Journal of Sustainable Development in Africa (Volume 18, No.1, 2016)
ISSN: 1520-5509
Clarion University of Pennsylvania, Clarion, Pennsylvania

FACTORS INFLUENCING THE USE OF PRODUCTIVITY ENHANCING TECHNOLOGIES AMONG CROP FARMERS IN ABUJA, NIGERIA

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ABSTRACT

This study examined factors influencing productivity enhancing technologies among crop farmers in Abuja, Nigeria. Agricultural productivity growth has been driven by improved farm technologies. Primary data were obtained using well-structured questionnaire. Descriptive statistics and Logit regression model were the analytical tools used. The results revealed that majority of the crop farmers were less than 55 years of age. About 65 percent of crop farmers had formal education. Fifty five percent of crop farmers had contact with extension agents. Agrochemicals; fertilizers; herbicides and pesticides were the major productivity enhancing technologies used by sampled crop farmers. Level of education; total number of technologies adopted had positive and significant relationship with the adoption of productivity enhancing technologies at $P< 0.10$ and $P < 0.01$ respectively. The coefficient of Nagelkerke (R Square) value was 0.758, while the coefficient of Cox and Snell determinations (R Square) value was 0.557. Sustainable agriculture seeks to harness new technologies, sustain farmers, resources and communities by promoting farming practices and methods that are profitable hence sustainable, environmentally sound and good for communities. Cover cropping, crop rotations, contour farming, improved seeds amongst others are productivity enhancing technologies practiced by crop farmers that move towards sustainability in agriculture. The study recommends that inputs should be made available to crop farmers in good time and at appropriate price, also financial institutions should provide adequate and accessible credit facilities to the crop farmers.

Keywords: Productivity Enhancing Technologies, Crop Farmers, Logit Model, Nigeria.

INTRODUCTION

Agriculture remains underdeveloped in Africa, as productivity per hectare is low and so the farmers have remained poor. Abulu and Yayock (2005) reported that technology adoption in sub-Sahara Africa was known to be generally low. Rural farmers in Africa and sub-Saharan Africa dominates the agricultural sector and provide the bulk of nations domestic food supply with the hand-hoe traditional method, low usage of agricultural inputs like fertilizers, herbicides, pesticides, improved seeds and seedlings, credit facilities are prevalent (FAO,2003).Agricultural productivity enhancement technology depends on the willingness and ability of the small scale farmers to make use of new technology (Rogers, 2003).According to FAO (2000) agricultural technology could be seen as practices or techniques, tools or equipment's, know-how and skills or combinations of above components. A technology or innovation is defined as an idea or practice developed in research laboratories. Fleming (2003) opined that adoption of improved technologies is an important means to increase the productivity of smallholder agriculture in Africa. Ouma (2006) suggested that the use of improved farm technologies will continue to be a critical input for increase in farm productivity. Productivity enhancement technologies involve the systematic application of collective resources to solution of problems through the assertion of control over nature and all kinds of human processes (Rogers, 2000). Mijindadi and Njoku (1985) identified inappropriate recommended practices, low literacy levels and inadequate extension services, farm size ,inadequate capital, poor economic infrastructure among factors that constraint technology adoption in Africa. Moris (2007) reported that low agricultural growth in Africa is positively correlated largely on low technological use. Weight and Kelly (1999) observed that the level of education of farmers play a vital role and accelerates the adoption rate of farmers. Obinne and Anyanwu (1991) suggested that education of farmers in Africa help develop managerial skills which leads to enhanced adoption. Michelle (2008) found out that technology adoption reduces poverty without deteriorating the income distribution. Ekwu and Eje (2004) observed that in Africa and other developing countries of the world, various agricultural technologies have been adopted based on the levels of mechanization these include hand tools technologies and mechanical power technologies. Sustainable agriculture systems emphasizes technologies that are appropriate to the scale of production, based on relative small, profitable farms that use fewer off-farm inputs, integrate animal and plant production where appropriate, maintain a higher biotic diversity and make the transition to renewable energy (Horrigan *et al*, 2002). Agricultural sustainability and food systems concerns about the need to develop agricultural technologies and practices that do not have adverse effect on the environment, are accessible to and effective for farmers and lead to both improvements in food productivity and have positive side effects on environmental goods and services (Pretty, 2008). If a technology works to improve productivity for farmers and does not cause undue harm to the environment, then it is likely to have some sustainability benefits (Dobbs and Pretty, 2004; MEA, 2005). As a more sustainable agriculture seeks to make the best use of technologies, nature's goods and services and practices must be locally adapted and fitted to place (Pretty, 2008) In other words, agricultural sustainability implies the need to fit these factors to the specific circumstances of different agricultural systems. The specific objectives of this study include:-

(i) identify the socio-economic characteristics of sampled crop farmers in the study area.

(ii) evaluate the existing productivity enhancing agricultural technologies and their level of usage by sampled crop farmers in the study area,

(iii) evaluate factors influencing crop farmers adoption of productivity enhancing agricultural technologies in the study area.

METHODOLOGY

The Study Area

The study was conducted in Abuja, Nigeria. Geographically located at Latitudes 8^0 56^l and 59^l north of equator and Longitudes 7^0 5^l 59^l east of meridian on the map of the world. The study area has an area of 1043 Km^2 and a population of 1, 5710,770 people. The study area has potentials to produce both root crops and tubers such as yam and cassava; seeds and nuts (melon seed and benniseed); fruits and vegetables (water melon, cucumber and carrots), agriculture is the main economic activity of the rural populace. Figure 1 shows the map of Africa showing Nigeria. Figure 2 shows the map of Nigeria showing Abuja, Federal Capital Territory, Nigeria.

Figure 1: Map of Africa showing Nigeria

Figure 2: Map of Nigeria showing Abuja, Federal Capital Territory.

Sampling Technique and Sample Size

Purposive sampling technique was used to select Abuja. Multistage sampling technique was used to select crop farmers in the study area. The 1st stage was the use of simple random selection of two extension blocks out of the ten extension blocks in the area. The 2nd stage is the systematic sampling of 66 crop farmers which involves the selection of every second crop farmer on the comprehensive list of crop farmers from the two extension blocks.

Method of Data Collection

Primary data were used for this study. The data were collected using structured questionnaire which were administered by trained enumerators for this study under the supervision of the researcher.

Method of Data Analysis

The following analytical tools were used to achieve stated objectives:

(i) Descriptive Statistics

(ii) Logit Regression Model.

Descriptive Statistics

This involves the use of mean, percentages, frequency distribution tables etc .This was used to achieve specific objectives (i) and (ii).

Logit Regression Model

The model is stated thus:-

$$P_i = E(Y = 1/X_i) = \beta_1 + \beta_2 X_i$$

$$P_i = E(Y = 1/X_i) = \frac{1}{1+e^{-(\beta_1+\beta_2 X_i)}}$$

$$P_i = \frac{1}{1+e^{-Z_i}} = \frac{e^z}{1+e^z}$$

$$Z_i = \beta_1 + \beta_2 X_i$$

Where, Z_i ranges from $-\infty$ to $+\infty$ and P_i ranges from 0 and 1.

$$1 - P_i = \frac{1}{1+e^{Z_i}}$$

$$\frac{P_i}{1-P_i} = \frac{1+e^{Z_i}}{1+e^{-Z_i}} = e^{Z_i}$$

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_1 + \beta_2 X_i + U_i$$

Where, L= Logit goes from - ∞ to + ∞. One can add as many regressors as may be dictated by the underlying theory

$$P_i = F(Z_i) = \frac{1}{1+\exp(-X_i\beta)}$$

$$Z_i = X_i\beta$$

Where, P_i = Probability that the ith farmers select the first alternative, X_i = Vector of sampled farmer associated with the ith farmer.

$$\text{Log}\left(\frac{P_i}{1-P_i}\right) = \text{Log } Y = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta_9X_9+ U_i$$

Where;

β_0 = Constant Term

$\beta_1 - \beta_9$ = Logit Regression Coefficients

Y = Adoption (1, Adopt Productivity Enhancing Technologies; 0, Otherwise)

X_1 = Age of Farmers (Years)

X_2 = Marital Status (1, Married; 0, Otherwise)

X_3 = Household Size (Units)

X_4 = Educational Status (Years)

X_5 = Extension Contacts (Number of Visits)

X_6 = Farm Size (Hectares)

X_7 =Farm Income (Naira)

X_8 = Amount of Accessible Credit (Naira)

X_9 = Total Number of Production Enhancing Technologies Adopted by Crop Farmers (Units)

U_i = Error Term

This was used to achieved specific objectives (iii)

RESULTS AND DISCUSSION

SocioEconomic Characteristics of Sampled Crop Farmers in Abuja, Nigeria.

Table 1 indicated that 75.4 percent of sampled crop farmers were less than 55 years of age. These farmers could be considered to be in their economically active age. This finding is in consonance with report of Amanza *et al* (2007). About 71 percent of crop farmers were male and 65 percent of the crop farmers had formal education. This agrees with Abdullahi and Abdullahi (2011) who reported that education facilitates the adoption and use of modern technologies and improved farm practices. This implies that the more educated a farmer is the greater the chances of accessing readily available modern farming technologies and improved practices. About 44 percent of sampled crop farmers had less than 5 members as household size. This result is in line with Orojobi and Damisa (2007). Furthermore, 88 percent of sampled crop farmers had less than 4 hectares of farm land. Also, 55 percent of crop farmers had contact with extension agents. According to Ike (2005) and Abalu and Igwe (2005) an extension staff should visit the farmer regularly or fortnightly to know their problems on the innovations transferred and other farm activities so as to help find required solutions to them. Daramola and Aturamu (2000) noted that contacts with extension agents exposes the farmers to the availability and technical know-how of innovations and increase their desirability for acquiring them.

Productivity Enhancing Technologies Used by Sampled Crop Farmers in the Study Area

Table 2 revealed that a high percentage of sampled crop farmers adopted and use major agrochemicals such as fertilizers (15 percent); herbicides (10 percent); and pesticides (5 percent). This agrees with the findings of Ikechukwu (2000) who reported that the proper application of fertilizers and other agrochemicals have been described as essential prerequisites for the realization of increase in crop yield. The use of hybrid seeds (8 percent) and crop rotation techniques were among the most improved farm practices used and adopted by sampled crop farmers. This result was in agreement with findings of Adesina and Zinnah (2003) who reported that crop farmers tends to adopt more farm practices that are less complex and flexible to use. Tillage operations (17 percent) and ploughing techniques (12 percent) were among the farm mechanization techniques adopted and use by sampled crop farmers.

Factors Influencing Crop Farmers' Adoption of Productivity Enhancing Agricultural Technologies in the Study Area

Maximum Likelihood Estimates using Logit regression model was used to determine the factors influencing productivity enhancing technologies among crop farmers' in the study area. The variables examined in the model include ; age, sex, household size, level of education, extension contact, farm size, level of income, amount of accessible credits and total number of technologies adopted. From results presented in Table 3, level of education (X_4) was positive and significant at P < 0.10, total number of technologies adopted (X_9) had positive and significantly influence the productivity enhancing technologies among crop farmers at P < 0.01. The coefficient of Cox and Snell R Square was 0.557 indicating that 55.7% of productivity enhancing technologies adopted by crop farmers was accounted for by variations in selected explanatory variables included in the model, this suggests that the model has an explanatory power on the changes in crop farmers adoption of production enhancing technologies, the coefficient of Nagelkerke value was 0.758 or 75.8%, this implies that the

selected explanatory variables explain the behavior of crop farmers adoption of productivity enhancing technologies at 75.8% level of confidence. There was a significant change in log-likelihood value; this suggests that there was a significant cause-effect relationship between crop farmers' adoption of productivity enhancing technologies and the selected explanatory variables.

Productivity Enhancing Technologies among Crop Farmers: Implications for Sustainable Agricultural Development.

Table 2 shows that 7% of sampled crop farmers practice crop rotation, while 3% of sampled crop farmers practice cover cropping. The use cover cropping, crop rotation, soil management, contour farming, appropriate spacing, improved seeds as stated in Table 2 are methods or factors that enhance agricultural development and sustainability, for example by rotating two or more crops in a field, farmers interrupt pests reproductive cycles and reduce the need for pest control. Rotations sometimes reduce the need for added fertilizers because one crop provides nutrient for the next crop (Horrigan *et al*, 2002). Also, cover crops are planted to improve soil quality, prevent soil erosion, and minimize weed growth. Some cover crops can also generate income. Farmers use technologies, inputs because they are sustainable and promise greater yields from their crops. Pretty (2008) observed that agricultural resource-conserving and sustainable technologies and practices are currently being used, the total number of farmers using them worldwide is still relatively small. This is because their adoption is not a costless process for farmers. They cannot simply cut their existing use of fertilizers or pesticides and hope to maintain outputs, thus making operations more profitable. Farmers also cannot simply introduce a new productive element into their farming systems and hope it would succeed. Farmers must first invest in learning. Lack of information and managerial skills is, therefore, a major barrier to the adoption of sustainable agriculture.

Table 1: Socio-Economic Characteristics of Sampled Crop Farmers in Abuja, Nigeria.

Variables	Frequency	Percentages
Age (Years)		
25-35	18	27.00
36-45	11	17.00
46-55	21	32.00
56-65	15	22.00
>65	01	02.00
Sex		
Male	47	71.00
Female	19	29.00
Marital Status		
Married	77	86.00
Single	09	10.00
Divorced	04	04.00
Household Size (Units)		
<5	29	44.00
6 – 10	30	45.00
11 – 15	06	09.00
>16	01	02.00
Level of Education		
Primary	12	18.00
Secondary	21	32.00
Tertiary	10	15.00
Non-Formal	23	35.00
Farm Size (Hectares)		
< 4	58	88.00
5 – 9	08	12.00
Income Level (Naira)		
1000-5,000	06	09.00
6,000-10,000	25	38.00
11,000 -15,000	13	19.70
16,000 – 20,000	08	12.00
21,000 – 25,000	11	17.00
26,000 – 30,000	02	03.00
>30,000	01	02.00
Amount of Credit (Naira)		
50,000-100,000	60	91.00
>120,000	06	09.00
Total	**66**	**100.00**

Source: Field Survey, 2015

Table 2 Types of Productivity Enhancing Technologies Used and Adopted by Sampled Crop Farmers

Type of Technologies	*Frequency	Percentage
(a) Agrochemicals		
Herbicides	20	10.10
Pesticides	16	05.05
Fertilizers	30	15.15
Sub-Total		**30.30**
(b) Improved Farm Practices		
Hybrid Seeds	17	08.59
Drainage System	03	01.52
Irrigation System	08	04.04
Appropriate Spacing	01	00.51
Crop Rotation	14	07.07
Organic Farming	12	06.06
Cover Cropping	07	03.54
Contour Farming	04	02.02
Sub-Total		**33.35**
(c) Farm Mechanization		
Tillage Operations	34	17.17
Ploughing	25	12.63
Seed Processing Mill	01	00.51
Harrowing	04	02.02
Harvesting Equipment	02	01.01
Sub-Total		**33.34**
Total	**198**	**100.00**

Source : Field Survey, 2015 *Multiple Responses

Table 3 Maximum Likelihood Estimate of the Logit Model Showing Factors Influencing Adoption of Productivity Enhancing Technologies among Crop Farmers' in Abuja, Nigeria.

Variables	β	S.E	Wald	Level of Significance
Age (X_1)	0.100	0.085	1.382	NS
Sex (X_2)	0.613	1.159	0.279	NS
Household Size (X_3)	-0.019	0.216	0.008	NS
Level of Education (X_4)	0.238*	0.135	3.134	0.10
Extension Contact (X_5)	0.273	0.291	0.883	NS
Farm Size (X_6)	-0.270	0.254	1.131	NS
Farm Income (X_7)	0.000	0.000	0.716	NS
Amount of Accessible Credit (X_8)	0.000	0.000	0.387	NS
Total Technologies Adopted(X_9)	1.119***	0.308	13.185	0.01
Sample Size	66			
-2 Log Likelihood	33.868***			
Cox and Snell R Square	0.557			
Nagelkerke R Square	0.758			

Source: Field Survey, 2015

*-Significance at 10% Probability Level

**-Significant at 5% Probability Level

***-Significant at 1% Probability Level

Problems Encountered in Adopting the Productivity Enhancing Technologies by Sampled Crop Farmers in the Study Area.

Table 4 shows that 56% of sampled crop farmers had problem of credit facilities. This result was in line with findings of Ajakaiye (1998) who observed that Nigerian farmers needs credit facilities, farm inputs and farm machineries especially for their farm products. Furthermore, 14% of sampled crop farmer's complaints of irrigation facilities, about 28% of sampled farmers complaints of high cost of leasing agricultural machines..

Table 4 Problems Encountered by Crop Farmers in Adopting Production Enhancing Technologies

Problems Encountered	Frequency	Percentage
Lack of Credit	19	29.00
Lack of Irrigation Facilities	09	14.00
Lack of Improved Agricultural Inputs	19	29.00
High Cost of Leasing Agricultural Machines	19	28.00
Total	**66**	**100.00**

Source: Field Survey, 2015.

Suggested Solutions to Problems Encountered by Sampled Crop Farmers.

About 22% of sampled crop farmers suggested that agrochemical dealers should site their agro stores and centers closer to the reach of the farmers. Adequate extension agents should be provided and efforts should be made to reach and teach farmers some of technologies use, this will increase adoption level. Price of improved agricultural inputs should subsidized and make available to farmers at appropriate time. Banks and financial institutions should make credits available and accessible to farmers.

Table 5 Suggested Solutions to Problems Encountered by Sampled Crop Farmers

Suggested Solutions	*Frequency	Percentage
Government Should Subsidized Price of Inputs	26	34.21
Farm Machineries Should be Provided	12	15.79
Adequate Extension Agents	11	14.47
Bank Credits be Made Available	12	15.78
Agrochemical Centers Should be Closer to Farmers	15	19.75
Total	**76**	**100.00**

Source: Field Survey, 2015 * Multiple Responses

CONCLUSION

Agriculture plays a crucial role in sustainable development and in hunger and poverty eradication. Agricultural sustainable development has three principal dimensions: economic growth, social equity and protection of the environment. Underlying the economic dimension is the principle that society's well-being have to be maximized and poverty eradicated through the optimal and efficiency use of natural resources. The social aspect refers to the relationship between nature and human being, uplifting the welfare of people, improves access to basic health and education services fulfill food security needs. The

environmental dimension on the other hand is concerned with the conservation and enhancement of the physical and biological resource base and ecosystem. In adopting factors or methods or productivity enhancing technologies that can influence moves towards sustainability in agriculture, ultimately this shift involves decisions by individual farmers. Some farmers will be motivated to change because of environmental concerns, but we also need to reassure farmers that agricultural sustainable methods are economically viable. It can be concluded that cover cropping, crop rotations, contour farming, herbicides, pesticides, fertilizers, are technologies that can move towards sustainability in agriculture. Age, level of education and land ownership as supported by FAO (2012) are among other factors that influence adoption of sustainable agricultural practices. Level of education and total number of technologies adopted positively and significantly influence productivity enhancement technologies among sampled farmers in the study area.

RECOMMENDATIONS

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

(i) Agricultural Inputs should be made available to crop farmers in good time and affordable prices.

(ii) Adequate and availability of extension agents should be provided to disseminate information of productivity enhancement technologies to farmers.

(iii) Bank and financial institutions should be established closer to farmers for easy access and at low interest rate.

REFERENCES

Abalu, G.O and Igwe,B.A (2005). *Improved Agricultural Technologies of the Small Scale Nigerian Farmers*. Proceedings of the National Farming Systems Research Workshop held in Jos, Plateau State Nigeria, May 10th - 13th .A Publication of the Nigerian National Farming System Research, pp 120 - 125

Abulu,O.I and Yayock,B.A (2005). Adoption of Improved Farm Technology in Northern Nigeria . *Quarterly Journal of International Agriculture 19(3):237-247*

Adesina, A.A and Zinnah,A (2003).Adoption of Agricultural Innovation in Developing Countries: A Survey on Economic Development and Cultural Change 33: 225 – 398

Ajakaiye, M.B(1998). Financing Agricultural Programs in Nigeria: *Role of the Nigerian Agricultural Cooperative Bank Limited* in: Okorie, A and Ijere, M.O. *Readings in Agricultural Finance*, Longman, Lagos pp 32

Amanza,P.S; Olayemi, J.K; Adiaobi, A.O; Bial,Y and Iheanacho, A (2007). Baseline Socioeconomic Survey Report Agriculture in Borno State. Nigeria International Institute of Tropical Agriculture, Ibadan pp 62 – 72.

Daramola, A.G and Aturamu, O.A (2000). Agroforestry Policy Option for Nigeria: A Stimulation Study. *Journal of Food Agriculture and Environment 3: 120 - 124.*

Dobbs, T and Pretty, J.N (2004). Agro-Environmental Stewardship Schemes and Multifunctionality. Rev Agric Econs 26, 220 – 237 (doi: 10.111/j.1467-9353.2004.00172.x)

Ekwu, K.C and Eje, I (2004). Influence of Household Factors on the Utilization of Garri Processing Technologies in South Eastern Nigeria. *Journal of Agricultural Extension 9: 134 – 141*.

Fleming, A (2003). Economic Assessment of the Soybean incorporation within Smallholder Coffee based

Cropping Systems and Factors Affecting Adoption in New Guinea, pp 121-130

FAO (2000). The Economies of Conservation Agriculture, Food and Agriculture Organization, Rome.

FAO (2003).Farm Management Research for Small Farmer Development., Food and Agriculture Organization, Rome.

Horrigan, L; Lawrence, R.S and Walker, P (2002). How Sustainable Agriculture Can Address the Environment and Human Health Harms of Industrial Agriculture. Environmental Health Perspective Volume 110 Number 5 445-456

Ikechukwu, G.E (2000). Technology Transfer to Smallholders for Increased Agricultural Productiveness; A Case Study of Fertilizer Application in Bauchi Local Government Area, Bauchi State, Nigeria. *Journal of Agricultural Extension 5 (1& 2): 39 -46*.

MEA (2005). Millenium Ecosystem Assessment. Ecosystem and Well-Being. Washington DC. Island Press.

Mitchelle, K.J (2008). Technology Adoption in West Africa : Adoption and Dis-Adoption of Soyabean in Togo, Benin Border, NC ,175pp.

Mijindadi, N.B and Njoku, J.E (1985). Adoption of New Technologies by Agricultural Cooperatives Rice Societies in Kano, Nigeria. *International Journal of Development Technology 3: 211 - 218*

Moris, M.L (2007). Adoption and Impact of Improved Maize Production Technology: A Case Study of the Ghana Grains Development Project. Economic Programme Paper 99: 211 – 218

Obinne, C.P and Anyanwu, A.I (1991). Adoption of Improved Cassava Production Technologies by Small Scale Farmers in Bendel State. *Journal of Agricultural Sciences and Technologies 1 (1): 12- 15*.

Orojobi,J.O and Damisa,M.A (2007). Assessment of Agrochemical Input Application on Smallholder Farms in Kaduna State, Nigeria. *Nigeria Journal of Rural Economy and Society 3: 56 – 61*.

Ouma, J.O (2006). Determinants of Improved Maize Fertilizer Use in Kenya: Policy Implications. Paper Presented at the International Association of Agricultural Economist Conference, Gold Coast, Australia, August 12 – 18, pp 8 – 13.

Pretty, J (2008). Agricultural Sustainability: Concepts, Principles and Evidence. Philosophical Transaction of the Royal Society 363, 447 - 465

Rogers,E.M (2000, 2003).*Diffusion of Innovations*, Free Press, New York,500pp.

Weight, D and Kelly, V (1999). Fertilizer Impact on Soil and Crops of sub-Saharan Africa, Agricultural Economics, MSU International Development Paper, Michigan,53pp

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