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Determinants of Maize Framers' Productivity among Smallholder Farmers in Oyo State, Nigeria

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ABSTRACT

Smallholders farmer's productivity has be declining due to many problems ranging from declining soil fertility to lack of basic inputs for their production. Hence, this study examined the determinants of Maize farmers' productivity among smallholder Farmers in Oyo state Nigeria. A three stage sampling procedure was used to collect data from rural maize farmers in Lagelu Local Government area of Oyo state. Descriptive statistics, productivity analysis and Ordinary Least Square Regression Model were used to isolate the factors that affect maize farmers' productivity in the study area. The socio-economic characteristics of the respondents showed that majority of them are male (68.3%), the age distribution showed that 56.1% are between ages 41-60 years, a very good productive age for maize production. Majority of the respondents are married (86.6%), while only 4.9% are youths, an obvious albatross to maize production in Nigeria, with less youth population in farming. The distribution of the Total factor productivity (TFP) indicated that, 72(50.7%) of the respondents having TFP <1, 58(40.8%) having TFP 1.01-2.00, 09(6.3%) and 03(2.1%) having TFP>2 and TFP=1 respectively. The result of double log production function showed that the coefficients of labour, farm size (hectares) are statistically significant at 1% p>1, while that of farming experience is significant at 5% (p>5), with positives coefficients. The adjusted R-squared of 0.8572 explained the coefficient of variation of the maize farmers productivity model. It's recommended that farmers in the study area should be provided with tractors and other farm implements that can help increase their productivity, also increasing the farm size and land hectarage used for maize production should be prioritize. There is also the need to train the farmers adequately on new and improved farm practices; this will be like a boost to their experience in maize production.

1.0. INTRODUCTION

Agriculture in Nigeria as in most other developing countries is dominated by small farm producers (Oladeebo, 2004). Small holder farmers constitute about 80% of the farming population in Nigeria (Awoke and Okorji, 2004). These smallholder farmers though individually look insignificant but collectively form an important foundation upon which the Nigerian Agriculture rests. Several constraints and barriers, which appear insurmountable, limit the overall farming activities and if this is anything to go by, the destiny of the developing country heavily rest on the shoulder of the small producers. According to Awoke and Okorji (2004), small holder farmers are those farmers who produce on small scale, not involved in commercial agriculture but produce on subsistence level, and cultivate less than five hectares of land annually on the average. It is a known fact that over 12 million farmers, scattered in different ecological zones engage in the production of a wide variety of arable crops and this is done under traditional subsistence agriculture (Oluwatayo 2008), example of this is Maize which serve as a very important staple food for millions of Nigerians and residents of West Africa. Maize is one of the two major crops covering about 40% of the area under agricultural production, and its production accounts for 43% of Maize grown in West Africa (Smith *et al.*, 1997; Phillip, 2001; Iken and Amusa, 2004; McCann, 2005). Maize production therefore is of strategic importance for food security and the socio-economic stability of countries and sub regions in sub Saharan Africa, including Nigeria.

Productivity improvements particularly in developing countries have been found to be a powerful force in poverty reduction (De Janvry & Sadoulet, 2002). Higher productivity can be expected to lower food prices either at a national or global level, depending upon whether countries are open to trade in agricultural products. And such declines in prices can be expected to benefit consumers not involved in farming, and particularly the poorest, who spend around three-quarter of their income on staple foods(Cranfield *et al.* 2007).Increases in agricultural productivity lead also to agricultural growth and can help to alleviate poverty in poor and developing countries, where agriculture often employs the greatest portion of the population (OECD,2006). At the same time, food prices decrease and food supplies become more stable and labourers therefore have more money to spend on food as well as other products. This also leads to agricultural growth. People see that there is a greater opportunity to earn their living by farming and are attracted to agriculture either as owners of farms themselves or as labourers (OECD 2006 and 2007).

As productivity meets the potential yield, and poverty level is reduced to a greater extent, the percentage of employment generation will increase, food security will be guaranteed, there will be growth in the agricultural sector, basic infrastructures in rural areas will result in rural development of the farm settlements. Also, there will better storage facilities and means of transportation with value addition; investment diversification will also be an added advantage. A well-funded agricultural sector would not only ensure adequate provision of food to feed our ever increasing population and provide raw materials for industries, but would also provide for export purposes and increase the quantity of goods and services produced in the economy. The increased revenue so derived can be used in developing other important sectors of our economy, thus raising the living standard of the populace and boosting the economic prosperity of the nation. Commercial arable farming would also reduce the number of people engaged in agricultural production and make them available for other useful purposes that will generate more revenue for the economy (Oni 2009).

1.1. Problem Statement

Among various factors accounting for the low productivity of these farmers are, the use of obsolete cultural practices, scanty plant stands, poor weed control, non-usage of fertilizer, organic manures and other improved agricultural inputs including the management of the crop under degraded soil condition (FAO, 2003). Other factors and their consequences are climate change which results in poor and unpredictable yields, thereby making farmers more vulnerable, particularly in Africa (UNFCCC, 2007). Declining soil nutrients, that is, soil infertility which is as a result of soil erosion washes away the essential nutrients and particles of the soil that can fasten growth. Lack of access to credit by farmers make procurements of farm inputs to be impossible, as a result of this; farmers cannot meet up with the expected potential yield. Reduction in farm output is also caused by rural urban migration of vibrant individuals, which results in the absence of graduates who are expected to accept and adopt new innovations which can make farming a valuable occupation. When the rural farmers lack access to knowledge and information that would help them achieve maximum agricultural yield, they are not only grope in the dark but are driven to the urban centres in search of formal employment, as the only option for survival (Munyua, 2000). Irrigation Problems which is as a result of failing water management has made it difficult for farmers to meet up with the expected production increase.

Despite the economic importance of Maize to the teeming populace in Nigeria, it has not been produced to meet food and industrial needs of the country and this could be attributed to low productivity from Maize farms or that farmers have not adopted improved technologies for Maize production (Onuk *et al.,* 2010). Additionally, other factors like price fluctuation, diseases and pests, poor storage facilities have been associated with low Maize production in the country (Ojo, 2003). Hence, the following research questions will guide us in this study.

1.2. Research Questions

- What are the socio economic characteristics of Maize farmers in the study area?
- What is the level of productivity of Maize crop farmers in the study area?
- What are the determinants of farmers' productivity in the study area?

1.3. Justification for the Study

This study derives its justification from the fact that Maize is the world's most widely grown cereal, as it is grown in a range of agro-ecological environments. More Maize is produced annually than any other grain owing to the fact that it is cheaper than other cereals (such as rice and wheat) all parts of which can be used as food and non-food products (IITA 2009) which include basic ingredient for local drinks and food products, largely used as livestock feed and raw material for industrial products, the corn is separated to flour, corn, meal, grits and other products while in developing countries it is mainly used as food.

However, there has been a fluctuating trend in Maize production over the last decade, which threatens household food security and income sources (Ajah *et al*., 2012). To ensure that Maize is readily available for the immediate environment, the country at large and ensuring farmers poverty status are being reduced, socio-economic variables that influence the poverty status of farmers and how their productivity can be improved in order to ensure agricultural growth and development in Nigeria (mostly in the rural areas where we have 70% of her over 140 million involved in agriculture production (NBS/CBN, 2006)will be addressed in this study.

This study will therefore contribute to the existing knowledge on Maize farmer's productivity and their poverty status. It will help in formulating future strategies to improve Maize farmers productivity, increase productivity for effective economic development, achieve long run economic growth per person through increases in capital (factors that increase productivity), both human and physical, and technology, help in improving market reforms through good infrastructure, such as roads and information networks, loan small amounts of money to farmers or villages so these people can obtain the things they need to increase their economic rewards and ensure adequate food supplies, expand export crop production, produce raw materials for domestic industries and create rural employment opportunities. All of these will reduce farmers' poverty status and provide an easy reference for various researchers. It can also be useful for policy makers for future interventions and developmental strategy in the Maize sub-sector.

2.0. Literature Review

Abu (2016) examines the effect of fertilizer market liberalization on the productivity of maize and rural poverty reduction in Nigeria, using data envelope analysis (DEA) Malmquist index. Data were collected from 1990-1996 (pre-liberalization period) and 1997-2006 (liberalization period). The study was in line with several other studies in Sub-Saharan Africa (SSA) countries which have shown that fertilizer market liberalization has not stimulated increased crop yield, raised agricultural production or raised income of smallholder farmers. It is concluded that the liberalization of the fertilizer market did not accomplish the benefits expected from the process, that fertilizer market liberalization may not be appropriate for an economy that is dominated by millions of smallholder resource poor farmers. Consequently, improving access to fertilizer by re-introducing fertilizer subsidy targeted at smallholder resource poor farmers may not be out of place to enhance maize productivity in order to boost food security position, increase farmers' income and lighten poverty in rural households. An effective fertilizer distribution channel should be put in place to ensure that subsidized fertilizer gets to farmers as early as possible. (Adesiyan 2015) examined the performance of maize production in Osun state and the factors affecting maize production in Ilesa East and Ilesa west Local Government areas. Findings from the study showed that land used in hectares, labour in man-days, and quantity of fertilizer and level of education were significant factors affecting output of maize while quantity of maize seeds, herbicides and insecticides were negative and significant factors affecting maize output in the study area. Akerele (2012) examined the socio-economic determinants of maize production in Yewa North local government area of Ogun state. The results showed that 87.5 percent of the respondents were men who were involved in maize production than women (12.5 percent), with the modal age between 18-45 years. 66 percent of the respondents had formal education with the household size of 1-5 members. The findings also revealed some of the constraints encountered by the maize farmers to be lack of capital, inadequate land acquisition, bad roads, high transportation and lack of equipment to improve on maize production. It is therefore recommended that farmers should combine their inputs efficiently so as to give reasonable level of output and combat the problems militating against efficient maize production

Ammani *et al*., (2010) studied the effects of the liberalization of the Nigerian fertilizer sector, vis-à-vis the sustenance of the present dual fertilizer distribution arrangement, on maize production in Nigeria. Time series data was collected for the period 1990-2006. A multiple regression model was specified with aggregate fertilizer use, maize hectarage and a dummy variable designed to capture the effects of the changes induced by fertilizer liberalization measure, as explanatory variables. Aggregate maize output was the dependent variable. Results of this study indicated that

a significant decrease in aggregate maize production followed the Federal Government's liberalization of the fertilizer sector in 1997. The statistically significant decrease in Maize production is attributable to the statistically significant decrease in fertilizer use during the fertilizer liberalization period. The paper concluded that the sustenance of the present dual fertilizer distribution arrangement has a negative effect on maize production in Nigeria. Ezeaku *et al*., (2010) assessed scientifically the resource use efficiency of maize for future production optimization. Data from 2009/2011 maize production years and socio-economic (qualitative) data were collected from administered questionnaire on ninety farmers from three communities. Soil samples were analyzed for lithological similarity of the soils. Result showed that soil properties varied within the locations but were of similar lithology. Regression analysis showed that quadratic factorial form was best fitted with R2 = 92.0% and adjusted R2 = 91.4%. Yield increased by 0.17, 0.08 and 78.2 $Kgha^{-1}$ for every unit of seed, labour and land used. Maximum yield estimate ($2.34kgha^{-1}$) was obtained based on optimal levels of input. All the inputs showed decreasing returns to scale, except fertilizer. It was suggested that the need to reduce the use of variable inputs, which returns are less than the cost so as to increase present level of production profitability by the farmers. The scope of higher production lies in adequate availability of inputs. Educating and training the farming community to adopt innovative technology is important for efficient use and sustainable management of their farm soils and crops. Oyewo *et al*., (2014) studied the factors affecting maize production among farmers in Oluyole local government area of Oyo state, using Ordinary Least Square (OLS) regression model. The result shows that 58.6% of the farmers were male, and large percentage (76.8%) of the respondent had one form of formal education. 51.5% made use of hired labour. The output analysis showed that 53.4% of the farmers produce between 6-10 bags (50kg/bag) of maize. The coefficient of extension visit was positive and significant at 10% (p>0.001), labour was negative and significant at 10% (p>0.001), while that of bush burning, bush fallowing, zero tillage and herbicide usage were negative. They recommend that the extension workers should intensify farmer's enlightenment programme on farmland management and bush burning should be discouraged.

3.0. METHODOLOGY

3.1. Study Area: The study was carried out in Lagelu local government area, Ibadan, Oyo State, Nigeria. It is one of the local governments created by the Federal Military Government of Nigeria on 27th September, 1991. Its headquarters is Iyana-Offa. It has an area of $338km^2$ and a population of 147, 957 at the 2006 census (NIPOST, 2009). This geographical location is one of the local governments in Ibadan municipal under the Ibadan/Ibarapa agricultural zones, with Akinyele, Egbeda, Ona-Ara, Ibarapa North, Ibarapa Central and Ibarapa East, (Adeola and Ayoade, 2009) under the same zone. The vegetation is a derived Savannah zone and a low land rain-forest area. The zone experience both wet and dry season annually. The main occupation of the inhabitants is farming. Arable crops cultivating in the zone include maize, melon, soy-bean, cassava, cowpea, and yam, vegetables while tree crops are cocoa, oil palm and cashew, (Adeola and Ayoade, 2009) and they also engaged in trading and few others are in the civil service.

3.2. Sampling Technique: A three stage Sampling technique was used which involves random selection of 5 wards out of 14 wards based on which of the villages that major most in Maize production. Thirty (30) Maize farmers' each from the 5 wards were randomly chosen. Sample sizes of 142 respondents out of 150 copies of questionnaire administered were finally recovered for the study.

3.3. Methods of Data Collection: Data collection from the respondents was mainly through structured questionnaire. Information such as socio economic characteristics of the farmers, expenditure, information about their farm operation like farm size, average yield, ownership of the land, access to extension services, quantity of fertilizer used, quantity of maize seed planted, Membership of cooperative associations amongst others were asked.

3.1. Methods of Data Analysis

Total Factor Productivity

The equation was used to assess the level of Maize farmers' productivity in the study area. The equation is stated as:

$$\textit{Total Factor Productivity} = \frac{Value\ of\ total\ output}{Value\ of\ total\ input} \ldots\ldots (1)$$

Double Logarithm Regression Model: Double Logarithm form is a functional form in which variables are transformed using the natural logarithm transformation. Double log means the dependent and all independent variables are all logged. It can also be called log-log form or specification. The double logarithm function model was used to examine the factors affecting output of Maize farmers' in the study area. The model is stated thus:

$$LnY = \beta_0 + \beta_1 LnX_1 + \beta_2 LnX_2 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + \beta_6 LnX_6 + \mu i (2)$$

Where,

Y = (Farmers Productivity = output in kg)
The explanatory variables include:
X_1 = labour in mondays (family labour = 0, if otherwise 1)
X_2 = farm size (hectares)
X_3 = agro chemicals (kg)
X_4 = fertilizer (kg)
X_5 = seeds (kg)
X_6 = farming experience (in years)

β_i = vector of parameters to be estimated
μ_i = error term

4.0. Presentation of Results and Discussions

4.1. Socio-economic Characteristics of the Respondents

Table (i) below shows the socio-economic characteristics of the respondents. About 56.1% of the farmers fall between age range 41-60years which has the highest percentage while those in the age range 21-40years had the least percentage of 16.9% which means that the age range between 41-60years is the dominant age of farmers in the study area. The mean age of all the respondents interviewed was 52 years which implies that majority of these farmers are still in their active years and can be productive with the minimum age of respondents being 25years while the maximum age of respondents is 80years. The gender distribution shows that 68.3% of the farmers were male while 31.7% of the farmers were females. It shows that majority of the farmers are men and shows that female participation is becoming significant in farming. The distribution of the households by marital status shows that 4.9% of the respondents were single, while the remaining 95.1% were married out of which 86.6% were married. (Ajah and Nmadu 2012, also did a study where 86.25% were married, 2.1% were once married and divorced, 5.6% and 0.7 were also once married but have lost either of the spouse and separated respectively). The above table also shows that greater percentages of the farmers were married and this could be attributed to the fact that married farmers are more experienced in terms of adopting land use technique when compared to their single counterpart (Yusuf *et al.,* 2011).The study also found out that 68.3% of the respondents are married to only one partner while 31.7% of the respondents are married to more than one partner. The household size of between 1-6 has the highest percentage of 52.1 members while household with 1-6 members has 52.1% with 13 and above members has the lowest percentage of 5.0%. The mean value of the household sizes is approximately 7, while the highest number is 16 members and the lowest is 1 member. The education distribution of the respondents shows that 21.1% of the respondents had no formal educational while only 3.5% had post -secondary education. The highest number of respondents (47.2%) had secondary education. It appears the level of illiteracy in the study area is not high. With the majority of the respondents having a form of education from primary education to tertiary education, the respondents are expected to be able to adopt improved technologies when introduced, with little supervision compared to those with no formal education. This is because the education level is assumed to influence the productivity level of the farmers. 28.2% of these respondents also had primary education. Number of years in farming implies the respondent's years of experience in their occupation (i.e. farming). The respondents that have between 11 to 20 years of farming experience are on the higher side with a percentage of about 53.5%. This indicates that most of the farmers have been practicing farming for long and these accumulated years of experience may help farmers in identifying farming practices that are most suitable for them. This also leads to a higher level of productivity compared to the respondents having lesser number of years, an indication that they had enough farming experience to enhance maize production. Since experience is the best teacher, it is correct to say that the more experience a farmer acquires over the years, the more the farmer can allocate scarce resources in order to avert risk and increase maize production. The average number of years in farming in the study area is approximately 20.8 years which is almost the same with the work of Oyekale and Idjesa 2009 and Ajah and Nmadu, 2012 with 20 years and 21years respectively as the average years of farming experience in their study area. The highest number of years in farming in the study area is 65 years and the lowest highest number of years in farming in the study area is 2 years. The farm size distribution of the respondents shows that 48.2% of the respondents cultivate less than 1 hectare while the remaining 51.8% cultivate above 1 hectare of farmland. The average farmland cultivated is approximately 1.2 hectares (3 acres). The small farm size cultivated can result in the yield/output being small thereby affecting the level of productivity and also their income. On land ownership, 76% of the respondents own the land used for farming while 23.9% pay for the land used in farming. This could also have effect on productivity level, as rent is saved and used for either other household needs or investments or to buy more inputs or pay for technology adoption which will help in increasing the output of the farmers. Land owners can also use their lands as collateral for credit facilities. About 80.3% of the respondents have farming activities as their primary occupation, 7% are into trading, 5.6% are civil servant while 7% are also artisans. Also, it was revealed that 62% of the respondents belong to one farmer's association while 38% of the respondents do not belong to any farmer's association. One of the benefits of belonging to farmer's association is that information on improved technology is easily disseminated among them. It could also serve as a forum where farmers borrow money.

Table (i) Socio-economic Distribution of the Respondents

Gender	Frequency	Percentage (%)
Female	45	31.7
Male	97	68.3
Age		
21-40	24	16.9
41-60	80	56.1
Above 60	38	27.0
Marital Status		
Single	07	4.9
Married	123	86.6
Divorced	03	2.1
Separated	01	0.7
Widowed	08	5.6
Household Size		
1-6	74	52.1
7-12	61	42.9
13 and above	07	5.0
Educational Status		
No formal Education	30	21.1
Primary	40	28.2
Secondary	67	47.2
Tertiary	05	3.5
Farming Experience		
1-20	89	62.6
21-40	39	27.5
41 and above	14	9.9
Farm Size		
Less than 1 hectare	69	48.2
Less than 2 hectare	39	27.7
Less than 3 hectare	23	16.3
Less than 4 hectare	06	4.3
Less than 5 hectare	05	3.5
Land Ownership		
Personal land	108	76.1
Hired or leasehold	34	23.9
Primary Occupation		
Farming	114	80.3
Trading	10	7.0
Civil servant	08	5.6
Artisan	10	7.0
Membership of Association		
Yes		
No	88	62.0
Total	54	38.0
	142	100

Distribution of Respondents by Households Expenditure

Table (ii) below shows the expenditure distribution of the respondents. This explains that 45.1% of the farmers spend between ₦100,000 and ₦200,000 in a year, while 16.5% spend less than ₦100,000 and only 7.5% spend greater than ₦400,000 per year. The average expenditure spent by these farmers was approximately ₦178,063.18.

Table (ii) Distribution of Respondents by Expenditure

Expenditure (₦)	Frequency	Percentage (%)
Less than 100,000	22	16.5
100,000-200,000	60	45.1
200,001-300,000	29	21.8
300,001-400,000	12	9.0
Greater than 400,000	10	7.5
Total	133	100.0

Source: Field Survey 2013

Distribution of Respondents by Level of Maize Farmers' Productivity

As indicated in table (iii), the lowest value of total factor productivity change is 0 and the highest is 3.82 among 142 farmers. The latter value showed that this particular farmer has an extra 2.82 unit of output which could be as a result of efficient use of inputs available such as improved seed, access to extension services, use of agrochemicals and fertilizer in the right quantity and so on. In assessing the level of productivity of the farmers, the table below shows that 50.7% of the respondents have low level of productivity which indicates that one unit of input used results in less than one unit of output produced. About 2.1% of the respondents break even in their productivity, that is, they are neither loosing nor gaining. 40.8% have more than 0.01 extra unit of output while 6.3% of the respondents have more than 2 units of extra unit of output. The implication of the group that has more than 0.01 is that they have extra output which can help in expanding their production capacity, thereby increasing their income and also give them opportunity to save for the future.

Table (iii) Total Factor Productivity Distribution of Respondents

Total Factor Productivity	Frequency	Percentage (%)
TFP< 1.00	72	50.7
TFP= 1.00	3	2.1
TFP=1.01 -2.00	58	40.8
TFP>2	9	6.3
Total	142	100.0

Source: Field Survey 2013.

Distribution of Respondents by Total Factor Productivity Distribution based on Gender

Table (iv) shows the total factor productivity distribution based on Gender. In comparing the Gender that has high level of productivity with low level of productivity among respondents, the study found out that male farmers have higher productivity at all levels (TFP<1, TFP=1 and TFP= 1.01-2.00) as indicated in table iv below. This shows that the male farmers have more energy in carrying out their farm operation than the female Maize farmers, which are generally refer to as weaker sex.

Table (iv) Total Factor Productivity Distribution of Respondents based on Gender

Gender	TFP<1	TFP=1	TFP=1.01-2.00	TFP>2	Total Freq.
Female	18	0	26	1	45
Male	54	3	32	8	97
Total	**72**	**3**	**58**	**9**	**142**

Source: Field Survey 2013.

Distribution of Respondents by Total Factor Productivity Distribution based on Age

Table (v) shows that farmers of age above 60years have more low level of productivity than other lower age ranges. This may be due to old age where they have little or no energy for strenuous farm activities like clearing and weeding. The farmers in their active years of 41-50 are on the higher side in terms of extra unit of output produced compared to other age ranges. Farmers between the age ranges 21 to 40 have no extra unit greater than 2. None of the farmers between the ages 31 to 60 breaks even, they either had a lower unit of output produced or a higher level of output produced implying low level of productivity and high level of productivity respectively. Few farmers above 60 years of age have a more unit of output relative to a given level of input which may be due to long years of

experience in farming, for this reason they have improved over the years.

.**Table (v) Total Factor Productivity Distribution of Respondents based on Age**

Age (years)	TFP<1	TFP=1	TFP=1.01-2.00	TFP>2	Total
21-40	12	2	10	0	24
41-60	38	0	38	4	80
Above 60	22	1	10	5	38
Total	**72**	**3**	**58**	**9**	**142**

Determinants of Maize Farmers Productivity in Oyo State, Nigeria

Table (vi) presents the results of Double Logarithm Regression Analysis showing relationships between farmer's socio-economic characteristics and Maize output. The results in the table showed that years of farming experience, labour and Farm size in hectares were the major socioeconomic factors that significantly influenced maize output at 1%. The R-squared of 0.8633 indicated that the variables accounted for 86.33 percent of the variation in Maize output. All the variables in the model had positive coefficient indicating their direct relationship between the inputs and the outputs used in Maize production. The coefficient of farming experience indicated that the number of years of farming experience was a significant factor and it is positively related to Maize output. By implication, an additional year of experience in farming increased the output of a Maize farmer by approximately 16.8kg. The positive sign is in accordance to a priori expectations because it was expected that the more experience a farmer acquire over the years, the more competent the farmer will be in farm management activities that will result in increased output. Okoye *et al.,*(2009) considered that more experienced farmers were more efficient in their decision-making processes and were more willing to take risks associated with the adoption of innovation. Similarly, Adah, Olukosi, Ahmed, and Balogun (2007) stated that the greater the years of farming experience, the greater the farmer's ability to manage general and specific factors that affect the business. Hence, the farmer will be in a better position to invest wisely. The study shows that labour is one of the determinants of maize farmers' productivity. An increase in labour should lead to increase in maize output as there will be more hands on the farm to work especially when the labour type is family. This family labour tends to contribute to the low cost of labour being spent on farming activities, but in cases where we have more labourers coupled with high cost of labour, the farmer may tend to incur more cost on labour and thereby not having a good yield as expected, spending more money on labour than other farming activities. In this study, the labour follows the expected positive sign meaning that an increase in labour will lead to an increase in maize output. In the work of Asiribo *et al.,* 2009, labour was significant with a positive sign. Farm size in hectares may either have a positive or negative sign. When it has a positive sign it implies that the more land a farmer has maize seed to plant on, the more the expected output compared to when a farmer has a small land area. On the other hand, when it has a negative sign, it may mean that the whole land is not used for Maize production; other activities are going on, on the farmland. The farm size is significant and positively related to Maize output. The sign of the coefficient suggested that an additional hectare cultivated by a maize farmer would increase output by 45.14kg. This result disagrees with what Nmadu and Ibiejemite (2007) arrived at that area of land cultivated did not significantly increase farm output. In this study, quantity of seed used, fertilizer and agrochemicals were not significant but have the expected positive signs. The insignificance of these factors could be because farmers lack the technical know-how on how to apply these inputs adequately and rightly (especially fertilizer and agrochemicals) to their farming activities or operations. Awotide *et al.*, (2008) also observed that seed input limited maize output. Agrochemicals such as herbicides, pesticides and insecticides have shown not to be significant but have a positive relationship. This positive relationship implies that when farmers use agrochemicals appropriately with the knowledge acquired from extension agents and through field or off farm demonstration (by extension personnel), it reduces the population of weeds, insects and pests to the barest minimum both on the farm land and in the storage houses, thus bringing about a higher yield for the farmer. Seed quantity with the positive sign explains that the more seeds used on farmland, the more yield is expected, except the seeds are not viable. In cases where the seeds are hybrid seeds, the yield is usually more. Also, the quantity of fertilizer used was positive and statistically insignificant. This insignificance of this factor negates Ibrahim *et al.,*(2008) and Onyenweaku and Effion's study conducted in 2008 and 2005 respectively. Here, the positive sign also implies that an increase in the quantity of fertilizer used will lead to more maize output that is an output of maize increased with an increase in fertilizer application.

In assessing the level of farmers' productivity, the study shows the distribution of the Total factor productivity (TFP) indicated that, 72(50.7%) of the respondents having TFP <1, 58(40.8%) having TFP 1.01-2.00, 09(6.3%) and 03(2.1%) having TFP>2 and TFP=1 respectively. The distribution of TFP on gender basis indicated that male respondents have high productivities percentage of 54%, 3%, 32% and 8% with the female respondents having 18%, 0%, 26%,

and 1% respectively across the TFP level of TFP<1, TFP=1, TFP=1.01-2.00 and TFP>2 respectively. The age distribution of TFP showed that 12%, 2%, 10% and 0% for age between 21-40years, 38%, 0%, 38% and 4% between the age 41-60years and 22%,1%.10% and 5% for above 60 years of the respondents at TFP level of TFP<1, TFP=1, TFP=1.01-2.00 and TFP>2 respectively. The result of double log production function showed that the coefficients of labour, farm size (hectares) are statistically significant at 1% p>1, while that of farming experience is significant at 5% (p>5), with positives coefficients. The R and adjusted R-squared was 0.8633 and 0.8572 respectively, indicating that 85.72% of the maize farmers' resources were used for productive farm activities.

Table (vi) Result of the Double Logarithm Production Function Analysis of Maize Output

Variables	Coefficient	Standard error	P>/t/
Constant	0.1214	0.3278	0.711
Labour	0.6796	0.4081	0.000***
Farm Size (Hectares)	0.4514	0.7363	0.000***
Agrochemicals	0.0473	0.0585	0.421
Fertilizer	0.0437	0.0350	0.216
Seed Quantity	0.0684	0.0529	0.198
Farming Experience	0.1681	0.0620	0.008**

Source: Field Survey 2013. *, ** and *** Sig 1%, 5% and 10% respectively. R-Squared=0.8633, Adjusted R-Squared=0.8572

CONCLUSION AND RECOMMENDATIONS

It's an obvious fact that maize farmers' productivity has been declining despite many intervention programs from the government and Non-governmental agencies. This declining productivity has contributed greatly to the country's food insecurity. This study was able to identify various factors that culminate in low maize production and productivity in Nigeria. It is against this background that the study recommended that farmers in the study area should be provided with tractors and other farm implements that can help increase their productivity, also increasing the farm size and land hectarage used for maize production should be of priority. The land can be tilled together within their cooperative groups and share among themselves. There is also the need to train the farmers adequately on new and improved farm practices; this will boost their experience in maize production.

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