



EFFECTS OF SOCIAL CAPITAL DIMENSIONS ON OUTPUT AND GROSS MARGIN OF CASSAVA FARMERS IN OSUN STATE

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ABSTRACT

This paper investigated the effects of social capital dimensions on output and gross margin of cassava farmers in Osun State. A multi-stage sampling procedure was used for selecting 100 respondents for the study. Data were analysed using descriptive statistics, budgetary technique, social capital indices, and Ordinary Least Square model. The results showed average values of 48 years for age, 14 years for years of experience, 8 persons for household size, and 5ha for farm size. The estimated costs and return of cassava farmers per hectare of land on the average were ₦153,577.60 and ₦329,693.40 per annum whereas the total revenue on the average was ₦450,000 while the gross margin and net income were ₦328,151.30 and ₦329,032.80, respectively. The benefit cost ratio and labour efficiency analysis were 2.930 and 6.230, respectively. Age (5.747), farm size (0.463), decision making index (0.590) and labour contribution index (0.021) were significant factors affecting the output of cassava farmers while, years of education (0.372), farm size (0.572), membership index (0.448), meeting index (0.530) and decision-making index (0.450) were significant factors affecting the gross margin of cassava enterprise. The study concluded that social capital dimensions are among key variables affecting output and gross margin of cassava farmers. Following from the findings of the study, farmers should participate more actively in group activities as effective participation in association's decision making process enhances access to productive resources such as credit, labour among others.

Keywords: Social capital dimensions, Output, Gross Margin, Cassava farmers, Osun State

INTRODUCTION

Cassava (*Manihot esculenta* crantz) is regarded as the most important root crop in Nigeria (Adofu *et al.*, 2011; Umunakwe, 2015). Nigeria is currently the largest producer of cassava in the world with an annual output of over 59 million tons (FAOSTAT, 2019). However, the production is mostly done by rural smallholder farmers. These small holders are cultivating less than two hectares of land and their production is with crude farm tools, obsolete farming practices, and non-availability of inputs among other things (Haruna *et al.*, 2008), which yield lower output, resulting to low profitability in cassava enterprise. Cassava output could increase by raising both the quality and quantity of inputs such as improved varieties, fertilisers, herbicides, pesticides among others. However, these small holder farmers cannot afford these investments due to their limited access to credit (Liverpool *et al.*, 2011).

Consequently, the farmers have organised themselves into social networks to improve their access to credit. Participation in the social network generates social capital which has been defined as networks of social relations and norms which govern interactions among individuals, households and communities, and could help to facilitate access to financial resources (Imandoust, 2011). This significantly improves the ability of cassava farmers with no or few savings to meet their financial needs for agricultural inputs (Swain *et al.*, 2008).

Social capital is highly dependent on collective action, cooperation, reciprocity and interrelationship among the households with likelihood of access to various forms of social

support to obtain some collective benefits (Warren, 2008). These benefits are for the entire group, nevertheless, it can as well be captured by farmers within the group (Warren, 2008). These benefits generated through social capital could improve output and gross margin of cassava farmers. However, many studies (Isham, 2002; Okunmadewa *et al.*, 2007; Hazell *et al.*, 2008; Yusuf, 2008 and Anyiro, 2014) on social capital are largely focused on issues such as poverty, welfare and adoption. Not much has been done with respect to output and gross margin.

Following from this, there is a need to assess the effects of social capital dimensions on output and gross margin of cassava farmers in Osun State. Specifically, the study described the socioeconomic characteristics of cassava farmers in the study area, examined the dimension of social capital in the study area, determined the costs and returns to cassava production in the study area, and determined the effect of social capital on output and gross margin of cassava farmers in the study area.

METHODOLOGY

The study was conducted in Osun State. The State has a total annual rainfall of 1570mm and temperature which falls between 25°C and 27°C. The State has a total land area of 9251km (3572 sq mi) with a population of about 4,137,627 as at 2005. There are diverse forms of social capital networks in Osun State. The chief occupations of the people were business, trading and agriculture. Food crops, such as cassava, yam, maize, and vegetables are grown in the area.

Multistage sampling procedure was used in selecting cassava farmers for the study area. The first stage involved purposive selection of four Local Government Areas (LGAs). The LGAs include Ife East, Ife Central, Ife North and Ife south LGAs. The selection was based on the predominance of cassava farmers in the LGAs. The second stage involved a simple random selection of five villages from each LGA. In the third stage, there was also simple random selection of five cassava farmers that are members of social groups such as farmers 'groups, religious associations, traders' groups, cooperatives, NGO groups, village associations, ethnic groups, self-help groups among others from each village. In all, a total of 100 respondents were interviewed.

Data were analysed using descriptive statistics, social capital indices, budgetary analysis and multiple regression model. Descriptive statistics such as mean, and percentage was used to describe the socioeconomic characteristics of the respondents in the study area.

Social capital indices - The different social capital dimensions were constructed using social capital indices following Balogun *et al.* (2011), Adepoju and Oni, (2012), Iyanda (2015), Balogun *et al.* (2017)

Cash contribution index - This is the amount paid as membership due per annum in a social group. The summation of total cash such as payment of membership dues and other dues contributed to the various social groups, which the farmers belong was calculated. The actual contribution for each household was rescaled by dividing the amount by the maximum amount in the data.

Labour contribution index - This is represented by the number of days that farmers have worked for their various groups per year.

Decision making index - This is the summation of respondents' participation in the decision making of the three most important groups to them. The farmers were asked to evaluate their contribution to decision making process of the group subjectively. Whether it is very active, active, passive, and very passive. This response was scaled from 3 to 0 respectively and averaged across the three most important groups for each farmer. An average of the rank for the three groups was calculated.

Heterogeneity index - This was rated according to twelve criteria such as neighborhood, kin group, occupation, economic status, religion, political affiliation, sex, age group, level of education, cultural practices, belief and trust, following Balogun *et al.* (2011). For each response, A yes was coded as 1, while a no was coded as 0. A maximum score of 12 was allotted for each group to represents the highest level of heterogeneity.

Membership density index - This is measured by the number of active farmers' membership in existing groups. The proportion of membership of group by individual was found by dividing the total number of groups to which each farmer belongs by the total number of groups available in the study area.

Meeting attendance index - The index was obtained by summing up attendance of household members at meetings and divide by the number scheduled meeting per year.

Aggregate social capital index - This is the multiplicative social capital index. The index was calculated using the products of all the dimensions of social capital available to the cassava farmers in their various social groups in the study area.

Budgetary technique - The evaluation of the cost and returns associated with cassava production was analysed using the budgeting technique.

The formula is given as,

$$GM_i = \sum P_i Y_i - C_i \dots\dots\dots (1)$$

GM_i = Gross margin of farm I; P_i = Farm gate price per tonnes of cassava of farm I; Y_i = Total quantity in kg of cassava of farm I; C_i = Total variable costs incurred on farm I; i...n = Total number of cassava farms

Subsequently, a net return was obtained from gross margin.

$$\text{Net returns} = \text{GM} - \text{TF} \dots\dots\dots (2)$$

TFC = Total Fixed Cost

Profitability and efficiency ratio; the following ratios were computed to ascertain the extent of profitability of cassava enterprise namely,

- i. Operating expense ratio = TVC/ GR....(3)
- ii. Return per Naira outlay = NI/TC.....(4)
- iii. Benefit Cost Ratio (BCR) = TR/TC....(5)
- iv. Labour Efficiency measure = TR/LC...(6)

Where,

GR is Gross Revenue; NI is Net Income; TC is Total Cost.

Ordinary Least Square model

Ordinary Least Square model was used to analyse the effect of social capital dimensions on output and gross margin of cassava farmers in the study area.

Output model

The model is implicitly expressed as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \dots \beta_{12} X_{12} \dots\dots\dots (7)$$

Y= output

The explanatory variables are: X₁= age of respondent (years); X₂= years of formal education; X₃= farm size (hectare); X₄= farming experience (years); X₅= household size (number of person); X₆= marital status (1= married; 0=otherwise); X₇= membership index; X₈= meeting index; X₉= cash



contribution index; X_{10} = heterogeneity index; X_{11} = decision making index; X_{12} = labour contribution index; U_i = error term

Gross margin model

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_{12} X_{12} \dots \dots \dots (8)$$

Y= gross margin

The explanatory variables are: X_1 = age of respondent (years); X_2 = years of formal education; X_3 = farm size (hectare); X_4 = farming experience (years); X_5 = household size (number of person); X_6 = marital status (1= married; 0=otherwise); X_7 = membership index; X_8 = meeting index; X_9 = cash contribution index; X_{10} = heterogeneity index; X_{11} = decision making index; X_{12} = labour contribution index; U_i = error term

RESULTS AND DISCUSSION

Socioeconomic characteristics

The socioeconomic characteristics of the respondents were presented in Table 1. The average

age of cassava farmers in the study area was 47.59 ± 7.61 years. This implies that young and vibrant people are still involved in cassava production in the study area. About 81% of respondents were married. This could serve as a good source of labour to assist in the farming operation thereby reducing cost of hiring labour. On the average, the household size in the study area was 7.83 ±3.15 persons and years of farming experience was 14.37 ±7.48. The household is relatively large which could also indicate a large supply of labour to the family enterprise and they also have many years of farming experience. About 88% of the respondents had formal education in the study area. This implies that literacy level of the sampled farmers is relatively high. The average farm size was 5.01 ±3.20 ha. This implies that that cassava production in the study area takes place on smallholdings. About 91% of them were males. This implies that male farmers were more active and involved in cassava production activities in the study area.

Table 1: Socioeconomic characteristics of cassava farmers

Variables	Data
Age (years)	47.59(±7.61)
Male (%)	91
Married (%)	81
Formal education (%)	88
Household size (#)	7.83 (±3.15)
Farm size (ha)	5.01(±3.20)
Years of farming experience	14.37(±7.48)

Source: Field Survey, 2018

Dimension of social capital

Six dimensions of social capital among the cassava farmers in the study area were identified. The summary statistics for each of these forms was presented in Table 2. Density of Membership (0.742) was high. This means that the proportion of cassava farmers’ membership in associations is 7 out of 10 associations. Degree of Heterogeneity (0.524) was low in the study area. This suggests homogenous characteristics such as same ethnicity, same occupation, same religion and same neighbourhood among the cassava farmers. Decision-Making (0.721) was high in the study area. This implies that cassava farmers are actively involved in decision making in the social groups they belong. The Meeting Attendance (0.697) in the study area was high. This implies that cassava farmers attend the statutory meetings. Cash Contribution value was 0.525 which is relatively low. This implies that the cash commitment to associations by the cassava farmers is low. Labour Contribution (0.656) was high. This shows that cassava farmers are still committed to contributing labour to the social group where they belong. The aggregate social capital was 0.659. The result

shows that high level of social capital existed among cassava farmers in the study area. This would improve the economic gains of the cassava farmers in the social groups to boost their output and gross margin. This result compares favourably with Ajani and Tijani (2009) and Iyanda (2015).

Costs and returns of cassava farmers

Table 3 reveals the profit margin of cassava farmers in the study area. The estimated costs and returns of cassava farmers per hectare of land on the average in the study area were ₦153,577.60 and ₦296,421.53 per annum respectively. Among the cost components, cost of labour had the largest share of the total cost (47.04%), followed by cost of fertiliser (8.54%), cost of herbicide or pesticide (6.18%), cost of planting (5.25%), cost fertiliser application (4.84%), cost of weeding (3.97%), cost of transportation (3.23%), and least of it was the cost of cassava plant stem which constitutes (0.29%). Whereas the total revenue on the average was ₦450,000, while the gross margin and net income or returns to management were ₦328,151.30 and ₦295,760.93, respectively.

Table 2: Forms of social capital available to cassava farmers

Variables	Mean	Standard deviation	Min	Max
Cash contribution	0.525	0.347	0.1	1
Labour contribution	0.656	0.350	0.133	1
Decision making	0.721	0.571	0.111	1
Heterogeneity	0.524	0.272	0.167	1
Density of membership	0.742	0.425	0.181	1
Meeting attendance	0.697	0.425	0.125	1
Aggregate Social capital (Multiplicative)	0.659	0.449	0.121	0.954

Source: Field survey, 2018

The return per naira outlay was ₦2.147. This implies that for every ₦1 invested in cassava enterprise, there is a return of ₦2.147 to the enterprise and the operating cash expenses ratio was 27%, which connotes that 27% of the total revenue was used to cover the operating expenses. The benefit cost ratio and labour efficiency analysis were 2.930 and 6.230, respectively. This implies that ₦1 spent on cost yielded ₦2.930 return to the

farmer and output earning per ₦1 expenditure on labour was ₦6.230 showing that labour was well managed. These measures of performance indicate that cassava production in the study area is viable and the business of cassava production is profitable. This result agrees with Itam *et al.* (2014).

Table 3: Average costs and returns (₦) to cassava farmers in the study area for 2017/2018 cropping season of a hectare of cassava farm

Item	Mean Value	% of total cost
REVENUE		
Cassava output	25tonnes	
Price per(tonne)	₦18,000	
Total revenue (TR)	₦450,000	
VARIABLE COST		
Labour cost	₦72233.33	47.04
Planting cost	₦8057.58	5.25
Weeding cost	₦6102.02	3.97
Fertiliser application	₦7438.89	4.84
Cassava planting stem cost	₦450.50	0.29
Transportation cost	₦4957.00	3.23
Fertiliser cost	₦13117.64	8.54
Pesticide/herbicide cost	₦9491.83	6.18
Gross margin (GM) = TR-TVC	₦328151.30	
FIXED COST		
Rent on land	₦21417.23	13.94
Depreciation cost on implement	₦10312.64	6.72
Total Fixed Cost (TFC)	₦31729.87	20.66
Total cost (TC)	₦153578.13	
Net Income (NI) = (GM-TFC)	₦296421.53	
Tax paid	₦660.60	
Net income less tax	₦295760.93	
Return per naira outlay (N) NI/TC		2.147
Operating expense ratio= TVC/TR		0.270
Labour efficiency = TR/labour cost		6.230
Benefit Cost ratio (BCR) = TR/TC		2.930

Source: Field survey, 2018

Effect of social capital dimensions on output of cassava farmers

The R-Square was 0.694. This suggests that 69.4% of the variability in the cassava output of the respondents is jointly explained by variations

in the specified independent variables considered in the model. The model was statistically significant at 1 percent level. Table 4 revealed that age, farm size, decision making index and labour contribution index were significant factors affecting the output



of cassava farmers. Age of farmers was positive and significant; this implies that a unit increase in age of farmers increased cassava output by 5.747 units. Farm size was positive and significant; this implies that a unit increase in farm size increased cassava output by 0.463 units. The results agree with Itam *et al.* (2014) and Balogun *et al.* (2018). Decision making index was positive and

significant; this implies that a unit increase in decision making index increased cassava output by 0.590 units. This result agrees with Balogun *et al.* (2018). Labour contribution index was positive and significant; this implies that a unit increase in labour contribution index increased cassava output by 0.021 units. This result agrees with Iyanda *et al.* (2014) and Balogun *et al.* (2017).

Table 4: Effect of social capital dimensions on output of cassava farmers

Variables	Coefficient	t- statistics
Age	5.747***	3.23
Marital status	-4.137	0.910
Household size	7.967	0.160
Years of Farm experience	-3.456	-0.120
Years of Education	4.274	0.170
Farm size	0.463**	2.600
Density of membership	0.001	0.500
Cash contribution index	-0.148	0.100
Meeting index	-0.967	-0.240
Heterogeneity index	0.017	0.070
Decision making index	0.590**	2.380
Labour contribution index	0.021***	2.570
R-square	0.694	
Adjusted R-Square	0.610	
Number of observations	100	
Prob > F	0.000	

Source: Field survey, 2018. Note ***, **, * t-values significant at 1%, 5%, 10% respectively

Effect of social capital dimensions on gross margin of cassava farmers

The R-Square was 0.754. This suggests that 75.4% of the variability in the gross margin of cassava farmers is jointly explained by variations in the specified independent variables considered in the model. The model was statistically significant at 1 percent level. Table 5 revealed that marital status, years of education, farm size, membership index, meeting index and decision-making index were significant factors affecting the gross margin of cassava farmers. Marital status was positive and significant; this implies that a unit increase in marital status increased gross margin of cassava farmers by 0.039 units. Years of formal education was positive and significant; this implies that a unit increase in years of formal education increased gross margin of cassava farmers by 0.372 units. The results agree with Oni (2016). Farm size was

negative and significant; this implies that a unit increase in farm size decreased gross margin of cassava farmers by 0.572 units. Membership density index was positive and significant; this implies that a unit increase in membership density index increased gross margin of cassava farmers by 0.448 units. The result agrees with Durojaiye *et al.* (2013) that additional membership in associations improve profitability. Meeting index was positive and significant; this implies that a unit increase in meeting index increased gross margin of cassava farmers by 0.530 units. The result agrees with Kehinde (2019). Decision making index was positive and significant; this implies that a unit increase in decision making index increased gross margin of cassava farmers by 0.450 units. The result disagrees with Durojaiye *et al.* (2013) that active participation in decision making reduces profitability.

Table 5: Effect of social capital dimensions on gross margin of cassava enterprise

Variables	Coefficient	T- statistics
Age	0.001	0.020
Marital status	0.039*	1.890
Household size	0.429	1.390
Years of Farm experience	0.002	1.250
Years of Education	0.372**	2.184
Farm size	-0.572**	-2.244
Density of membership	0.448**	2.210
Cash contribution index	-0.769	-0.240
Meeting index	0.530**	2.130
Heterogeneity index	0.919	0.178
Decision making index	0.450**	2.497
Labour contribution index	0.662	1.310
R-square	0.754	
Adjusted R-Square	0.710	
Number of observations	100	
Prob > F	0.000	

Source: Field survey, 2018 Note, ***, **, * t-values significant at 1%, 5%, 10% respectively

CONCLUSION

The study concluded that majority of the cassava farmers were male, small scale and at their productive age. Cassava production in the study area is viable and the business of cassava production is profitable. Social capital is an important variable affecting output and gross margin of cassava farmers. Following the findings of the study, farmers should be encouraged to join social groups to be able to improve their cassava production. Also, farmers should participate more actively in group activities as effective participation in association's decision making facilitates access to productive resources such as credit, labour among others.

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