inputs acquired from market to the value of agricultural production on the input side (Braun & Kennedy, 1994).

Agricultural commercialisation has been identified as one of the strategies by the donor agencies (WorldBank, 2002; DFID, 2002). Commercialisation of smallholder farms is now viewed by the government as the focal point to the agricultural development of the country (Gebremedhin and Jaleta, 2010). In Nigeria, government has promoted increasing commercialisation of agricultural production through its different schemes, policies and programmes. Commercial Agriculture Development Project (CADP); a World Bank Assisted investment under the Federal Ministry of Agriculture and Rural Development became inevitable in assessing the contribution of commercial agriculture to improving Nigeria economy under non-oil growth in terms of employment, development, growth, revenue generation, provision of raw materials and others. Commercialisation among smallholder farmers is assumed to lead towards more specialized production systems, which are based on comparative advantages in resource use. Consecutively, specialization leads to higher productivity through scale economies, greater learning by doing, regular interaction and exposure to new ideas through trade, and better incentives in the form of higher income, which can achieve welfare gains for smallholders (Jaleta et al., 2009).

Smallholder agriculture contributes greatly to national income, employment, food and nutrition in Nigeria. However, market participation of the smallholders is very low despite the fact that there are benefits of market orientation and favourable trends in the commercialisation of agriculture. The major challenge now in Nigeria is the inability of the smallholder to benefit from commercialisation by participating in the market. In spite of the policies of the Government of Nigeria to commercialize subsistent agriculture, there is

a dearth of information on the commercialisation process of small holders in Nigeria.

Commercialisation is seen as a common and powerful means to increase rural household income and food access, as well as diversify production and reduce risks of income and food shortfalls (Ali and Farooq, 2003). In order to provide empirical evidences of these issues, it is necessary to consider the level of commercialisation in Nigeria; to understand the factors affecting the extent of commercialisation; and to know which products are best to target that are needed to guide policy decisions and device appropriate interventions. Hence, the objectives of this paper are to: (i) assess the current level of crop commercialisation among smallholder farming households (ii) analyze variation in the level of commercialisation among smallholder farm households and (iii) determine factors influencing the extent of crop commercialisation among smallholder farming households in southwest Nigeria.

Literature Review

Rohana and Branda (2010) explained agricultural commercialisation in the context of marketable surplus. They defined marketable surplus as quantities of products available for consumption by the non-farming population and also as raw materials for manufacturing and processing industries. This concept helps to measure the extent of commercialisation of the production activities of a particular crop, while high proportions of marketable surpluses indicate greater market orientation of the producers; lesser proportions of surpluses mean that the producers are more subsistence-oriented. The Food and Agriculture Organization (FAO, 1989) categorized farmers into three different groups based on the marketable surplus as a percentage of total production in the following manner: Subsistence farmers produce marketable surplus under 25% of the total production. Transition farmer produce marketable surplus ranging from 25 to 50% of total production and Commercial farmers producing marketable surplus of more than 50% of the total production.

Ele et al. (2013) determined the household commercialisation index; identified the variation in the level of commercialisation among households in the three agricultural zones, and identified the micro-level

factors determining the level of commercialisation in Cross River State, Nigeria. Findings showed that the degree of commercialisation in the study area was moderately high (about 60.40%). On the average, households sold about 56.10%, 66.60% and 58.50% of their total production (in grain equivalent terms) for the Southern, Central and Northern zones respectively. Tobit regression analysis showed that total quantity of food crops produced, farming experience, access to agricultural extension service, size of land used for cultivation, membership in cooperatives and household size are important factors determining the level of commercialisation of smallholder farms. The study revealed the importance of food crop production level (in quantity terms) as a determinant factor for degree of commercialisation which justifies the recommendations for government interventions in the formulation of policies to enhance food crop production and in creating enabling environment for income generation.

Okezie *et al.* (2008) assessed the commercialisation of agriculture in Abia State, Nigeria. The study identified three concepts under which household subsistence or commercial orientation can be quantified. The first concept, agricultural subsistence orientation measures the extent to which farm households consume out of their aggregate agricultural produce whilst the second and third, look more broadly at subsistence orientation at the income generation side and consumption side. They concluded that agriculture is not subsistence-oriented in terms of value of agricultural produce that is for market. Households that are most subsistence oriented earned less in terms of off-farm income compared to those that were least-subsistence oriented.

Aboagye (2002) employed the Tobit model to quantify effects of commercialisation of maize farmers in the East Akyem district of Ghana. Commercialisation of maize production was defined as the volume of maize output which is sold by a farmer. The study identified that farmers' age, marital status, farming system, male family member's assistance in maize farming, time farmer spend on maize farming, proportion of time family children in the household assist in maize farming, farm size and farmers own funds are the internal factors associated with higher commercialisation of maize. The external factors identified to associate with an increase in sales of maize are access to vehicles for conveying

produce from village to the market, distance to the nearest health post, amount of formal and informal credit.

Kabiti *et al.* (2016) carried out a study with the objective of determining factors that affect smallholder commercialisation of farming enterprises. Input and output commercialisation indices were derived for all the participating farmers. Tobit model was used to regress the indices and farmer specific variables. The paper reveals that the farmers are fairly commercialized for both input and output sides. In addition, factors that determined input and output commercialisation are varied. The paper recommended increased public and private sector contribution towards commercialisation through training and financial support and increased remittances by family members outside farming. The study concluded that smallholder farmers had a great potential for commercialisation if necessary conditions were met.

II. METHODS AND MATERIAL

2.1 Study Area

This study was carried out in the Southwest, Nigeria. Southwest is one of the six geo-political zones in Nigeria. This zone comprises of six states namely; Lagos, Oyo, Ogun, Ondo, Osun and Ekiti. It falls on latitude 6° to the North and latitude 4° to the South, while it is marked by longitude 4° to the West and 6° to the East. The dry season lasts from November to March while the wet seasons starts from April and ends in October. Southwest Nigeria covers approximately 12 percent of Nigeria's total land mass and the vegetation is typically rainforest. The total population is 27,581,992 as at 2006 and the people are predominantly farmers. The climate in the zone favours the cultivation of crops like maize, yam, cassava, millet, rice, plantain, cocoa, kola nut, coffee, cashew, palm produce (NPC, 2006).

2.2 Sampling Procedure

A cross-sectional primary data was collected using a structured questionnaire administered to the farming households. A multi-stage sampling technique was employed for this study. The first stage was a random selection of two states from the zone; Ogun and Oyo

state were selected. The second stage was proportionate to size sampling of Local Governments Areas (LGAs) from the selected states. Based on the proportionate factor, nine (9) and fourteen (14) LGAs were selected from Ogun and Oyo states respectively. The third stage was a random selection of four villages in each of the LGAs selected, while the last stage was a proportionate to size sampling households in the selected villages. A total of four hundred smallholder households were randomly selected, giving a total number of 186 and 214 households that were selected from Ogun and Osun states respectively. However, only three hundred and seventy-three copies of questionnaire were found to be valid.

2.3 Methods of Data Analysis

Data collected were analyzed using descriptive statistic, Household Commercialisation Index and Tobit model. The descriptive statistics such as frequency distribution, percentages were used. Household Commercialisation Index (HCI) was used to assess the level of crop Commercialisation among smallholder farming households in the study area. Household Commercialisation Index for total agricultural production is given as

$$HCI_i = \left[\frac{\text{Gross value of crop sales}_{hhi'yearj}}{\text{Gross value of all crop production}_{hhi'yearj}} \right] * 100$$

The index measures the ratio of the gross value of crop sales by household i in year j to the gross value of all crops produced by the same household i in the same year j expressed as a percentage.

Crop specific commercialisation was also calculated for maize, cassava and yam which were the dominant crops. Household Commercialisation Index for crop specific production is given as

$$HMCI = \frac{\text{Gross value of maize sales}}{\text{Gross value of total crop production}} \times 100$$

$$HCCI = \frac{\text{Gross Value of cassava sales}}{\text{Gross value of total crop production}} \times 100$$

$$HYCI = \frac{\text{Gross value of yam sales}}{\text{Gross value of total crop production}} \times 100$$

A tobit regression model was used to determine factors influencing the extent of smallholder farming households' participation in crop commercialisation in the study area. The Tobit estimation assumes that both the decision to commercialize and the intensity of commercialisation are jointly determined by the same variables (Green, 1993)

The Tobit model explaining drivers of extent of household commercialisation is define as:

$$y_i^* = \beta_0 + X_i\beta + \varepsilon_i$$

y_i^* = the ratio of output sold to output produced. That is, the percentage of output that is sold.

β = vector of parameters to be estimated

X = set of explanatory variables and

ε_i = the disturbance term.

Where $\varepsilon_i \approx N(0, \sigma^2)$, y_i^* is a latent variable that is observed for values greater than 0 and censored otherwise? The observed y is defined by the following measurement equations

$$\begin{aligned} y_i &= 0 & \text{if } y_i^* = \beta_0 + X_i\beta + \varepsilon_i \leq 0 \\ y_i &= X_i\beta + \varepsilon_i & \text{if } y_i^* = \beta_0 + X_i\beta + \varepsilon_i > 0 \end{aligned}$$

The Explanatory Variables are stated below

X_1 = age of household head (Number of years)

X_2 = marital status of household head (married =1; otherwise = 0)

X_3 =gender of the household head (male =1; otherwise= 0)

X_4 =number of years of education of household head (Number of years)

X_5 = number of household member (Number)

X_6 = number of adults in the household who assist on the farm (Number)

X_7 = membership of Association (member =1; otherwise= 0)

X_8 = status of land ownership (owned =1; otherwise=0)

X_9 = size of the total cultivated farm land (Hectares)

X_{10} = household access to extension services (yes =1; otherwise = 0)

X_{11} = household head access to credit (yes =1; otherwise= 1)

X_{12} = distance of farm to the nearest market (Kilometers)

- X₁₃ = incomes earned by household from all farming activities annually (Naira)
- X₁₄ = engagement in off-farm activities (yes =1; otherwise = 0)
- X₁₅= total output of crop produced for the year (Kilogram)
- X₁₆= number of years of experience in farming by household head (Years)
- X₁₇ = hired labour employed (Standard days)
- X₁₈ = household access to market information (yes = 0; otherwise = 0)
- X₁₉ =use of fertilizer (yes = 0; otherwise = 0)
- X₂₀= Time dedicated for Leisure (Hours)

III. RESULTS AND DISCUSSION

Level of Crop Commercialisation among Smallholder Farming Households

As indicated in Table 1 below, average household food crop commercialisation level was found to be high at about 0.84. This was further categories into three groups namely low, medium and high level of commercialisation. The assessment of the current level of crop commercialisation among households using the results of commercialisation index (Table1) show that 6.44% of the household heads operated at low Commercialisation level, 9.65% operated on a medium scale, while 83.91% of the household heads operated at high commercialisation level. The food crop farm households sold on the average about 84% of its output with total sales that ranged from 8.52% to 97.60%.

Table 1 : Level of Crop Commercialisation among Smallholder Farming Households

Degree of Commercialisation	Frequenc y	Percentage
Low (<=25%)	24	6.44
Medium (25 – 50%)	36	9.65
High (51 – 100%)	313	83.91
Total	373	100
Household Commercialisation Index		0.84
Minimum Commercialisation Index		0.08
Maximum Commercialisation Index		0.97

Source: Field Survey, 2015

Crop Specific Household Commercialisation Index

As indicated in Table 2, even though there was high degree of commercialisation, there were variations in the degree of commercialisation of different crops among farm households. Results indicated that maize commercialisation was 81%, cassava commercialisation was 88% and yam commercialisation was 77%. This implies that the crop driving commercialisation in the study area was cassava.

Table 2 : Percentage Distribution and Household Commercialisation Index for Specific Crops

Degree of Commercialisation	Food Crops		
	Maize	Cassava	Yam
Low	2.14%	8.04%	54.16%
Medium	9.38%	1.88%	1.88%
High	88.48%	90.08%	43.96%
Crop Commercialisation Index	0.81	0.88	0.77

Source: Field Survey, 2015

Variations in the Degree of Commercialisation across Households

Table 3 highlights the importance of farm and household factors on the level of crop commercialisation. The mean age of household heads with high crop commercialisation level was 40 years compared to 56 years for the heads of households with low commercialisation level. This shows that it is possible that younger heads are more dynamic with regards to adoption of innovations that would enhance their productivity and enhance their marketing surplus. Gender of household head is expected to capture the differences in market participation between male and female. Males are expected to have a higher propensity to participate in markets than female. About 91% of household heads were male in high commercialized households while 71% of household heads were male in low commercialised households.

The degree of crop commercialisation was high among households with higher household size. The average farming experience of 30 years for household with high commercialisation was higher than households with low commercialisation with average farming experience of 27 years. Households that operated at medium scale had the highest farm experience of 31 years. The mean

market distance of highly commercialized household is 7.31km compared to 13.4km of low commercialized households. Access to extension services is expected to enhance farmer skills and Knowledge, link farmers with modern technology and markets, and input supply (Lerman, 2004), thus it is expected to induce high commercialisation level. Result shows that at high commercialisation level, only 20% of respondents do not have access to extension services compared to 40% of respondents who had no access to extension services at low commercialisation level.

Credit service improves crop commercialisation of households through purchase of agricultural inputs like improved seed and chemical fertilizers. Results show that on the average about 67% of the high commercialized households had access to credit, 63% on the medium scale had access to credit while only 55% of the household with low level of commercialisation had greater access to credit facilities. This implies that the level of commercialisation increases with greater access to credit. Access to market information was high with households with high degree of commercialisation than other levels; 92% of Households with high commercialisation level had access to market information while 85% of those on the medium scale had access to market information and 70% of households with low degree of commercialisation had access to market information. Land size is considered as a critical production factor that determines the type of crops grown and the amount of crop harvested. The degree of crop commercialisation was higher among households with large farm size. The mean cultivated farm size by households with high crop commercialisation level was 6.83 hectares, compared to 3.81 hectares for household with low commercialisation level.

Table 3 : Household and Farm Characteristics by Degree of Crop Commercialisation

Variables	Crop Commercialisation Level		
	Low	Medium	High
Age	56	49	40
Gender	71	92	91
Household Size	6	7	8
Farming Experience	27	29	30
Market Distance	13.7	9.5	7.31
Extension Access	60	70	90
Credit Access	55	63	67
Access to Market Information	70	85	92
Farm Size	3.81	4.6	6.83

Source: Field Survey, 2015

Factors Influencing the Extent of Crop Commercialisation among Smallholder Farming Households:

Table 4 shows a log likelihood of 383.933 and a chi-square of 108.06 both at 1 percent level of significance implying that the model had a good fit to the data. The Pseudo R-squared is 0.4234 indicating that 42% of the variations in the dependent variable were incorporated in the model. Age of household head was found to be significant at 10% level of significance with a positive sign. This indicates that the extent of crop sales increases by 0.94 for every year added to the age of the household head. Gender of the household head was found to be significant at 10 % level of significance. Being a male head of household increases the extent of commercialisation by 0.231, that is male are expected to have higher propensity to participate in markets than female.

Level of education of household head was significant at 5%, with a positive sign. Education is posited to influence a household's understanding of market dynamics and therefore improve decisions about the amount of output sold (Makhura *et al.*, 2001), the level of commercialisation of crop increases by 0.13 for every additional year of education attained by a household head. Household size was significant at 5% with a positive sign. This means that as the number of persons in the household increases, the extent of commercialisation in the study area increases.

Membership of an association had a positive sign and was significant at 10%. Being a member of an

association increases the level of commercialisation by 0.17. This was in line with the expectation that membership in groups will positively impact on market participation through household's access to information important on production and marketing decisions. The result is also in line with the findings of Olwande, (2010). Farm size was significant at 1% and had the expected positive sign indicating that increase in farm size would increase the degree of commercialisation of the households. The extent of food crop commercialisation increases by 0.06 for every additional hectare of land put to food crop cultivation. The result confirms the findings by Rahut *et al.* (2010) who established an increase in the degree of food crops commercialisation with farm size.

Farm experience	0.0053	0.0040	0.0006
Hired labour	0.0034	0.0029	0.0004
Access to market information	0.1507	0.1403	0.0021
Use of fertilizer	0.0258***	0.0151	0.0038
Leisure time	-0.0399*	0.0205	-0.0004
log likelihood -383.9334			
LR chi ² (20) 108.06 Prob>chi ² 0.000			
Pseudo R ² 0.4234			
Note: ***, ** and * are significance level at 1%, 5%, and 10% respectively.			

Source: Field Survey, 2015

Table 4: Tobit Regression Analysis of Factors Influencing the Extent of Crop Commercialisation

Variable	Coefficient	Standard Error	Marginal Effect
Constant	1.1011	0.3777	
Age	0.0094*	0.0051	0.0001
Gender	0.2316*	0.1322	0.0037
Marital status	0.0014	0.0959	0.0000
Level of education	0.1304**	0.0513	0.0045
Household size	0.0523**	0.0231	0.0006
Family labour	0.0307	0.0266	0.0003
Association membership	0.1714*	0.1020	0.0065
Land ownership	0.0015	0.0340	0.0002
Farm size	0.0607***	0.0151	0.0006
Access to credit	0.1583*	0.0959	0.0061
Access to extension	0.0820	0.0961	0.0008
Market distance	-0.0150**	0.0073	-0.0004
Farm income	2.56E-07***	6.76E-08	2.71E-09
Off farm activities	0.2858	0.0757	0.0032
Total output	6.63E-06***	1.54E-06	7.04E-08

Accessibility to credits by the farmers was significant and positive at 10% level, thus positively influencing farmer's orientation towards commercialisation. Distance to market was seen to be significant at 5% level but with a negative sign. The implication is that extent of crop commercialisation decreases by 0.02 for a kilometre increase in the distance from household residence to the nearest market. Households further away from market places have lower commercialisation. This result is in line with previous studies like Omiti *et al.* (2009).

Farm income was also significant at 1% level with a positive sign, showing that increasing income from agricultural activities of the farm household will lead to an increase in the extent of commercialisation among the farmers. Off-farm income was also significant at 1% level with a positive sign implying that engagement in off farm activities increase the extent of food crop commercialisation. This confirms to a study that revealed that off-farm income was positively related to the level of cereal sale in sub-Saharan Africa, which financed production and enhanced marketable surplus (Siziba *et al.* 2011).

Total quantity of crop produced was significant at 1% level with a positive sign. This implies that increase in quantity of food crop produced is associated with higher level of crop sales. According to Omiti *et al.* (2009). Surplus production serves as incentive for a household to participate in market. Use of fertilizer was found to be significant at 1 % level with a positive sign indicating

that an increase in the unit of inputs used will lead to increase in extent of commercialisation level by the household. Off time, that is time dedicated for leisure was found to be negatively significant at 10% level implying that more time dedicated for leisure, decrease the extent of food crop commercialisation by the household and vice versa.

IV. CONCLUSION

This study assessed the level of crop commercialisation and identified the factors that play significant roles in determining the level of commercialisation among smallholder farmers in southwest Nigeria. The degree of crop commercialisation among the smallholder farmers was found to be comparatively high. There were, however, variations in the degree of commercialisation of different crops among farm households. The degree of crop commercialisation indicates that cassava commercialisation was the highest followed by maize and yam, this implies that the crop driving commercialisation in the study area was cassava. Also, the degree of commercialisation differs widely across farm and household factors. It is therefore recommended that farmers should increase farm size for increase in agricultural production and government should provide support such as credit facilities and input subsidy to encourage commercialisation.

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