ANALYSIS OF SOCIO-ECONOMIC VARIABLES ON AGRICULTURAL PRODUCTIVITY OF SOME SELECTED ARABLE CROPS IN IMO STATE. NIGERIA.

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ABSTRACT
The paper investigated the influence of socio-economic variables on agricultural productivity of some selected arable crops in Imo State, Nigeria. Structured questionnaire were used to collect data from 92 respondents using purposive sampling procedures. Furthermore, descriptive and econometric tools such as the means, frequency, percentage, ANOVA and ordinary least square multiple regressions analysis were used to analyze the data. Majority (77.2%) of the respondents were females, with a mean age of 53 years. Most of the respondents were married, educated with a household size of 7 persons which accounted for (65.2%), (75.0%) and (80.4%) respectively. Again about 80% of the socio-economic variables investigated were positively related and statistically significant at 1% and 5% level. This implies that the socio-economic variables had a strong influence on agricultural productivity in the study area. The ANOVA result showed that there are significant differences in agricultural productivity across the three agricultural zones investigated. Productivity in the area was seriously constrained by lack of capital, high cost of labour as well as high cost of farm inputs. However, a call for private sector investment in agriculture, implementation of profitable policies and mechanization of agriculture were recommended for increased production.

Key words: Agricultural productivity, production, arable crop, Socio Economics

INTRODUCTION

It is widely agreed that increased productivity is the main contributor to economic growth. The advent of oil in the early 1970's made Nigeria highly dependent on oil revenue with the performance of the agricultural sector adversely affected over years. Though the growth rate in the agricultural sector in Nigeria increase from an average of about 3% in the 1990's to about 7% in mid 2000, the food security/sufficiency status of Nigerians continued to decline (Adeoti, 2004). Agricultural productivity is driven by innovations in on farm tasks, changes in the organization and structure of the farm sector, research aimed at improvements in farm production and/or random events like weather (Eldon, 2010). Nigeria's rich human and material resource endowments give it the potential to become Africa's largest economy and a major player in the global economy (NNPC, 2004). Compared with other African and Asian countries especially Indonesia which is comparable to Nigeria in many respects, economic development in Nigeria has however been disappointing with GDP of about 45 billion, 32.053 billion and 55 billion dollars in 2000, 2002 and 2003 respectively and per capital income of about $300 a year. Nigeria has become one of the poorest countries in the world. Having earned about $300 billion from oil exports between the mid 1970's and 2000, its per capital income was disappointingly 20% lower than that of 1975. Inability to tap much of the abundant human and material resources can therefore put the attainment of the Millennium Development Goals (MDGs) by 2015 in jeopardy Adakaren et al, (2009).

Farmer decisions with regard to production and land use are strongly influence by socio-economic factors. In many areas, the farm size of farmers affects agricultural productivity. This is usually the case when the land in question is fragmented, that is divided into smaller pieces and allocated to individual farmers. The size of the farms makes the use of mechanized farming wasteful and large scale farming becomes impossible (Marocchino, 2009). In addition, the productivity of farmers to some extent could be attributed to the farmers' years of experience over decades. Productivity is achieved, if a farmer is versed in his farming business. That is he cultivates his crops at ease with little or no assistance from extension agents. He has full knowledge of his farming calendar, cropping system, as well as land use patterns and/or system (Carter, 2009).

According to Nenna et. al, (2011) the role of agriculture in economic development of most countries can hardly be overemphasized. The contribution of agricultural growth to overall poverty reduction has been documented (Adisa et. al, 2011). Nigeria economy and its development was agriculture based (Tacoli, 2004). In 1960's

agriculture accounted for well over 80% of the export earnings and employment; about 65% of the GDP and about 50% of the government revenue (Isa, 2000). This contribution to the Nigerian economic growth has however declined over the years. According to CBN, (2003) the contribution of agriculture to GDP was about 50% in 1770 and 34% in 2003. Ukpabi, (2004) stated that, at present, agriculture accounted for only 41% of the real sector while crude oil accounted 13%. Although agriculture no longer serves as the leading contributor to Nigerian's gross national product, and leading foreign exchange earner due to phenomenal growth in the petroleum sector.

However, the principal constraint to the growth of the agricultural sector is the fact that the structure and method of production have remained the same since independence more than four decades ago. The United Nations food and agricultural organization rates the productivity of Nigeria's farmland as low to medium but with medium to good productivity if properly managed (Carter, 2009). Despite the several agricultural schemes and programmes initiated by the government over time agricultural productivity is still declining at a faster rate leading to food insecurity in Nigeria. The high illiteracy level among the farming population as well as the seasonal search for a white collar job among the youth force have contributed immensely to the declining rate of food production. In addition, conservatism among small scale farmers poses a serious problem to agricultural productivity, as majority of them are not willing to adopt improved and new farming techniques (Isa, 2000).

However, this study is centered on the analysis of socio-economic variables on agricultural productivity of some selected arable crops in Imo State. Nigeria. The hypothesis that there are significant differences in the agricultural productivity across the three agricultural zones of the state are tested in this study.

MATERIALS AND METHODS

The study is carried out in Imo State. The state is located in the rain forest zone of South-Eastern Nigeria. It is bounded in the east, west, north and south by Abia State, Anambra State, Ebonyi State and Rivers State respectively. It has three agricultural zones which include Owerri, Orlu and Okigwe. A representative sample of the farmers in the state was chosen using purposive sampling technique. This is to enable the survey cover the entire state. Two local government areas were purposively selected from each of the three agricultural zones namely (Owerri, Okigwe and Orlu). The areas selected are noted for their predominant agricultural activities especially on arable crop production. The local government areas are Ohaji-Egbema and Ngor-Okpala for Owerri zone, Oru East and Nkwere for Orlu zone while Onuimo and Obowo were selected from Okigwe zone thereby giving a total of six local government areas, four communities were randomly selected and this was followed with a random sampling of five farmers from each of the selected communities giving a total of 120 respondents. The number of registered farmers in the area formed the sample frame. A well structured questionnaire was used to elicit information among the sampled farmers but only 92 responses were found useful for data analysis.

Data were analyzed using both descriptive as well as econometric tool. The socio-economic characteristics were described using descriptive statistics while the factors that account for the variations in agricultural productivity of arable crop farmers in the area were analyzed using the ordinary least square multiple regression analysis.

Agricultural Productivity of arable crops was estimated using the total factor productivity (TFP) estimate.This is expressed as;

$$TFP_{ACP} = Y\left(\frac{1}{TVC}\right) \text{ ----------1.0}$$

But Average Variable cost of production (AVC) $= TVC\left(\frac{1}{Y}\right)$ ----------2.0

$$TFP_{ACP} = \frac{1}{AVC} \text{ ----------3.0}$$

Where;
TFP_{ACP} = Total factor productivity
TVC = Total variable cost
AVC = Average variable cost of production

The factor affecting arable crop productivity in the area were fitted into cob-douglas functional form as shown below;

$TFP_{ACP} =$ F (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e)

Where;

TFP_{ACP} = Total factor productivity of arable crop in Naira
X_1 = Gender (dummy: male = 1, female = 0)
X_2 = Age (years)
X_3 = Education (No of years spent in school)
X_4 = Household size (No of persons)
X_5 = Farming experience (years)
X_6 = Annual farm income (Naira)
X_7 = Membership of social organization (dummy; 1 for member and 0 otherwise)
X_8 = Farm size (Ha)
X_9 = Extension contact (No. of visits)
e = Error term

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Gender distribution of farmers as shown in Table 1, indicates that majority (77.2%) were female. This findings corroborates Ibekwe, (2008) who observed that women play a vital role on food production and are the backbone of agricultural sector, accounting for 70% of farm labour and being responsible for 80% of food production. Majority (59.8%) of the respondents were between 50-60 years. This implies that the respondents were aged, hence, this might have a tremendous influence on productivity and efficiency or resources utilization. Also Courtney (2011) concurred that farming is dominated by aged people due to the lack of interest of young school leavers in agriculture. About (65.2%) of the respondents were married with children which is a significant indication of high family labour availability utilized in the farming business. Majority (75.0%) were a bit educated, which is an added advantage to adopt new technology and innovations. Majority (80.4%) of the respondents had household size ranging from 5-9 persons with a mean household size of 7.0 persons. The table also showed that (69.6%) of the respondents had farming experience ranging from 11-15 years which showed that the farmers were highly experienced and knowledgeable enough to adopt new and improved farming technologies in a bid to increase production. Again, (88.0%) of the respondents had no access to credit while (11.9%) had access to credit. This implies that majority of them were unable to access one of the important production inputs, so could not exploit their potentials for increased production. About (66.3%) of the respondents earned less than ₦100.000 per annum due to the production constraints encountered during the farming season. A greater proportion (71.7%) of the respondents belonged to 3-4 farmers organization, which could offer more opportunities for participatory interaction with extension agents. The table showed that majority (89.1%) of the respondents had farm size ranging from 0.1-1.0 hectares. The mean farm size is 0.7 hectares. This means that majority of the respondents operated on a small scale bases (cultivating less than 3.0 hectares). Furthermore, majority (85.9%) of the respondents used family labour due to the high prevalence cost of labour in the study area.

Table 1: Distribution of Respondents According to Socio-Economic Characteristics (n=92)

Variables	Frequency	Percentage	Mean
Gender			
Male	21	22.8	
Female	71	77.2	
Age (years)			
30 – 39	9	9.8	53
40 – 49	10	10.9	
50 – 59	55	59.8	
60 and above	18	19.6	
Marital Status			
Single	18	19.6	
Married	60	65.2	
Divorced	2	2.2	
Widowed	12	13.0	
Education			
No formal education	13	14.1	
Primary education	69	75.0	
Secondary education	10	10.9	

Household Size				
1 -4	14		15.2	7.0
5 – 9	74		80.4	
10-14	4		4.3	
Years of Experience				
1 – 5	6		6.5	13.0
6 – 10	5		5.4	
11 – 15	64		69.6	
16 – 20	14		15.2	
21 and above	3		3.3	
Access to Credit				
Yes	11		11.9	
No	81		88.0	
Annual Income (₦)				
100,000	61		66.3	99,847.83
100,000 – 150,000	19		20.7	
151,000 – 201,000	7		7.6	
202,000 – 252,000	5		5.4	
253,000 and above	-	-		
Membership of Farmers' Organization				
1 - 2	26		28.3	3.0
3 – 4	26		71.7	
Farm Size (Ha)				
0.1 – 1.0	82	89.1		0.7
1.1 - 2.0	7	7.6		
2.1 – 3.0	3	3.3		
Labour Source				
Family only	79		85.9	
Hired only	6		6.5	
Both	7		7.6	

Source: Field survey, 2010.

The Output of Some Selected Arable Food Crops in Imo State

Table 2, shows the output of different arable food crops in the area. The result reveals that more than 97.4% of the farmers cultivated at least cassava with other crops with a mean output of 6,950.18kg. This implies that almost all the farmers engaging in cassava mixed crop production. The mean quantity of maize and beans cultivated are 1261.27 and 2562kg respectively. The result further reveals that only 48.2%, 28.1% and 30.7% of the farmers engaged in the production of fluted pumpkin (telfaria occidentalis), tomatoes (lycorpersicion spp) and pepper (capsicum spp) respectively. While 25.4% and 22.8% of the farmers engaged in Okro (Abelmoscus spp) and garden egg (Solanum spp) production each. It could be deduced from the table that average production of fluted pumpkin and pepper are 219.54 and 304.94kg respectively. It therefore follows that among the various crops produced in the state, fluted pumpkin and pepper recorded the least outputs. This could be due to poor farmers interest in the production of these crops in the area.

Table 2. Summary statistics of different outputs of crops produced in Imo state.

Crops produced	No of farmers			Mean	Standard	Minimum	Maximum
	Frequency	%	Unit Output	Deviation	value	value	
Yam (Dioscorea spp)	85	74.6	kg 1920.00	3487.35437	50.00	19580.00	
Cassava (Manihot spp)	111	97.4	kg 6950.18	12619.58824	50.00	122000.00	
Maize (Zea maize)	110	96.5	kg 1261.27	1628.76162	50.00	10000.00	
Melon (Cucumisdudaim)	97	85.1	kg 449.22	805.82720	20.00	5000.00	
Vegetable (Fluted Pumpkin)	55	48.2	kg 219.54	118.42931	30.00	1000.00	
Cocoyam (Colocasia spp)	34	29.8	kg 1493.99	2310.84281	40.00	12000.00	
Tomatoes (Lycopersicion spp)	32	28.1	kg 1907.93	2881.2952	40.00	14000.00	
Bean (Phaseolus vulgaris)	30	26.3	kg 2562.34	4062.5501	50.00	26000.00	
Okro (Abelmoscus spp)	29	25.4	kg 1852.00	2657.2105	25.00	13000.00	

Garden egg (Solanum spp)	26	22.8	kg	3916.65	4744.34199	30.00	30000.00
Pepper (Capsicum spp)	35	30.7	kg	304.94	195.3298	30.00	1200.00

Source: Field Survey, 2010.

Table 3, shows the total factor productivity of the different zones namely Owerri, Orlu and Okigwe respectively. Orlu zone recorded the highest total factor productivity and mean output of 2.50 and 202567.72 relative to Owerri and Okigwe zones with 2.44 and 2.36 respectively. The table further showed the mean input of the different zones with Okigwe zone recording the highest mean inputs in comparison with other zones. The mean input of Okigwe zone is 81403.82, relative to 80140.75 and 81150.47 obtained in Owerri and Orlu zones.

The ANOVA in Table 3 further reveals that there is a significant differences in agricultural productivity across the three agricultural zones of Imo State. The model produced F-cal value of 6.61 which was significant at 5% level when compared with the F–critical value of 3.07. This implies that there are significant differences in agricultural productivity across the three agricultural zones of the state.

Table 3: The Productivity Level of Arable crop Farmers across the three zones in the State

Zone	Total Input	Total Output	Total Factor Productivity
Okigwe	81403.82	192357.38	2.36
Orlu	81150.47	202567.72	2.50
Owerri	80140.75	195556.90	2.44

ANOVA	**Sources of variation**	**SS**	**DF**	**MS**	**F**
	Between Groups	4652797	2	2326399	6.61*
	Within Group	39082655	89	352095.9	
	Total	43735452	91		

Influence of Socio-Economic Variables on Agricultural Productivity

Table 4 showed that, the multiple regression analysis was adopted to predict the influence of the respondent's socio-economic factor (independent variables) on agricultural productivity (dependent variable). The selected predictors were gender (X_1), age (X_2), education (X_3), household (X_4), farming experiences (X_5), annual farm income (X_6), membership of socio-organization (X_7), farm size (X_8), extension contact (X_9). Date were fitted to the regression model and tried in four functional forms of linear, exponential, semi-log and double-log. Again double-log was chosen as the lead equation based on having the lowest standard error, highest value of coefficient of multiple determination (R^2), highest F-value and number of significant parameter estimates. Out of the nine regressors, seven were positively related and statistically significant at 5% and 1% productivity level. This implies that variables such as gender (X_1), education (X_3), household (X_4), farming experience (X_5), annual income (X_6), membership of socio-organization (X_7), farm size (X_8) were positively related and statistically significant at 5% and 1% respectively and had a strong influence on agricultural productivity. The coefficient of age was inversely related to agricultural productivity though significant at 1% level. This implies that older farmers are less receptive and more conservative in adopting new technologies.

Again extension contact was inversely related and not significant at both 1% and 5% level. This implies that extension services were poorly conducted in the study area.

Similarly, gender (X_1), education (X_3), household size (X_4), farming experience (X_5), annual income (X_6), membership of socio-organization (X_7), and farm size (X_8) increased productivity by 8.91, 8.85, 7.13, 9.3, 8.41, 7.14 and 9.44% respectively. This implies that increase in education, farming experience, membership of social organization increases farmers' knowledge, managerial skills, capital and input acquisition and adoption of improved techniques efficiently. Again farmers' productivity is also increased by increase in household size, gender, annual farm income and farm size respectively. This theory is supported by Ozor and Nnaji, (2010) stating that more of family labour is readily available and this increases productivity. Furthermore, Adeoti, (2004) reported that years of experience reduces farmer's inefficiency and increases production as well. Result of the multiple regression analysis reveals the co-efficient of multiple determination (R^2) to be 0.861. This implies that 86.1% of the variations in agricultural productivity was explained by the independent variables while the F-statistic value of 41.332 was significant and confirms the overall significance of the regression analysis. Also the Durbin-Watson value of 1.868 indicated the absence of autocorrelation among the factors considered.

Table 4: Estimated multiple Regression Parameters

Variables	Coefficients	T-Values	Significant Levels
Constant	285.1169		
Gender (X_1)	0.0891	2.4121	*
Age (X_2)	-0.0342	-3.1963	**
Education (X_3)	0.0885	4.0783	**
Household size (X_4)	0.0713	4.2011	**
Farming experience (X_5)	0.0927	2.8789	**
Annual farm income (x_6)	0.0841	3.9116	**
Social organization (X_7)	0.0714	2.1802	*
Farm size (x_8)	0.0944	4.3704	**
Extension Contact (x_9)	0.0981	-1.1554	
R^2 =	0.861		
F – Value =	41.332***		
DW - Value =	1.868		
$t_{0.01, 82}$ =	2.617		
$t_{0.05, 82}$ =	1.980		
$F_{0.05}$ =	2.75		

Lny = 285.1169lsn0.0891ln (x_1) – 0.0342ln (x_2)+ 0.0885ln (x_3)+ 0.0713ln (x_4)+ 0.0927ln (x_5)+ 0.0841ln (x_6)+ 0.0714ln (x_7)+ 0.0944ln (x_8)+ 0.0981ln (x_9)
Source: Field survey, 2010.
N/B ** Significant at 1% level, * Significant at 5% level

Problem Militating Against Agricultural Productivity in the Study Area.
Table 5, showed the problems perceived by arable crop farmers in the state. The problems include lack of capital with a mean score of (3.6), high cost of labour (3.3) and high cost of farm inputs (3.1). A similar report of poor access to credit facilities was observed by Ugwumba, Okoh and Isitor (2009), who stated that lack of credit facilities affects and impedes productivity. Other identified constraints include poor extension services (2.9), pests and diseases (2.7), land tenure systems (2.4), poor storage facilities (2.2) and poor weather conditions (1.9).

Table 5: Distribution of respondents according to production problems

Problems	Mean Scores	Rank
Lack of capital	3.6	1st
High cast of labour	3.3	2nd
High cost farm inputs	3.1	3rd
Poor extension services	2.9	4th
Pest and diseases	2.7	5th
Land tenure systems	2.4	6th
Poor storage facilities	2.2	7th
Poor weather conditions	1.9	8th

Source: Field survey, 2010.

CONCLUSION AND RECOMMENDATIONS

The findings of this study showed that all the socio-economic variables investigated had a strong influence on agricultural productivity and exhibited different contrasting relationship. Across the three agricultural zones resident in the state, the ANOVA model showed that, there are significant differences in agricultural productivity of the three zones investigated. Furthermore, the various production constraints perceived by the rural farmers need to be addressed by the government to ensure maximum production. Again, there is need for private partnership investments in agriculture as this will encourage efficient food production and security. Again government at all levels should come up with profitable policies in agriculture and ensure its implementation to the minimum. Consequently, for increased productivity to be attained, agriculture should be seen as a viable profession/business and should be mechanized.

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