NET FARM INCOME ANALYSIS OF MAIZE PRODUCTION IN GWAGWALADA AREA COUNCIL OF FEDERAL CAPITAL TERRITORY, NIGERIA.

BY

*[1]Alabi, O.O; [2]Coker, A.A.A; and [1]Idegbesor, M.E

[1] Department of Agricultural-Economics and Extension, Faculty of Agriculture, University of Abuja, P.M.B 117 Abuja, Federal Capital Territory, Nigeria.

[2]Department of Agricultural Economics and Extension Technology, Federal University of Technology, Minna, P.M.B. 65, Minna, Niger-State

* E-mails for correspondence: omotayoalabi@yahoo.com; senatorake@yahoo.com

ABSTRACT

This study examined net farm income of maize production in Gwagwalada Area Council of Federal Capital Territory. The specific objectives are to: identify the socio-economic characteristics of maize farmers in the study area, evaluate the costs and returns of maize production in the study area, and evaluate factors affecting net farm income of maize production in the study area. A simple random sampling technique was used to obtain samples of 120 maize farmers. Primary data were used for this study. The data were collected using structured questionnaire. The data were analyzed using descriptive statistics, farm budgeting technique and econometric multiple regression analysis. The result shows that 95 percent of sampled farmers are males. About 83 percent of sampled maize farmer's age is less than 55 year, while, 96 percent are married. Econometric multiple regression analysis revealed that marital status; level of education and F-value were significant at 1% probability level. The Coefficient of Multiple Determinations implies that 22.3% of the independent variables included in the model jointly explain the variations in dependent variable. Estimated costs and returns analysis revealed a net farm income of ₦937, 656 per annum which shows that maize production in the study area is profitable. From the findings, it is suggested that agricultural extension agents should educate farmers on the need to be involved in agricultural activities especially on technologies that can improve maize production.

Key words: Maize, Net Farm Income

http://dx.doi.org/10.4314/joafss.v11i1.16

INTRODUCTION

Background of the Study

Maize (*Zea mays)* is a member of the grass family *gramineae*. It originated from South and Central America. Maize was introduced to West Africa by the Portuguese in the 10th Century. Maize is one of the most important grains in Nigeria, not only on the basis of the number of those engaged in its cultivation, but also its economic value. Maize is a major important cereal being cultivated in the rainforest and the derived savannah zones of Nigeria. Maize has been in the diet of Nigerians for centuries. It started as a subsistence crop and has gradually become a more important crop. Maize has now risen to be commercial crop on which many agro-based industries depend on for raw materials (Iken and Amusa, 2004). Maize is the most important cereal in the World after wheat and rice with regard to cultivation areas and total production (Purseglove, 1992; Osagie and Eka, 1998). Maize can be classified according to the structure of the grain. We have sweet corn, flint corn, dent corn, soft or flour corn and pop corn. Also, there are different varieties like western yellow 1096BP6 (yellow), NS – 1 (yellow) Tsolo (yellow) N.S. 5 (white), TZPB (white). According to IITA (2001) report, maize contains 80 percent carbohydrate, 10 percent protein, 3.5 percent fibre and 2

percent minerals. Iron and vitamin B are also present in maize. Africans consume maize as a starch base in wide variety of porridges, pastes, grits and beer. Green maize (fresh on the cob) is eaten parched, baked, roasted or boiled and plays an important role in filling the hunger gap after the dry season (Iken *et al.*,2002).Maize is a staple food crop for most sub-Saharan Africans of which Nigeria is inclusive with per capital Kg/year of 40 (FAOSTAT, 2003). In Nigeria maize is the third most important cereal crop after sorghum and millet (Ojo, 2000). The demand for maize as a result of various domestic uses shows that a domestic demand of 3.5 million metric tonnes outstrips supply production of 2 million metric tonnes (Akande, 1994). Maize is becoming the miracle seed for Nigeria's agricultural and economic development. It has established itself as a very significant component of the farming system and determines the cropping pattern of the predominantly peasant farmers, especially in the Northern States (Ahmed, 1996). Maize has been of great importance in providing food for man, feed for livestock and raw materials for some agro-based industries. Maize constitutes a staple food in many regions of the world.

In Nigeria, about 80% of maize is consumed by man and animals, while 20% is utilized in variety of industries process for production of starch, oil high fructose, corn sweetener, ethanol, cereal and alkaline. Maize consists of 71% starch, 9% protein and 4% oil in a dry matter weight basis. The ability of the Nigerian agriculture to perform its role in agricultural development according to Ogunsumi *et al.* (2005) has been on decline in the last three decades. Hence the Nigerian government adopted different agricultural programmes and policies aimed at raising productivity and efficiency of agricultural sector such as Agricultural Transformation Agenda Policy(ATA), Nigeria Incentive Based Risk Sharing System for Agricultural Lending(NIRSAL), Commodity Value Chains (CVC). These programs and policies placed the smallholder farmers in central focus.

Problem Statement

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. This could be attributed to low productivity from maize farms or farmers have not adopted improved technologies for maize production. These factors play a major role in the adoption process. A number of studies have conducted concerning the economics of maize production including costs and returns (Hossain, 1990; BARI, 1988 and BARI, 1980). However, no study is conducted on the profitability of maize and maize-based cropping pattern compared to competitive crop Boro-rice and Boro rice-based cropping pattern at farm level. In view of the above stated facts, the present study was undertaken with the overall objectives to characterize maize production system, estimate the profitability and identify and analyze the constraints and opportunities for the higher production of maize and maize-based cropping patterns (Hassan, 2008).

This study intends to provide answers to the following research questions:

(i) What are the socio-economic characteristics of maize farmers in the study area?

(ii) What are the costs and returns associated with maize production in the study area?

(iii) What are the factors influencing net farm income of maize producers in the study area?

Objectives of the Study

The broad objective of the study is to examine the net farm income of maize production in Gwagwalada Area Council of Federal Capital Territory. The specific objectives are to:

(i) identify the socio-economic characteristics of maize farmers in the study area;
(ii) evaluate the costs and returns of maize production in the study area; and
(iii) determine factors influencing net farm income of maize production in the study area.

Literature Review and Conceptual Framework

Maize (*Zea mays* L.) belongs to the family *gramineae* and genus *zea* growing between Latitudes 50°N and 10°S of the Equator (Ogunsimi *et al.*, 2002). According to Obi (1991) and Nwere (1998), maize or corn originated in the Western hemisphere, possibly the Americas, but now cultivated in many parts of Africa, Europe and Asia. Maize production and supply in Nigeria has not met the demand of the citizens despite the paucity of improved production packages and consequent follow-up by the extension agents. According to Central Bank of Nigeria, CBN (1997), there has been a persistent lag in the domestic production of grains in Nigeria. Maize is one of the most widely distributed of the World's food plants. It production holds a special position in the agriculture of the United States of America where it is the second most important crop, comprising of about 25% of the total crop land. In Nigeria, maize is ranked fourth after millet, sorghum and rice (Obi, 1991, Nwere, 1998). Maize is one of the major food staples especially in the developing nations. In some places, it may account for 80 – 90% of the total caloric intake of the rural population, though it has low protein and vitamins content (Ejidike, 2001). In Nigeria, products from maize include: pap (ogi or akamu), maize gel (eko), moin-moin, porridge among others. Industrially, maize can be made into cornflakes, cerelac, biscuits, snacks, ice cream, cookies, etc. The high starch content of maize satisfies the energy or caloric requirements of people consuming it. Maize is the second most common cereal food crop after rice and is produced largely in the Northern Guinea Savanna of Nigeria. The major domestic markets for maize are located at Dawanau in Kano, Dandume and Jibia in Katsina, Giwa in Kaduna, Shinkafi and Talata Mafara in Zamfara, Bodija in Ibadan, Ose at Onitsha and Mile 12 in Lagos. Nigerian maize also filters into international markets such as Niger, Chad, Mali, Benin Republic and some other countries in the West African sub-region (ASCE, 2008). Maize is widely consumed as a staple food by poor rural and urban households, providing carbohydrate, vitamins and relatively small amount of protein to human beings and livestock as well. It also provides livelihood for many urban poor household; particularly women and children engaging in hawking fresh maize in boiled or roasted form. More than 60 percent of the Nigerian's production of maize is consumed by the industrial sector for production of flour, animal feeds, biscuits, beverages, malt drink, beer, cornflakes, starch, syrup and dextrose (ASCE, 2008). The ban on importation of cereals by the Federal Government of Nigeria since 1986 has greatly expanded these latter uses and thus overall demand for maize (Ahmed and Rikko, 2005).

Utilization of Maize

Maize is one of the most important food grains in the world. It is the highest yielding grain crop with multiple uses for food and industrial purposes. Maize is one of the most important crops in Nigeria. Owing to the suitability of the Northern Guinea Savannah

ecological zone of Nigeria, there has being rapid expansion in the production of maize and its uses are equally increasing (Odojoma, 1990). Its production is expanding just as its uses are equally increasing. There are three major end users of maize grains, the rural dwellers, the urban populace and the industries. These three complement one another in maize demand by all sectors. Maize has been put to a wider range of uses than any other cereal in the industrial sector because of its broad distribution, its diverse grain types and its wide range of biological and industrial properties. It can be used as human food, as fodder crop and for industrial purposes (Shaib *et al.*, 1997).In Africa, more than half of all maize is utilized directly as human food. The commercial value of grain is the greatest in the developing world compared to other cereal grains (Walton, 1999). Maize contributes 15 percent (more than 50 million tonnes) of protein and 19 percent of the calories derived from food crops in the World's diet. For twenty developing countries, mainly in Latin America and Africa, maize is the single largest source of calories for the poor and is a primary weaning food. Per capital demand for maize will continue to rise in sub-Sahara Africa where it is the dominant food grain. Elsewhere, decline in demand for food maize is offset by dramatic increases in demand for feed maize and other industrial uses (Ado, 1999). Growth in maize utilization has been driven by the rapidity increasing demand for maize as livestock feed and industrial food and non-food products. Direct food uses of maize tend to decline as per capital income, milk, meat and egg consumption increases. The demand for maize as livestock feed in Nigeria for the past two decades has been on the increase. This could be adduced to the fact that food consumption patterns have changed leading to a sharp increase in demand for livestock and poultry products and consequently, leading to increase in demand for maize by the livestock feed industries (Islam and Kaul, 1986). There are several questions relating to the industrial demand for maize. The first is the expenditure on maize purchase by the industries which is of importance in the market development. The second is the effect of changes in the prize of maize based on the industrial demand. Maize demand by industry is a derived demand and so the assumption is a constant margin in transforming maize into primary demand.

Maize (*Zea mays*) is the third most important cereal grain after wheat and rice, providing nutrient for humans and animals and serving as a basic raw materials for the production of starch, alcoholic beverages, food sweeteners and more recently fuel (FAO, 1992). Maize is potentially attractive raw materials for feed, food, fuel and industry (Hallgreen *et al.*, 1992). Maize can be malted and used for the production of traditional African beer or in a mixture with a precooked or extruded cereals for weaning food (Reichert, 1982). There is the need for a more detailed understanding of industrial demand and supply for maize, millet for planning of the economy. Kormawa and Aiyedun (1999) emphasized the need to investigate and analyze the food grain industrial demand. Koleoso and Olatunji (1992) reported that maize are currently used as adjuncts in virtually all Nigerian breweries, level range from 25% to 50%. Subrahamanian *et al.* (1992) said that the possibilities of snack food for maize are excellent, since such products have long shelf life. Maize has found wide application in the pharmaceutical industry. The most commonly usage is in the tabulated products where it serves as a base carrying the active ingredient (Abubakar, 2000). Maize starch because of its relatively low cost has found usage as a raw material in dextrose producing industries. Glucose powder and syrup industries often use maize starch as an adjunct or main raw material in the production of glucose powder and various glucose syrups of varying dextrose equivalent values (IITA, 1996). Utilization of maize by commercial industries to produce breakfast cereals, baby foods, baked goods, beverages and starch

product is increasing, providing more diverse market for sorghum, maize and millet farmers. The principal food product from wet milling of maize is corn oil (Inglett, 1970; Watson and Rainstad, 1992; Watson, 1992). By-products are used for livestock feed and other applications. Corn starch is used primarily to thicken and stabilize other ingredients. Baking powder, prepared mixes, candies, baking goods and pudding require starch products. Paper and textile industries utilize starch. The greatest use of corn syrup is in confectionaries, baked foods, table syrup, fountain syrups, sweet beverages, catsup, pickles and other condiments. The largest single food use for dextrose is in baked goods where it serves as a yeast nutrient, provides some sweetness and causes crust browning (Okoruwa, 1992). Other major uses of dextrose are in confectionary manufacturing, canning and frozen packs, catsup, jams, jellies, soft drinks, wines and malt liquors. Corn oil is also used as carriers for vitamins and the medicinal. The primary products derived from dry milling of maize are maize meal, flour and maize grifts. Other products are oil and by-products for animal feed (Okoruwa, 1992).

Sustainable Maize Production in Nigeria

In Nigeria, efforts to improve and sustain maize technologies have met with some success, as improved maize varieties are now grown in most areas of Northern Nigeria and in appreciable quantity across other agro ecological zones of Southern Nigeria. Nigeria has been somewhere in between two extremes (Olarinde and Manyong, 2007) of the miserable maize production performance in the Africa's regions between 1982 and 1997 and the impressive maize yield growth rates of approximately 3 percent annually as they achieved between 1967 and 1982. She experienced severe negative growth in maize yields of -1.1 percent between 1982 and 1990, but with growth rebounding somewhat annually between 1990 and 1997. The remarkable disjuncture between research efforts and technological diffusion on the one hand and yield performance on the other indicates that technological development has not been the main factor behind short-term maize yield trend. This sluggish yield response has been blamed on some factors (Olarinde and Manyong, 2007), among which is limited adoption of complementary inputs such as fertilizer and other soil fertility-related practices to accompany new seed varieties. These factors have all played out in an environment characterized by frequent intense conflicts, and weak institutional arrangements. A summary of literature on sustainable maize production in Nigeria shows that most of the problems militating against the consistent expansion of the maize programme are being seriously addressed (Olarinde and Manyong, 2007). Efforts in this regard include some viable agricultural policy instruments. However, the somewhat negative perception and of course risk attitudes of maize producers in Nigeria (Olarinde and Manyong, 2007) towards crop technology has increased in the last decade, indicating why the various policy initiatives of the government may not result in any commensurate agricultural and economic gains. In effect, if maize policies arising from the various technologies and of course the Nigeria's rural development initiatives are going to be effective, they need to be tailored towards the risk attitudes of particular categories of farmers.

Package of Practices for Maize Production

Since 2005, MARKETS – Maximizing Agricultural Revenues and Key Enterprises in Targeted Sites – has been expanding economic opportunities in the agricultural sector by increasing jobs, sales and investment for farm and non-farm agricultural businesses. By promoting commercial agriculture, improved productivity, value-added processing and

expanding final product markets, MARKETS is having an impact on improving rural household livelihoods and reducing poverty (USAID, 2010).

Nigeria has an annual maize production in excess of 7 million metric tonnes (USAID, 2010). Maize will continue to play a large and important role in Nigeria's food production. Maize has several advantages to other crops;

(i) It is a major source of energy and of all cereals gives the highest yield per man hour invested

(ii) It is usually the first crop to be harvested for food during the hunger period.

(iii) It is easy to grow as sole crop or intercropped with other crops and

(iv) It is easy to harvest; it does not shatter and is not liable to bird damage. It industrial demand is also increasing particularly in the food, beverage and livestock feed industries.

Many maize technologies have been developed in national and international research stations but most of these are yet to be adopted by farmers. High quality seed is in short supply because the seed sector is not adequately organized. Farmer also needs improved access to fertilizers, crop protection products and other inputs (USAID, 2010).

MARKETS are addressing these concerns through an integrated approach to developing a sustainable and effective maize value chain. The approach includes the provision of technical assistance to producers through the adoption of improved practices, facilitation of access to credit and inputs, improvement in value addition and linkages to markets (USAID, 2010).

METHODOLOGY

The Study Area

This study was conducted in Gwagwalada Area Council Abuja, Federal Capital Territory (FCT). Abuja shares boundaries with Kaduna State in the North, in the west by Niger State, in the south-east by Nasarawa State and in the south west by Kogi State. Gwagwalada is located on the south west border of Abuja and shares boundaries with Kuje and Kwali to the east and south respectively and Madalla in Niger State. Gwagwalada is geographically located within Latitude 07.1°.59"E and Longitudes 08.16° and 09.56"N.The area is characterized by wet and dry season. The wet season is between May – October and the dry season between November – April with an average temperature of 27 – 36°C and average rainfall of 1,000 – 1600mm per annual. It is predominantly a grass savannah region and it has potentials to produce both forest root crops and tuber crops. It also produces legumes, seeds and nuts, fruits, vegetables, grains (maize) and livestock. 60% of the economic activities of the Gwagwalada indigenes are farmers with a population of about 157,770 people (NPC, 2006). Gwagwalada is divided into six blocks which are Dagiri, Zuba, Dukpa, Giri, Dobi and Gwagwalada metropolis, this is the basis of this study.

Sampling Techniques and Sample Size

A simple random sampling technique was used to obtain samples of one hundred and twenty (120) maize farmers. In the study area, twenty (20) farmers each were randomly sampled from each of the six blocks to give a total of 120 sampled farmers.

Methods of Data Collection

Primary data were used to collect data for the study. The data collected were based on the 2011 cropping season. Data were collected through the use of structured questionnaire and were administered to one hundred and twenty (120) maize farmers in the study area. The information collected from the farmers was based on the socio-economic characteristics of maize farmers in the study area such as age. Information was also collected on the costs and returns of maize production such as price of maize (bags), output (Kg) sold and total variable costs incurred and the factors affecting net farm income of maize production in the study area.

Method of Data Analysis

The following analytical tools were used to achieve stated objectives:

(1) Descriptive Statistics
(2) Farm Budgeting Technique
(3) Econometric Multiple Regression Analysis.

Descriptive Statistics

This involves the use of mean, median, frequent-distribution tables. This was used to analyze the socio-economic characteristics of sampled maize farmers. This was used to achieve specific objectives one (1).

Farm Budgeting Technique

The farm budgeting technique was employed in examining the profitability (costs and returns) of maize production in the study area. To assess the costs and returns of maize production, the gross margin formula is explicitly stated as:

$$GM = \sum(P_{ij}Q_{ij} - r_{ij}\,X_{ij})$$

GM = Gross Margin (₦/kg)
P_{ij} = Price of maize for jth respondent
Q_{ij} = Quantity of maize for jth respondent
r_{ij} = Price of variable input in maize for jth respondent
X_{ij} = Quantity of variable input in maize for jth respondent

Farm budgeting model was used to achieve specific objective two (2).

Econometrics Multiple Regression Analysis

This was used to determine the extent to which factors used explained the variability in net farm income of maize producers in the study area. The model in its general form is implicitly stated as:

$$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, U_i)$$

Y = Net Farm Income of maize producers in Naira (₦)
X_1 = Age of farmers (Years)
X_2 = Farming experience of farmers (Years)
X_3 = Educational level (Years)
X_4 = Farm size (Hectare)
X_5 = Household size (Member per household)
X_6 = Access to credit (1= Access; 0= Otherwise)
X_7 = Marital status (1=Married; 0=Single)

U_i = Error term

To estimate the production function, the linear, semi-log and the Double-log regression functions were employed. The best regression was determined by the use of:

(i)The level of R^2 (Coefficient of Multiple Determinations).

(ii)The level of significance of overall equation (F-statistics)

(iii)The level of significance of each coefficient (t-statistics).

(iv)The correct signs of the coefficient relative to *a priori* expectation (Olayemi and Olayide, 1981).

The explicit forms of these functions take the following forms:

$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + U_i$ (Linear)

$Y = a + b_1\log X_1 + b_2\log X_2 + b_3\log X_3 + b_4\log X_4 + b_5\log X_5 + b_6\log X_6 + b_7\log X_7 + U_i$ (Semi-log).

$\text{Log } Y = a + b_1\log X_1 + b_2\log X_2 + b_3\log X_3 + b_4\log X_4 + b_5\log X_5 + b_6\log X_6 + b_7\log X_7 + U_i$ (Double-log).

This was used to achieve specific objective three (3).

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Sampled Maize Farmers

Table 1: Socio-Economic Characteristics of Sampled Maize Farmers

Variable	Frequency	Percentage (%)
Age (Years)		
< 35	23	19.49
36 – 45	29	24.58
46 – 55	46	38.95
56 – 65	20	16.95
Sex		
Male	112	94.92
Female	6	5.08
Marital Status		
Single	4	3.38
Married	114	96.62
Household Size		
<5	7	5.93
6 – 10	89	75.42
11 – 15	12	10.17
16 – 20	10	8.47
Level of Education(Years)		
Primary	22	18.64
Secondary	74	62.71
Tertiary	12	10.17
Non Formal	10	8.4

Years of Farming Experience		
< 11	79	66.95
11 – 20	30	25.42
21 – 30	9	7.63
Total	**118**	**100**

Source: Field Survey, 2012

Table 1 shows the socio-economic characteristics of maize farmers in Gwagwalada Area Council. From Table 1, greater percentages of the farmers (63.53%) were between the ages of 36 – 55 years. About 19.49% of the farmers had their ages less than 35 years which was in agreement with some studies (Adesehinwa and Bolorunduro, 2007) farmers were made up of young, energetic and active members of the rural population. This result is in line with earlier findings by Alabi *et al.* (2007), Alabi *et al.* (2006) and Nwaru (2004).The gender distribution shows that 94.92% of the maize farmers are male, while 5.08% of the farmers are female. This shows that male are active in maize production than females, as females are involved in the domestic activities and are also seen as weaker sex that do not participate much in the farming. Majority of the farmers (96.62%) were married, while 3.38% were single. About 75.42% of the sampled farmers had their household sizes between 11 – 15 people. Also, 8.47% and 5.93% had their household sizes of 16 – 20 and less than 5 members respectively. Labour availability through large household sizes depended on the age structure of the household member (Okike, 1999). The education attained by farmer's shows that majority of the farmers (91.6%) had formal education: this implies that they had either six (6) years primary education; twelve (12) years secondary education or more than twelve (12) years for tertiary education. Furthermore, 8.4% of sampled farmers had no formal education. Table 1 further shows that 66.95% of sampled farmers had farming experiences of less than 11 years, while, 25.42% and 7.63% of sampled farmers had farming experiences of 11 – 20 years and 21 – 30 years respectively. This shows that most of the maize farmers had experiences in maize farming; this implies the more experienced and well educated the farmers are the more likely for the farmers to adopt and make use of improved farm technologies which can bring about increase in farm productivity.

Production Parameters of Sampled Maize Farmers in Gwagwalada Area Council

Table 2: Farm Size of Sampled Farmers

Variable	Frequency	Percentage (%)
Farm Size		
< 1	47	39.83
1 - < 3	69	58.47
3 – 4	2	1.69

Source: Field Survey, 2012.

Table 2 shows that majority of the maize farmers (58.47%) had the size of their farm between 1 to less than 3 hectares, while 39.83% had farm size of less than one hectare. This implies that maize farming in the study is small-scale. This could be as a result of low accessibility to land and formal loans. Nigerian farmers fall into three broad categories, namely; small-scale with 0.10 to 5.99 hectares, medium scale with 6 to 9.99 hectares of large

scale holdings with 10 hectares upward. The findings are in agreement with Odunuga (1988) and Dillion (1990).

Table 3: Types of Labour used by Sampled Farmers

Types of Labour used	Frequency	Percentage (%)
Family	55	46.61
Hired	16	13.55
Family and Hired	4	59.83

Source: Field Survey, 2012.

Table 3 shows that family labour are mostly employed by the maize farmers in the study area, 46.61% of labour used are family labour, while 13.55% are hired labour. However, 39.83% of labour used is combined labour (family and hired labour).

Table 4: Money Borrowed by Sampled Farmers

Money Borrowed	Frequency	Percentage (%)
< ₦100,000	3	2.54
₦101,000 – ₦500,000	7	5.93
₦501,000 – ₦1,000,000	3	2.54

Source: Field Survey, 2012.

Table 4 indicated 5.93% of sampled farmers borrowed money between the range of ₦101, 000 – ₦500, 000 and 2.54% of farmers sampled borrowed less than ₦100, 000 and between ₦501, 000 – ₦1, 000,000 respectively. This indicates that most maize farmers are not into commercial farming but into subsistence farming.

Table 5: Sources of Credit by Sampled Farmers

Source of Credit	Frequency	Percentage
Bank	9	7.62
Friends	109	92.37

Source: Field Survey, 2012.

Table 5 shows that 92.37% of the farmers did not obtain credit from the banks but rather obtained funds from their friends, while 7.62% of sampled farmers obtained credit from banks.

Table 6: Access to Credit by Sampled Farmers

Access to Credit	Frequency	Percentage (%)
Yes	13	13.40
No	84	86.60
Total	**97**	**100**

Source: Field Survey, 2012.

Table 6 shows that 86.60% do not have access to credit, while 13.40% had access to credit. This could be attributed to huge collateral needed and also the cumbersome administrative processing procedures involved

Farm Budgeting Technique

Table 7: Costs and Returns Analysis of Maize Production

Items(Per Annum)	Mean Value (₦)	Total Value (₦)	Percentage (%)
Fertilizer Cost	4,723.81	557,410.00	21.84
Seed Cost	1,041.34	122,882.00	4.86
Chemical Cost	997.54	117,710.00	4.61
Cost of Hired Labour	11,826.81	1,395,564.00	54.69
Transportation Cost	252.5	29,800.00	1.16
Consumption Cost	2,779.66	32,8000.00	12.85
Total Variable Cost	**21,621.69**	**2,551,366.00**	**100.00**
Total Gross Income	**52,524.84**	**620,072.00**	
Net Farm Income	**7,046.23**	**937,656.00**	

The result of the gross margin analysis is presented in Table 7. Costs incurred on various resources used and the profits obtained from the sales of the produce were estimated based on the market price at the period under consideration (2011/12 farming season). The gross income was calculated by multiplying the total quantity of produce harvested by the price of output sold. The average gross income of the sampled maize farmers was ₦620, 072 per annum. The total variable cost was considered while the total fixed cost was negligible. The total variable costs include cost of hired labour, chemicals, fertilizer, seeds, consumption and transportation. The labour used consists of family and hired labour. The wage rate varies slightly depending on the operation to be performed on the farm. The total cost of hired labour was ₦1, 395,564 which accounts for 54.69% of the total variable costs. The cost incurred on chemical was ₦117, 710.00 accounting for about 4.61% of the variable cost. An average market price of ₦80 per mudu of maize was used in estimating the total cost of seeds. The total cost of seed used was found to be ₦122, 882 which is about 4.86% of the total cost of production. The cost of fertilizer was high as ₦557, 410 representing 21.84% of the total cost of production. The total cost of transportation and home consumption was ₦29, 800 and ₦328, 000 with 1.16% and 12.85% of the total variable costs respectively. Table 7 shows that on average the total variable cost is ₦2, 551,366 and the NFI was ₦937, 656 respectively.

Multiple Regression Analysis

Table 8: Multiple Regression Results (Double-Log Functional Form)

Variable	Regression Coefficient	Standard Error	t-Value
Constant	-1.701	2.119	-0.803
Age (X_1)	1.840	1.341	1.372
Farming Experience (X_2)	0.255	0.637	0.401
Level of Education (X_3)	1.748	0.636	2.748***
Farm Size (X_4)	0.215	0.390	0.5522

Household Size (X_5)	0.326	1.067	0.305
Access to Credit (X_6)	-0.696	0.697	-0.99
Marital Status (X_7)	-3.737	1.247	2.996***

Source: Field Survey Data Analysis, 2012

R^2-Value = 0.223

Adjusted R^2 Value = 0.164

F-value = 3.806***

* - Significant at 10% Probability Level

** - Significant at 5% Probability Level

*** - Significant at 1% Probability Level

Table 8 presented double – log functional form. The double log regression model was chosen as the best fit and as the lead equation. The results shows that marital status (X_1) and level of education attained (X_3) were significant at 1% level of probability. The R^2 was 0.223 which implies that 22.3% of the independent variables jointly explain variations in the dependent variable. The F-value of 3.806 was significant at 1% probability level. This implies all explanatory variables included in the model adequately explained variations in the dependent variable. Estimates obtained from the double-logarithmic functional form are direct elasticity. For instance, the estimated coefficient for farm size was 0.215. This implies that, if farm size is increased by one unit holding other variables constant, the net farm income of farmers will increase by 0.215.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, it is concluded that maize farming in the study area is a profitable business and should be encouraged. Also, it was revealed that marital status and level of education play significant role in the production of maize. However, in the study area, family labour are the most used labour which shows that maize production is more or less a family farming.

Recommendations

Based on the findings of the study, the following recommendations were proffered.

1. Government should provide credit facilities to maize farmers.
2. Maize farmers should form association and cooperative society so that they can buy input in bulk to reduce per capital cost.
3. Agricultural extension agents should educate men and women on the needs to be involved in agricultural activities especially on technologies that can improve maize production.
4. Agricultural programmes and seminars should be organized by Agricultural extension agents to improve the farmers' level of production.
5. Microfinance and agricultural loans should be made available and readily accessible to farmers by Government to help overcome problems of accessing credit facilities.

REFERENCES

Abubakar, H. (2000). *Maize as Source of Starch for Food and Pharmaceutical Industries.* 152–158pp. In: Valentia, J. A. and Ado, S. G. (eds).Sustainable Maize Production in Nigeria.The Challenge in the coming Millenium. Sasakawa Global 2000, Nigeria Projects.

Adesehinwa, A. O. and Bolorunduro, P. T. (2007). Existing Fisheries Technologies and Approaches for Dissemination in Two Maritime States of Nigeria: Effectiveness and Constraints. *American European Journal of Agriculture and Environmental Science* 2(3): 231 – 239.

Ado, S. G. (1999). *Maize Production and Food Security.* A paper Presented at Food Security. Social Mobilization and Community Empowerment Workshop, Organized by Society for International Development, A.B.U. Kongo Campus, Zaria, 122pp.

Ahmad, B., Hassan, S. and Bakhsh, K. (2005). Factors affecting Yield and Profitability of Carrots in Two Districts of Punjab. *International Journal of Agriculture and Biology* 7(5): 794 – 798.

Ahmed, B. (1996). *Economic Analysis of Fertilizer used in Maize Production in the Northern Guinea Savannah of Nigeria.* Unpublished M.Sc Thesis of Department of Agric Economics and Rural Sociology, Ahmadu Bello University; Zaria, Nigeria, Pg 33.

Ahmed, A. and Rikko, L. (2005). *Investigations on Building Food Marketing Policy Evidence Base in Nigeria*: 1 – 22pp.

Akande, S. O. (1994). *Comparative Cost and Returns in Maize Production in Nigeria.* NISER Individual Research Project Report, Ibadan: NISER. Pg 104.

Alabi, O. O., Omotugba, J. T. and Kadiri, S. S. (2007). Economic Analysis of Maize Groundnut Intercropping Mixture in Sabo Local Government Area of Kaduna State. *Journal of Sustainable Tropical Agriculture Research* 22: 41 – 45.

Alabi, O. O., Omotugba, J. T. and Adebayo, O. (2006). *Economic of Scale of Maize Soybean Sustainable Tropical Agricultural Research,* 17:8 – 15.

ASCE(2008). CommoditiesMaize.http://www.abujacomex.com/pages/ Post/maize57.php.postedbyabujasecuritiesandcommodityexchange January 2008.Retrieved 12th September,2011.

Azih, I. (2004). Policy for Small Farms Productivity and Competiveness in Nigeria. *The Nigerian Economic Summit Group Economic Indicators* 10(3): 40 – 46.

Badmus, M. A. (2010). Market Liberalization and Maize Production in Nigeria. *Journal of Development and Agricultural Economics* 2(6): 226 – 230.

BARI (1980). *Annual Report 1987 – 1988.* Bangladesh Agricultural Institute, 45pp.

BARI (1980). Bangladesh Agricultural Research Institute Agro *Economic Study on On-Farm Maize Trials in Bangladesh.* BARI, Joydebpur, Gazipur, 22 – 30.

BARI (1988). *Annual Report 1987 – 1988.* (Bangladesh Agricultural Institute) On Farm Research Division, BARI, Joydebpur, Gazipur, 15pp.

BBS (2005). Bangladesh Bureau of Statistics. Web address: http://www.bbs.gov.bd. 12th September 2011.

CBN (1997). Central Bank of Nigeria *CBN Annual Report and Statement of Account for the Year Ended* 31st December 1997, Abuja.

Dillion, J. L. (1990). *The Analysis of Response in Crop and Livestock Production.* Pergamon Press Plc. Oxford England. Pp, 122 – 134.

Ejidike, B. N. (2001). *The Role of Women in Sustainable Agriculture.* Proceedings of the 26th Annual Conference of Nigeria Society for Animal Production, 121pp.

Enole, A. A. and Okon, U. E. (2010). *Economics of Water Leaf Production (Talinum triangulare) in Akwa Ibom State, Nigeria.* Field Actions Science Reports. 4(1).

FAOSTAT (2003).FAO, http//:faostatfao.org/default.htmm. Retrieved 14th December, 2003.

FAO (1992). Food and Agricultural Organization. *Maize in Human Nutrition*. Rome, Italy.

FAO and ILO (1997). Food and Agricultural Organization *Maize in Human Nutrition Intermediate Level Handbook.* FAO and ILO Publications, Rome, Italy,Pg. 12.

Fasoranti, O. O. (2008). The Determinants of Agricultural Production in Nigeria. *African Journal of Biotechnology* 3(6): 302 – 307.

FGN (1999). Federal Government of Nigeria. *Annual Report on Climatic Change,* Pg. 2.

Hallgreen, L., Rexen, F. P. B. and Munck, L. (1992). *Industrial Utilization of Whole Crop Sorghum for Food and Industry. 121- 130 pp* In: Gomex, M. I. House, I. R., Rooney, D. A. V. (eds).Utilization of Sorghum and Millet, APP502324 India, ICRISAT.

Hossain, M. M. (1990). *An Economic Analysis of Maize Cultivation in Saturia Upzila of Manikgonj District.* M.Sc. Thesis. Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh, Bangladesh, 15 – 16pp.

Iken, J. E., Amusa, N. A. and Obatobu, V. O. (2002). Nutrient Composition and Weight Evaluation of Small Newly Developed Maize Varieties in Nigeria. *Journal of Food Technology Africa (Kenya)* 7: 25 – 35.

Iken, J. E. and Amusa, N. A. (2004). Maize Research and Production in Nigeria. *African Journal of Biotechnology* 3(6): 302 – 307.

IITA (1996). International Institute for Tropical Agriculture. Ibadan, Nigeria Pg. 38.

IITA (2001). International Institute for Tropical Agriculture. Ibadan, Nigeria 76pp.

Inglett, G. E. (1970). *Corn: Culture, Processing, Product.* AVI Publishing Company, West Port, CT, USA, 369pp.

Islam, T. M. and Kaul, A. K. (1986). *Prospect of Maize in Bangladesh.* FAO/UNDP, Dhaka, Bangladesh Publisher. Pg. 1-7.

Koleoso, O. A. and Olatunji, O. (1992). *Sorghum Malt Adjunct Replacement in Clear Larger Beer Policy and Practice in Nigeria.* 41 – 44 pp. In: Gomez, M. I., House, I. R., Rooney, L. N. andDendy, D. V. A. (eds). Utilization of Sorghum and Millet Patancheru, A. P. 502324 India, ICRISAT, Rome Italy.

Kormawa, P. M. and Aiyedun, E. (1999). *Food Demand Structures and Market Studies for IITA Mandate Crops in the Drier Savanna of Nigeria.* Proceedings of a Methodology and Stakeholders Workshop, September, 1999.

National Population Commission (NPC) (2006). *Sample Population Census, Sample Survey 2006.*

Nwere, J. N. (1998). *Foods of Plant Origin.* AFRO – ORBIS Publications Ltd, Rest House Road, University of Nigeria, Nsukka, 96pp.

Nwaru, J. C. (2004). *Rural Credit Market and Arable Crop Production in Imo State of Nigeria.* Unpublished Ph.D. Dissertation Michael Okpara University of Agriculture Umudike. Pg. 18-20.

Obi, I. U. (1991). *Maize-its Agronomy, Diseases, Pests and Food Values.* Optimal Computer Solutions Ltd, Enugu. Pg. 149

Odojoma, I. P. (1990). *Potential for Hybrid Maize Production in the Nasarawa State of Nigeria.* A Comparative Study with the Open Pollinated Maize Varieties. An M.Sc Thesis. Department of Agricultural Economics and Rural Sociology, A.B.U. Zaria, Pg.18.

Odunuga, S. O. (1988). Acreage Response to Prices in Peasant Food Crop Agriculture in Oyo State. Unpublished M.Sc Thesis; Department of Agricultural Economics, Obafemi Awolowo University, Ile-Ife, Nigeria. Pp. 30 – 34.

Ogunsumi, L. O., Augustus, E. O., Ogbosika, G. E. and Omoyajowo, A.(2002). *Impact of Adoption of Maize Production Technology Women Farmers in Oyo State, Nigeria.* Proceedings of the 8th Annual National Conference of the Agricultural Extension Society of Nigeria (AESON), 16 – 19 September, 2002. 98 – 104pp.

Ogunsumi, I. O., Ewuola, S. O. and Daramola, A. G. (2005). Socio Economic Impact Assessment of Maize Production Technology on Farmers' Welfare in South West, Nigeria. *Journal of Central European Agriculture* 6(1): 15 – 26.

Ojo, S. O. (2000). Factor Productivity in Maize Production in Ondo State Nigeria. *Applied Tropical Agriculture* 15(1): 57 – 65.

Okike, I. (1999). *Crop-Livestock Interaction and Economic Efficiency of Farmers in the Savanna Zones of Nigeria.* Unpublished Ph.D Thesis. Department of Agricultural Economics, University of Ibadan, 299pp.

Okoruwa, A. E. (1992). *Utilization and Processing of Maize IITA Research Guide No. 35 Training Program.* International Institute of Tropical Agriculture (IITA) Ibadan, Nigeria, 27 pp.

Olarinde, L. O. and Manyong, V. M. (2007). *Risk Aversion and Sustainable Maize Production in Nigeria: Some Challenges and Prospects for Agricultural and Economic Development.* AAAE Conference Proceedings, 177 – 182pp.

Olayemi, J. K. and Olayide, S. O. (1981). *Elements of Applied Econometrics CARD.* Ibadan, Nigeria, pg 25.

Olomola, A. (1998). *Agricultural Credit and Production Efficiency.* NISER Monograph Series No. 4.

Osagie, A. U. and Eka, O. U. 1. (1998). *Nutritional Quality of Plant Foods.* Post Harvest Research Unit. University of Benin, Benin, 34 – 41pp.

Oyejide, T. A. (1990). *Recent Trends in Trade in Primary Commodities Implication for Africa.* Amsterdam, The Netherlands. World Conference Sio, 20: 6 – 9.

Purseglove, J. W. (1992). *Tropical Crops: Monocotyledons.* Longman Scientific and Technical, New York, 300 – 305pp.

Reichert, R. D. (1982). *Sorghum Dry Milling* pg. 547 – 563 in: Sorghum in the Eighties. Proceedings of the International Symposium on Sorgium. Patancheru, A. P502324 India ICRISAT. Pg. 4.

Safa, M. S. (2005). Socio-economic Factors affecting the Income of Small-Scale Agro-forestry Farmers in Hill Country Areas in Yemen: A Comparison of OLS and WLS Determinants. *Small Scale Forest Economics, Management and Policy* 4(1): 117 – 134.

Shaib, B., Aliyu, A. and Bakshi, S. (1997). *Nigeria National Agricultural Research Strategy Plan: 1996 – 2010.* Department of Agricultural Science, Federal Ministry of Agricuitural and Natural Resources, Abuja, Nigeria, 203pp.

Sowunmi, F. A. and Akintola, J. O. (2009). Effect of Climatic Variability on Maize Production in Nigeria. *Research Journal of Environmental and Earth Sciences* 2(1): 19 – 30.

USAID (2010). United States Agency for International Development. *Package of Practices for Maize Production.* USAID MARKETS2pp.**Walton, C. G. (1999).** *Maize.* In: Ernst, H. (ed). CIBA GEIGY Ltd, Basle, Switzerland Pg

Watson, S. A. and Rainstad, M. (1992). *Corn Chemistry and Technology.*American Association of Cereals Chemists, USA, 605pp.