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Original Research Article

DETERMINANTS OF PRODUCTIVITY AMONG WOMEN IN DEVELOPMENT ACTIVITY: A CASE STUDY OF THE CASSAVA WOMEN FARMERS OF BENUE AGRICULTURAL DEVELOPMENT PROJECT, NIGERIA.

ABSTRACT

The need to improve productivity and local production of cassava to meet internal demand, and the export drive in the Nigerian economy necessitated this study. Factors affecting productivity levels achieved by cassava women farmers of Benue Agricultural Development Project (ADP) were investigated. Structured questionnaire were randomly administered to 87 ADP cassava women farmers across the three agricultural zones of the State. Data analysis was through descriptive statistics, total factor productivity and regression techniques. Results showed total factor productivity of 2.66 across study farms implying that respondents' farm enterprises were productive. Regression analysis indicated that use of improved cassava stem cuttings (X_5), amount of agrochemicals used (X_6), farm size (X_7) and access to credit (X_9) significantly explained variations in respondents' output. Therefore, the study recommends that enhancement of respondents' access to better farm sizes, credit; agrochemicals and improved cassava varieties would improve productivity across farms in the study area.

Key words: Productivity, development activity, women farmers

1.0 INTRODUCTION

Nigeria is a country with great natural and human resource endowments. According to Ayoola (2009), Nigeria is a country that covers 98.3 million hectares with a largely rural population of about 150 million people. The country which measures 1200 kilometres from East to West and about 1500 kilometres from North to South is also blessed with other natural resources such as petroleum, solid mineral deposits, large water bodies, an extensive coastline coupled with an annual rainfall in the range of 300 – 4000 millimetres per annum. These features imply that the country is endowed with vast physical and human resources potential required for accelerated development of its agrarian economy. According to Ogen (2007), a strong and efficient agricultural sector

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would enable a country (or region) to feed its growing population, generate employment, earn foreign exchange and provide raw materials for industries. This he further explained is because the agricultural sector has a multiplier effect on any nation's socio-economic and industrial fabric, because of the sector's multi-functional nature, which has made it the 'engine' of growth in virtually all developed economies.

On the contrary, the agricultural sector in Nigeria instead of accelerating development has been on the decline for decades. According to the Central Bank of Nigeria (2005), Yusuf and Adenegan (2008), agriculture's contribution to GDP declined from 90% before independence (1960) to 25% in 1980, and later moved up to 41% from 2001-2006.This poor performance (attributed to neglect of the sector and overdependence on oil revenues) coupled with the rapid rate of population growth induced high levels of poverty in the Nigerian economy especially in the rural areas (Ogungbile, 2008; Ayoola, 2009). The National Population Commission (NPC, 2006) observed that while the rate of growth of population is 3.2%, the rate of growth of food production is 2.5%. Consequently, about 70% of Nigerians are poor and 67million Nigerians live below the poverty line (Ogungbile, 2008), with neither the means to produce food nor the income to buy food (Ogundari and Ojo, 2007). Poverty is concentrated in the agricultural sector as 7 out of every ten farming households in Nigeria are living below the national poverty line, and 6 out of every 10 poor households are in agriculture (Eboh, 2011).

In recognition of the critical importance of agriculture to national development, successive Nigerian governments have introduced measures to boost agricultural production and alleviate poverty with little or no success (Idachaba, 1991; Nnadozie and Nwarnu, 2002; Ogwumike, 2009). So in spite of successive programmes, the economy still remains undiversified and skewed as crude oil still accounts for more than 95% of the country's export revenue, and up to 85% of government revenues, but contributes less than 4% of total employment (Eboh,2011). On the other hand, the agricultural sector amidst low and stagnating productivity accounts for 41% of GDP and 60% of total employment (Ogen, 2007). Either way, this means majority of Nigerians have little income and are poor. Even the so called over 7% overall growth in national output since 2004 has not translated into improved welfare for the majority of Nigerians-a

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phenomenon Eboh (2011) described as 'jobless growth' Therefore, there is urgent need to help Nigerians escape poverty. In terms of the role of agricultural productivity in reducing poverty, Thirtle et al. (2001) concluded from cross-country regression analysis that, on average, every 1% increase in labour productivity in agriculture reduced the number of people living on less than a dollar a day by between 0.6 and 1.2%. They further observed that no other economic sector shows such a strong correlation between productivity gains and poverty reduction.

According to Lipton (2005), raising the productivity of small farmers would not only increase their incomes and food security, but also stimulate the rest of the economy, and contribute to broad-based food security and poverty alleviation. Consequently, enhancement of agricultural productivity in Nigeria is an important condition for economic diversification, poverty alleviation and national development. However, there is limited information to help economic planners and development partners to determine factors that affect agricultural productivity in Nigeria. Such information can help identify major constraints to productivity growth and in formulation of suitable policies to overcome such constraints. This is particularly important now that Nigeria is seeking through vision 20-20-20 to reverse past trends of poverty and economic stagnation to move the economy towards the path of accelerated economic growth and development. FAO (2005) revealed that women farmers contribute 60% of the labour force and 80% of food production in Nigeria. If the productivity of these women is increased, then food production will increase and any surplus production could be sold to provide the much needed income for national development. Hence, this study has focused on identifying the factors that affect the productivity of cassava women farmers of Benue State Agricultural Development Project, Nigeria. It is hoped that results of the study will contribute towards efforts to increase productivity, reduce poverty and accelerate national development.

2.0 MATERIALS AND METHODS

2.1 Study area, sampling and data collection: The study area is Benue State, Nigeria. Benue State has a population of 4,219,244 (NPC, 2006), and a total land area of 34,095km^2. It lies between longitude 8ºE and 10ºE, Latitude 6º3ºN and 8½ºN

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(BNARDA, 2001). Benue State consists of 23 Local Government Areas grouped into three Agricultural Zones (A,B,C). Crops grown include cassava, yams, cocoyam, sweet potatoes, citrus, mangos, oil palm. Other crops cultivated include rice, maize, millet, soyabeans, beniseed, groundnut, sorghum, ginger, sugarcane among others. Benue State also produces a great deal of livestock, forestry products and fish (Ater, 2002).

Multi stage sampling technique was adopted for the study. Stage one was the purposive selection of Benue State for the study since it is the largest cassava producing state in Nigeria (Olasunkanmi, et al, 2012). Stage two was the purposive selection of two cassava producing local governments from each of the three agricultural zones in the state giving a total of 6 local governments. Stage three was the random selection of twenty-nine ADP cassava women farmers from the two local governments in each zone giving a total of 87 respondents. Data was collected on respondents' personal characteristics such as age, level of education, marital status, household size, years of education, input and output data among others.

Descriptive statistics, total factor productivity and multiple regression techniques were used to analyse the data. The ordinary least square regression model was employed to estimate the determinants of respondents' productivity. This was similar to the procedure adopted by Alabi and Adebayo (2008). The explicit form of the model was:

$$Y_c = bo+b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 +b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10}$$

Where Y_c = Output of cassava in kilogammes (kg), Xi = farming experience in years

X_2 = Years of education, X_3 = family size of respondent

X_4 = Amount of fertilizer applied (kg), X_5 = use of improved cassava stem cuttings (dummy, 1 = improved, O otherwise

X_6 = Amount of agrochemicals used (Litres), X_7 = farm size (hectares),

X_8 = Total amount of labour used (man-days), X_9 = Credit use (dummy, 1 = Credit use, O otherwise) X_{10} = access to extension advice (dummy, 1 = access, O otherwise). b_0 = intercept, bi = regression coefficients of the various inputs used. e = error term.

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2.2 Concept of Agricultural Productivity, its Measurement and Importance

Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs used in production. Though individual outputs are measured by weights, their varying densities make measuring overall agricultural output difficult. Therefore, output is usually measured as the market value of final output (Owuor, 1997). The output values can be compared to different types of inputs such as capital, land and labour. These are called partial productivities measures. Commonly used measures are land productivity (yield) or output per unit of land. Labour productivity (output per economically active person (EAP) or agricultural person- hour). Yield is used to assess the success of new production practices or technology. Labour productivity is often used to compare productivities of sectors within or across economies. It is an indicator of rural welfare or rural living standards (Ohajiana, 2000). Agricultural productivity can also be measured by what is called total factor productivity (TFP) which is defined as the ratio of value of output over the values of inputs used in production. According to Fakayode et al (2008), total factor productivity or total productivity is the ratio of valued output (Q) to total variable costs of production (TVC). TFP=Q/TVC. Alternatively, $TFP=Q/\sum P_i X_i$ where $Pi_{=}$ unit price of the ith variable input, X_{I} = quantity of the ith variable input, ∑ = summation sign. FAO (2007) observed that increase in productivity can contribute to economic growth in several ways. Aside from providing more food, increasing the productivity of farms affects the country's prospects for growth and competiveness on the agricultural market, income distribution and savings, and labour migration to other sectors. Productivity increase can mean higher profits for management, transport, more revenue for government. When agricultural producers' income rises, they spend the money on non-agricultural items, thereby creating jobs for others throughout the economy. Ayoola (2008) quoting International Food Policy Research Institute (IFPRI) sources stated that for every US $ 1.0 increase in agricultural output in developing countries, the overall economy grows by US $ 2.3.

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3.0 RESULTS AND DISCUSSION

3.1 Personal Characteristics of Respondents. Table 1 shows that 3.4% of respondents were below 20 years while 9.2% were above the age of 50years while majority (87.3%) of the respondents were within the age category of 20 to 49. This implies that most of the respondents were in their active age and could successfully carry out agricultural activities.

Table 1: Personal Characteristics of Respondents

Age of Respondents (years)	Frequency	%
<20	3.	3.4
20-39	23	26.4
30-39	38	43.7
40-49	15	17.2
50-59	6	6.9
≥60	2	2.3
Total	87	100.0
Marital status		
Married	68	78.2
Divorced	4	4.6
Widowed	12	13.8
Total	87	
Single	3	3.4
Total years of education (years)	87	100.0
No formal education	16	18.4
Primary education	35	40.2
Secondary education	22	25.3
Tertiary education	14	16.1
Total	87	100.0
Family size		
≤ 10	67	77.01
10-19	17	19.54
≥ 20	3	3.45
Total	87	100.0
Membership of farmer's Association		
Never been a member	33	37.93
Once a member	15	17.24
Still a member	39	44.83
Total	87	100.00

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Farming experience (years)		
≤ 5	30	34.5
6-10	32	36.8
11-15	15	17.2
16-20	7	8.0
> 20	3	3.4
Total	87	100.0

Source: Field Data, 2010.

According to Ogunlade et al (2007) people in this age category are considered young, able bodied, and can still contribute to a productive enterprise. Table 1 further showed that altogether 96.6% of the respondents had been married at one point or the other, only 3.4% were single. This shows that respondents in the study were people married with responsibility. The effect of this could enhance the determination to succeed in farming in order to provide for their family's needs.

Table 1 also showed that 18.4% of respondents had no formal education, 40.2% had primary education while 25.3% and 16.1% had secondary and tertiary education respectively. This shows that altogether 81.6% of the respondents were educated while 18.4% had no formal education. This is higher than the national average level of education and it is not surprising since respondents were selected from women involved in innovative agricultural production (Benue agricultural development project). This high level of education among respondents could have a positive effect on productivity. Oladeebo and Ambe-Lamidi (2007) asserted that educated farmers are bound to be innovative and productive. Data analysis also showed that 77% of respondents had family sizes below 10 persons while 23.0% and 3.4% had family sizes from 10-19 and above 20 persons respectively. This indicates that the families are large enough to provide family labour especially during critical periods in cassava production.

Table 1 also indicated that 37.93% of the respondents had never belonged to any farmers' association while 62.07% have belonged to a farmers' association at one point or the other. Currently 44.83% of respondents are members of farmers' association. This implies that respondents are aware of the benefits of farmers' associations and have suitably positioned themselves to receive development assistance since such assistance is normally channeled through farmers' groups. This is not surprising since

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involvement an agricultural development project may have exposed respondents to extension teaching on the benefits of belonging to farmers' associations. Belonging to a farmer's association is expected to contribute towards productivity improvement.

Table 1 shows that 34.5% of the respondents have been farming for not more than 5years while 36.8% have been farming for 11years to 15years, 17.2% for 16-20years. Only 11.4% have been farming for more than 20years. This indicates that majority of the farmers have been in cassava farming for many years and can be said to be experienced in cassava production.

4.0 Costs and Returns of Respondents

According to Umoh(2006), urban farming may not be only for satisfying the household's food need or subsistence.The farmers may be interested in selling their outputs to raise income. Thus, the farmers like any other entrepreneur would be interested in the profitability of the farm enterprise. For this reason, efforts were made to determine the cost associated with urban farming and also revenue that accrues to the farmers' efforts. Only the variable cost of production was considered while the profitability was measured as the gross margin. (Table 2). Table 2 shows the frequency distribution of average costs and returns of respondents in the study area.

Table 2: Frequency Distribution of Costs and Returns of Respondents

Item		Percentage
1. Sale of various cassava products	(₦)	
a. Akpu	5,105.40	20.55
b. Chips	11,200.54	45.08
c. Gari	8,540.16	34.37
Total valued output(Q)	24,846.10	100.00
Costs		
i. Planting materials	2,905.92	31.20
ii. Fertilizer	1,900.01	20.4
iii. Labour	2,000.30	21.4
iv. Agrochemicals	400.00	04.3
v. Processing costs	1,516.00	16.3
vi. Transportation costs	600.00	06.4
total variable costs (TVC)	9,322.23	100.0
Gross margin	15,523.88	

Source: Field Data.

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4.1 Total Factor Productivity Analysis

Table 2 shows that total revenue (Q)=₦24,846.16.The total variable costs of production (TVC)=₦9322.22.Therefore, total factor productivity (TFP)=Q/TVCC= ₦24,846.16/₦9322.22 =2.66. This result indicates that respondents' farm enterprises are productive and could contribute positively to respondents' welfare since the benefits are close to three times the total variable costs of production. This result agrees with Nweke (1997), Enete (2007) and Chukwuji (2007) that cassava generates high income for farmers and it is in line with Nweke (2004) and Fakayode *et al* (2008) that cassava is the greatest poverty fighter among crops in Nigeria.

4.2 Determinants of Respondents' Productivity. The double log was selected as the lead equation for modeling respondents output. The value of the coefficient of determination (R^2) for the regression was 0.402 showing that 40.2% of the variation in output was explained by variables included in the model. The value of F – ratio (7.619) was significant beyond 1% (P<0.01) showing that the combined influence of the explanatory variables was strong. The major variables that explained variation in the output of respondents were use of improved cassava stem cuttings (P<0.10), amount of agrochemical used (P<0.05), farm size (P<0.10), access to credit (P<0.05).

Table 4: Determinants of ADP Respondents' output

Variable	**Coefficient**	**t-value**	**Sig.**
Constant	8.747	18.982	0.000
Farming Experience (X_1)+	0.099	0.681	0.501
Years of Education(X_2)+	0.140	0.973	0.338
Family Size (X_3)+	0.134	0.998	0.330
Amount of Fertilizer (X_4)+	0.287	1.558	0.129
Improved Cassava use(X_5)*	0.168	1.884	0.074
Amount of Agrochemicals (X_6)**	0.326	2.478	0.018
Farm Size (X_7)* +	0.247	1.917	0.064
Amount of Labour used (X_8)+	0.222	1.123	0.270

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Credit Access (dummy) (X_9)**	-0.312	-2.093	0.044
Extension Access (dummy)(X_{10})+	0.012	0.085	0.933

R^2 = 0.402, F- ratio = 7.619

Source: Field Survey, 2010.

These results have a number of implications:

The coefficient of use of improved cassava stem cuttings (X_5) was positive and significant at 10% level. This implies that the use of improved cassava stem cuttings have a positive significant effect on output and productivity. This is according to a priori expectation since improved varieties are developed and distributed to farmers to raise their farm yields. This finding agrees with Odii (2003) that improvement in agricultural technology (such as improved seeds, stem cuttings) leads to improvement in farm productivity. The implied policy is to develop and distribute more improved technologies to farmers to improve their farm yields income and reduce poverty in the study area.

The coefficient of agrochemicals (X_6) was positive and significant at 5% level showing the positive significant contribution of agrochemicals (such as herbicides, pesticides etc) to respondents output. This also conforms with Odii (2003) who observed that use of agrochemicals can lead to output maximization. The coefficient of farm size (X_7) was positive and significant at 10% level. This implies that unit increase in farm size will tend to increase output and vice versa. This result is in conformity with Morris (2001), Heralth and Takeya (2003), and Damisa and Igonoh (2007). The result underscores the need for policies to enable women farmers to expand their farm sizes so that they can increase their production and reap the benefits thereof.

The coefficient of access to credit was negative but significant at 5% level. This implies that the use of credit tends to reduce output of respondents. This is contrary to a priori expectation of a positive relationship between access to credit and output. This result is contrary to Yusuf and Adenegan (2008) who reported a positive insignificant relationship between access to credit and output in their study of technical efficiency

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among women farmers in Kogi state, Nigeria. The reason for the negative result could be due diversion of agricultural credit for non-agricultural uses. This was observed to be common in the study area where credit could be diverted to pay children's school fees, obtain chieftaincy tittles, perform burial ceremonies, pay hospital bills or even buy food for the family among others. This finding agree with Chukwuone (1995) and Mbah (2008) that women benefit little from agricultural services such as credit schemes, extension, land acquisition and technology that would improve their productivity. The policy implication here is mere extension of credit to farmers is not enough. There is need for adequate supervision of credit recipients to ensure proper use of credit in order to achieve the desired objectives.

The respondents were also asked to identify factors they consider as constraints to their productivity. They identified processing problems (46.%), poor pricing of output (37.9%), lack of credit (34.5%), soil fertility problems (31.0%), labour problems (28.7%), transport problems (27.6%) and poor market infrastructure (26.4%).

5.0 CONCLUSION AND RECOMMENDATIONS

This study was carried to identify the determinants of productivity among cassava women farmers involved in a development activity (Benue Agricultural Development Project) in Nigeria. Regression analysis indicated that 40.2% of the variation in output was explained by variables included in the model, while the F– ratio (7.619) was significant beyond 1% ($P<0.01$) indicating that the model was properly specified. The variables that significantly influenced respondents' productivity were use of improved cassava stem cuttings (X_5), amount of agrochemicals used (X_6), farm size (X_7) and access to credit (X_9). Results further showed total factor productivity (TFP) of 2.66 among respondents. Therefore, the study concluded that the cassava women farmers were productive in their farming enterprises.

Based on the findings of this study, the following recommendations are made:

Policies geared towards production and distribution of more improved cassava varieties, agro-chemicals such as herbicides, pesticides and enhancement of women farmers'

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access to land would improve productivity on cassava farms across the state and the country at large.

Policies to ensure proper supervision of credit given to cassava women farmers in the study area to ensure proper use would improve their productivity and welfare.

Provision of provide basic infrastructure such as goods rural roads, water supply, rural electricity, market infrastructure and agro-processing facilities that are situated in the rural areas would improve rural life, and stem rural-urban migration which is among the factors responsible for labour shortages in the study area.

There is need to put in place pricing policies to ensure that cassava women farmers get adequately compensated for their efforts in cassava production. This would serve an incentive for increased cassava production in the study area and would contribute positively towards poverty reduction, economic growth and development in Nigeria.

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