Socio-Economic Factors Influencing Yam (*Dioscorea Spp*) Production in Bwari Area Council, Abuja, Nigeria

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Abstract: *This study determined socioeconomic factors influencing yam production in Bwari Area Council Abuja, Nigeria. Primary data was used for this study. Data were obtained using structured questionnaire; the questionnaires were administered to one hundred and fifty (150) sampled yam farmers using simple random sampling technique. Data obtained were analyzed using descriptive statistics; multiple regression analysis. The resultshows that majority 87.8% were male while 91.2% were married. Also the result revealed that 33.8% had secondary education while 28.4% had obtained post-secondary education. The average age of the sampled respondents was 47 years in the study area. The analysis of multiple regression shows that age; Farming experience, gender and educational level of the sampled yam farmers were significant factors influencing yam production and were significant at 5% percent probability level respectively. The R^2 value of 0.53 which is the coefficient of multiple determination shows that 53% percent of the variation in dependent variable was explained by the explanatory variables included in the model and F-value of 3.14 is significant at 10% probability level. However yam farmers encountered inadequate capital, lack of land availability, government policy, diseases outbreak and inadequate transport facilities, bad road, and access to good market for their farm produce as a major constraint. The study therefore recommends that, provision should be made for subsidized input and Public Private Partnership (PPP) should be explored by government so as to help the education of farmers with regard to new technology and innovations in yam production in the study area.*
Keywords: *Yam, analysis, factors, regression, Nigeria*

I. Introduction

The Agricultural sector has always been an important component of Nigerian economy with over 70 percent of the population engage in agriculture and agricultural related activities (Pius,2013). The sector is almost entirely dominated by small scale resource poor farmers living in rural areas, with farm holdings of 1- 2 hectares, which are usually scattered over a wide area. Root and tubers crops comprise crop covering several genera. They are staple food crops, being the source of daily carbohydrate intake for the large populace of the world. Yam (*Dioscorea spp*) is a member of this important class of food. Yam is an important food crop especially in the yam zones of West Africa, comprising Cameroon, Nigeria, Benin, Togo, Ghana and Cote d' Ivoire. This zone produces more than 90% of the total world production which is estimated at about 20 – 25million tons per year (Sanusi and Salimonu, 2006). Nigeria is the main producer of yam in the world with about 71% of the world output followed by Ghana, Cote d' Ivoire, Benin and Togo (FAO, 2002). Yam is one of the root crops produced in Nigeria. It is the second most important tropical root crop in West Africa after Cassava (Osunde, 2008). The distribution of yam cuts across the world with the total global production put at about 39.9 million tons in 2005, the bulk of which came from the yam belt of West Africa (stretching from Nigeria to C'ote d'Ivoire) from which about 91% of the world's production obtains (FAOSTAT, 2005) in Tsado, (2012). Osunde, (2008) further observed that, West Africa accounts for about 90 - 95% of the world's production with Nigeria producing about 70% of that quantity. Available data also shows that yam is one of Nigeria leading root crop (Ajijola et al, 2014). As a food crop, the place of yam in the diet of the people in Nigeria cannot be overemphasized. It contribute more than 200 dietary calorie per capital daily for more than 150 million people in west Africa while servicing as an important source of income to the people (Babaleye, 2003). Yam has some inherent characteristics, which make it attractive, first, it is rich in carbohydrate especially starch consequently has a multiplicity of end use. Secondly, it is available all year round making it preferable to other seasonal crops (Izekor et al,2010) ,yam contains a higher value in protein (2.4%) and substantial amount of vitamins (Thiamine, Riboflavin and Ascorbic acid) and some other minerals like calcium, phosphorus and iron than any other common tuber crop. It is also comparable to any starchy root crop in energy and the fleshy tuber is one of the main sources of carbohydrate in the diet of many Nigerian. Yam is a preferred food and a

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food security crop in some Sub-Saharan African countries (Ajijola *et al,* 2014).Yam could be eaten as boiled yam or fried in oil. It can also be processed into yam flour or pounded yam. Moreover, yam is also a source of industrial starch, the quality of which varies with the species, although the quality of starch of some species is said to be comparable to cereal starchy (Ajijola, et al 2014). Apart from this, yam also plays vital roles in traditional culture, rituals and religion as well as local commerce of the African people (Izekor, 2010). Yam is reported to be part of the religious heritage of several Nigeria tribes and up to date often play a key role in religious ceremony (Sanusi and Salimonu, 2006). Worthy of note is the fact that many important cultural values are attached to yam, especially during wedding and other social ceremonies. In many farm communities in Nigeria and other West Africa countries, the size of the yam enterprise that one has a reflection of one social stature. Due to the importance attached to yam many communities celebrate the new yam festival annually. Yam production in Nigeria has more than tripled over the past 40 years from 6.7 million tons per annum in 1961 to 27 million tones' per annum in 2001(FAO, 2003). This increase is however attributed to larger hectares of land planted to yam than to increased productivity. This decline in average yield per hectare in Nigeria has been rather drastic dropping from 14.9% in 1986 -1990 to -2.5% in 1999 (CBN, 2002). Since yam remains a major staple food in Nigeria based on its cultural role (Ajijola *et al* 2014), contributing immensely to rural and regional economies and its significance among the food crops in Nigeria.

According to Ajijola (2014), the production of yam in Nigeria is grossly inadequate and cannot meet the ever-increasing demand for it under present level of input use. In order to meet this level of demand and even surpass it, there is need to assess the level of efficiency and its determinants (Awoniyi and Omonona, 2006). A recent study on yam has shown that the absolute level of production in West Africa and the world globally have remained static for the last three decades (Scott, *et al.,* 2000): allocation could limit the level of returns to an enterprise and in turn affect its attractiveness for resource allocation (Scott, et al, 2000). Yam production is constrained by several factors with planting material rated to about one third (1/3) of the total cost of production (Bolarinwa and Oladeji, 2009). Seed yams are the planting materials used in the field of production of ware or table yam and these are scarce and expensive. Yam farmers in Nigeria obtain planting materials from previous harvest through milking or cutting good ware yam into sections for planting in addition, small scale agriculture has in the time past suffered from limited access to credit facilities, modern technology farm input and inefficient use of resources. Lawrence, (2006) found that scarcity and the expensive nature of clean planting material was the major constraint to increasing yam production and productivity in West Africa. (Ajijola 2014), in a study carried out discovered that inefficiency in developing country agriculture is as a result of the subsistence needs, socioeconomic and demographic characteristics of the farmers. According to him, other factors are experience, accessibility to information, supervision contact and credit availability to the farmers. This static or declining trend may not be unconnected with productive resources, which are not being efficiently utilized, leading to low productivity (Fasasi, 2006).. Traditionally, yam is one of the prestigious crop that is viewed and accepted with high respect, especially during new yam festivals in most of the rural communities of eastern, central and some parts of southwest of Nigeria (Usongu et al,2014). (Okwuokenye (2015), reported that yam production in Nigeria has experienced increased in output yet has not been able to meet the yeaning demand of the people. This insufficiency is as a result of an increase in the Nigeria population and low market price. The growth rate of the Nigerian population is 3.3 percent as against the agricultural growth rate of 2.3 percent. So the gap between domestic supply and demand is still wide in favour of demand (Onyemechi, 2016). Also, (Ewuzienm,2015) stated that yam as a food crop in Nigeria is however, becoming expensive in urban areas as production has not kept pace with the population growth leading to demand exceeding supply(Onyemechi,2016).. There is equally need to increase the production of yam not only to satisfy domestic need but also export demand to increase foreign exchange earnings. However, the general decline in yam production over the years is linked to laborious cultivation methods, the need for staking and the high cost of seed yams, which are also consumed. The production of yam is constrained majorly by high cost of seed yams (Oronkwe et al, 2010), also among the problems of yam production includes high cost of labour and staking materials, inadequate and high cost of agrochemicals Ezedinma (2016).

Problems of yam production also include inappropriate decision on how best to allocate resources, inadequate use of corresponding production inputs and inadequate adoption of improved technologies by farmers. Also farmers might use resources rationally but not at economic optimal level. All these contribute to inefficiency. Effort aimed at increasing yam output cannot be achieved unless the current level of inputs utilization is scaled up (Fakayode, *et al*, 2008). A major limitation to yam production in Nigeria is the declining soil fertility which isexacerbated by the high cost and/or unavailability of chemical fertilizer (Ismaila *et al*, 2010). In Nigeria, Yam is among the most important crops, but poor seed supply, inefficient marketing system, and low investment in research are among the factors that have limited its production (Ayanlere *et al*, 2013).Despite human and material resources devoted to agriculture, the productive efficiency of most crops yam inclusive still fall under 60 % (Fakayode *et al*, 2008). Despite its importance; there is still insufficiency of the crop due to some problem, that hinder its productivity, socio – economic, socio- cultural, political factors and

use of agro-chemicals. Therefore, it is important to understand the farmers' levels of production and its relationship with land factors which can greatlyimprove the production of the commodity. This can be achieved throughinvestigating the socio-economic Characteristics and factors influencing yam production. Farmers output needs to be increased using existing inputs and technology. This research is therefore carried out to determine the factors influencing as well as the problems affecting Yam production in Bwari Area Council Abuja, Nigeria. This study is designed to provide answers to the following research questions:

(i)   What are the Socio-economic Characteristics of Yam Farmers in Bwari Area Council Abuja?
(ii)   What are the Factors influencing Yam Production in the Study Area?
(iii) What are the Constraints of Yam Production in the Study Area?

1.1 Objectives of the Study
The main objective of this Study is to examine the Factors influencing Yam production in the Study Area.
The specific objectives are: to,
(i)   Examine the socio-economic characteristics of Yam producers in the Study Area.
(ii)   To determine the Factors influencing Yam Production in the Study Area
(iii) To identify the constraints of Yam production in the Study Area.

II. Methodology

2.1 The Study Area
        This study was conducted in Bwari Area Council of Federal Capital Territory, Abuja, Nigeria. Abuja was created and carved out in 1976 from the Kaduna, Niger, Kwara and Plateau States. Abuja has a boundary with Kaduna State to north and Kogi State to the south. It is also bounded to the east and west by Nassarawa and Niger States respectively.
        There are six Area Councils in Abuja namely: Abaji, Bwari, Gwagwalada, Kuje, Kwali and Abuja Municipal Area Councils. Federal Capital Territory is located within Latitudes 700 20" North of Equator and Longitudes 600 45" and 700 39". Federal Capital Territory has total land area of about 8,000 Sq Kilometers with a total population of 776,298 at the 2006 census (NPC, 2006). It is predominantly a grassy savannah region, thus has potentials to produce both root crops and tubers such as yam and cassava. It also sustains legumes (groundnut & cowpea); grains (maize, sorghum & rice); seeds and nuts (melon seeds & benniseed); fruits and vegetable. Beside crop production, the rural communities also rear livestock such as sheep, goat, cattle and poultry birds at subsistence level. The main vegetation of the study area is Guinea-savannah (Dawan, 2000).
        A random sampling technique was adopted in selecting the wards for this study. Bwari Area council is comprised of ten (10) districts wards namely: Kuduru, Bwari central, Ushafa, Igu, Shere, Kawu, Npape, Biaji, Dutse-gbagi, and Galuyi. The five selected wards are. Kuduru, Bwari central, Ushafa, Igu, and Biaji ward. A simple random sampling technique was applied to select thirty (30) respondents from each of the five wards selected in Bwari Area Council making the total sample size of (150) farmers two questionnaires were not retrieved therefore making the total sample size of 148 respondents.
        The data was obtained from primary source. The primary data was collected with the aid of structured questionnaires administered to the respondents. Data was collected based on the socio-economic variables such as gender, age, farming experiences, educational status, household size and income level of the respondent, as well as factors influencing yam production in the study area.
 The following tools of analysis were employed to achieve the stated objectives:
(1) Descriptive Statistics.
(2) Multiple Regression Analysis.

        Descriptive statistics tool was employed to have summary description of the data collected. It involved the use of percentages, means and frequency distributions. This was used to achieve specific objective (1) & (3).

Multiple Linear Regression Analysis
The multiple regression implicit model that were estimated for the study was specified as:
        $Y= F(X_1,X_2,X_3,X_4,X_5,X_6,X_7,X_8,X_9,;U)$
The explicit functions are stated thus:
$Y = b_0 +b_1X_1 +b_2X_2+b_3X_3+b_4 X_4+b_5X_5+b_6X_6+ b_7X_7\ b_8\ X_8+b_9X_9 +U_1;$ (Linear Functional Form).
Where,
Y = Yam Output Yield (Kg)
X_1 = Age (years)
X_2 = Gender (Male =1, Female = 0, Otherwise)
X_3 = Educational level (Numberof years spent schooling)
X_4 = Farm size (In Hectares)

X_5= Farming Experience (Number of years in farming)
X_6= Fertilizer (Kg)
X_7 = Chemical (Quantity in Liters)
X_8 = Household Size (Number of persons)
X_9= Capital (₦)
B_1-B_9= Regression Coefficients
B_o= Constant Term
U_i= Error Term

The equation was fitted to linear functional form it was observed to be the best fit. The choice for the linear model was based on the relative magnitude of the coefficient of the multiple determination (R^2) that gave the explanatory power of the model, the total significance of the (R^2) values was expressed by the F- ratio at a certain probability levels (1, 5 or 10%) which gave the total contribution of the independent variables to the goodness of fit..

III. Result and Discussion

3.1 Socioeconomic Characteristics of Yam Farmers in the Study Area

Table 1 shows the result of socioeconomic characteristics of the respondent in the study area, the result shows that majority 87.8% were male and 91.2% were married. The large involvement of married farmers implies that, yam is an important source of food and income to the prospective families. This is in agreement with the findings of Augustine *et.al.* (2008) who found that over 70% of the married couples were involved in yam production in South Eastern Nigeria.

Also the result revealed that 33.8% had secondary education and 28.4% had obtained post-secondary education. The result also shows that 42.6% of the respondent in the study area belong to the age group of 41-50 years while 19. 6% belong to the age range of 50 to 61 years and the mean age of the sampled respondents was 47 years in the study area. This implies that majority of the sampled farmers are in their active age. This has implications on the availability of family labour and their productivity because age has a direct bearing on the availability of farm labour and the ease with which improved agricultural practices are adopted this is in line with (Rauf, 2010).. Table 1 also revealed that 50% percent of the sampled respondent had the household size belonging to the range of 6-10 people while 49.3 % belong to the household size of 1-5 people per household and the average household size was 6 people per household. This result suggests that, the farmers may require hired labour in order to increase their productivity/income since yam production is labour intensive. And the result also revealed that 50% of the respond had farming experience ranging from 11-20 years while 27.7% belongs to 21-30 years' experience with average of 14 years farming experience in the study area. Experience in itself could contribute positively or negatively to technology adoption, while at times farmers that are already used to doing things in a particular old way may find it difficult to change and as such experience could become an impediment to adoption of innovation. However, experience can also contribute positively since farmers that have seen and experienced the advantages of such innovations can share their experiences thereby encouraging other farmers to adopt. This result reveals that those who had spent more years in farming were more likely to adopt new technologies because farmers' previous experience with other innovations will likely influence their understanding of the gross margin of innovation. Experience also enables the farmer set realistic targets. This finding corroborates the earlier work of Ironkwe, *et. al.,*(2007). They found that experience improves farmers' production skills such as good planting methods and the use of improved seed. This may enhance the profitability of the innovation which is an advantage to the adoption of innovation by the farmers. The analysis also revealed 98% had farm size of 1-2 ha. Also about 92.5% of the sampled respondent had no access to credit. The result also shows that the majority 91.2% identify other means as sources of credit only 2% had access to credit through commercial banks. Access to credit can enhance adoption and profit efficiency. Non availability of credit to the farmers could limit adoption of yam production technologies in the study area, because the adoption of improved technology has cost implications. This lends credence to the work of Ironkwe *et. al.,* 2007; who found that farmers' lack of access to credit was a serious limiting factor in the adoption of new technologies. The result also shows that 99.3% could not have access to extension services. This is an indication that majority of the farmers did not have access to current agricultural practices. This may impede their effective production and hence profit realizable from the adoption of improved technology. A similar assertion was reported by Nnadi and Akwinu, (2006) who claimed that low level of extension contact remained largely responsible for the low level of adoption of new technologies.100% of the sampled respondent had access to market while 56.8% of the respondent does not belong to cooperative society, implying that most farmers in the study area had limited access to productive resources by pooling the resources and information about farm practices since cooperative societies serve as medium through which farmers could share ideas, resulting into receiving new information about new farm practices, as well as having access to funds since with the help of other cooperative members' new observations could be discussed this is in line with (Odurukwe *et. al.*, 2003).

These authors also suggested that, if a farmer belonged to a cooperative body, he will be more likely to be exposed to the adoption of new technologies.

Table;1 Socioeconomic Characteristics of the Yam Farmers in the Study Area

Variables	Frequency	Percentage
Gender		
Male	130	87.8
Female	18	12.2
Marital status		
Single	5	3.4
Married	135	91.2
Divorced	3	2
Widower	5	3.4
Education		
Primary school	24	16.2
Secondary	50	33.8
Post primary school	42	28.4
No formal education	3	2
No education	29	19.6
Age (years)		
21-30	10	6.8
31-40	27	19.2
41-50	63	42.6
51-60	29	19.6
61 and above	19	12.8
Household size (number)		
1-5	73	49.3
6-10	74	50
11-15	1	0.7

Table 1 contnd

Variable	Frequency	percentage
Farming experience (years)		
1-10	74	50
11-20	41	27.7
21-30	25	16.9
31-40	8	5.4
Farm size (Ha)		
1-2	145	98
3-4	3	2
Access to credit		
Yes	11	7.4
No	137	92.6
Source of credit		
Commercial bank	4	2.7
Cooperatives	3	2
Friends	5	3.4
Relatives	1	0.7
Others	135	91.3
Extension		
No	1	0.7
Yes	147	99.3
Market		
No	-	-
Yes	148	100
Cooperatives		
No	86	56.8

Yes	64	43.2
Total	**148**	**100**

3.2 Factors Influencing Yam Production in the Study Area

Table 2 shows the result of linear regression functional model, the analysis revealed that age, gender and educational level of the sampled respondents were thefactors influencing yam production and significant at 5% probability level respectively.Education of the farmers is a significant factor influencing yam production; the more educated the farmers, the higher the chances of adoption of new innovation and technology in yam production.more so farming experience, fertilizer and chemical were also found to be significant factors influencing yam production and were significant at 10% probability level, the negative sign of the coefficient of chemical indicates thatas more chemical is applied for weeds control the higher the yield of yam and visa vis. The negativity and statistically significant sign of farm size indicated that farmers with larger farm sizes tended to have more propensities to adopt as compared to farmers with limited farm lands. In other words, as the size of farm holdings increased, the adoption of yam production technologies also tended to increase visa Vis. These results is in line with the findings of (Waziri et al, 2014)who opined that increase in farm size significantly influences the adoption of the yam misnisett technology. Also fertilizer, household size and capital were found to be the significant factors influencing yam production in the study area and were significant at 10%and 1% probability level respectively. The R^2 value 0.53 shows that 53% of the variation in dependent variable isexplained by the explanatory variables included in the model and the F-value of 3.14 is significant at 10% probability level.

Table2; Factors Influence Yam Production in the Study Area

Variable	Regressioncoefficient	Standard Error	T-Value
Constant	**-**693.121	**1**556.584	0.445*
Age	29.524	36.614	0.806**
Gender	765.681	837.916	0.914**
Education	233.563	213.10	1.093***
Farming Exp	8607.956	11910.338	0.723**
Farm Size	-85.448	162.308	-0.526
Fertilizer	6.905	3.181	2.171***
Chemical	-14.650	107.606	-0.13
Household Size	321.186	228.186	1.4036***
Capital	0.10	0.009	1.092***
F-Value	3.140		
R^2	0.53		
Adjusted R^2	0.404		

Note
* Significant **at** 1%
** Significant at 5%
*** Significant at 10%

3.3 Constraints Encountered by Yam Producers in the Study Area

Table3 revealed that majority 99.3% of the respondent identified inadequate capital as the major constraints militating against yam production in the study area. Non availability of credit to the farmers could limit adoption of yam production technologies in the study area, because the adoption of improved technology has cost implications. The result also revealed that 37.2% of the sampled respondents encountered lack of land availability as a problem while 6.8 encountered land as their major constraint. Also the result revealed that 96.6% identifies government policy as the major constraints while 3.4% of the respondent experience outbreak of diseases in their farms and 63.5% encountered inadequate transport facilities. The analysis also shows that 93.2% identified bad road as the major constraints while 51.4% had access to market and 48.6% could not have access to good market for their farm produce. Also the result shows that 95.9% of the respondent encountered availability of miniset as the major constraints militating against yam production in the study area. The result also shows that 66.2% of the sampled respondent identified lack of chemical as the major constraints while 5.7% of the respondents identified price of yam as the major problems militating against yam production. More so 98.6%, 98% and 99.3% identified high cost of input, lack of extension services and uneven scale and measure as the major constraints of yam production respectively while 85.8% of the respondent encountered poor source of agricultural information about new technology in yam production in the study area.

Table 3; Constraint Encountered by the Yam Producers in the Study Area

Variable	Frequency	Percentage
Inadequate Capital	147	99.3
Lack of land availability	93	62.8
Government Policy	71	48
Outbreak of Diseases	5	3.4
Unavailability of labour	8	5.4
Inadequate Transport	54	36.5
Bad Road	138	93.2
Inadequate market	72	48.6
Availability of miniset	142	95.9
Lack of chemical	98	66.2
Price of yam	73	49.3
Cost of input	146	98.6
Lack of extension	3	2
Uneven scale	74	50
High cost	147	99.3
Poor information	127	85.8
Total	**148**	**100**

IV. Recommendations

Based on the result of findings;

The study therefore recommends that, Public Private Partnership (PPP) should be explored by government so as to help the education of farmers with regard to new technology and innovations. More so, new management skills need to be addressed so as to minimize negative tendencies that are capable of aggravating inefficient use of resources. Government should ensure better funding of the extension service (i.e. workers) in the study area through more training through workshops and seminars, provision of mobility such as motorcycles and motivation so as to boost their productivity and to enable adequate and timely supervision by supervisors with a view to make them extend knowledge to farmers. Accessible, affordable and simple agricultural production machineries and equipment for planting yam minisett and harvesting should be provided so as to reduced the drudgery involved in yam production which will ultimately improve farmer's technical efficiency. Financial institutions and the private sector should be encouraged to establish cottage type processing facilities in the study area that will include storage and packaging facilities so as to add value to yam produced in order to meet both local and the export specification of yam product. Government, private sector and the Non-Governmental Organizations (NGOs) should sensitize the farmers more on the formation of cooperative groups so as to benefit from the Nigeria Incentive-based Risk Sharing System for Agricultural Lending (NIRSAL) and also to enable them benefit from loan from commercial, agricultural and rural cooperative banks.

V. Conclusion

The study therefore concludes that, several socio-economic characteristics of farmers in the study area such as age, gender, education, farming experience in the business, farm size, fertilizer, chemical among others influences yam production while problems such as; inadequate funds, unfavorable prices and low availability of labour, government policies, disease outbreak were among the major problems faced by the farmers in the study area.

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