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International Journal of Applied Research and Technology
ISSN 2277-0585

Publication details, including instructions for authors and subscription information:
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Available online: January 31, 2014

To cite this article:

Osuji, E. E., Maduike, I. A., Oguegbuchulam, M. N. and Eze, E. U. (2014). Effects of Farm Inputs on Productivity of Farmers in Imo State, Nigeria. *International Journal of Applied Research and Technology*. 3(1): 3 – 9.

International Journal of Applied Research and Technology
Vol. 3, No. 1, January 2014. 3 – 9.

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(Received: 06 January 2014 / Accepted: 20 January 2014 / Published: 31 January 2014)

Abstract

This study investigated the effects of farm inputs on productivity of farmers in Imo State, Nigeria. Multi-stage random sampling technique was used to select 123 respondents for this study. Information on the objectives of this study were elicited from the sampled respondents through a well structured questionnaire. Data were analyzed using descriptive statistics such as the mean, frequency distribution, percentage and multiple regression model. Majority of the respondents were males (52.0%), with an average age of about (56 years) and had up to 20 years farming experience. Also majority of the farmers (50.4%) in the area had secondary education with a mean household size of 4 persons and cultivated less than 3.0 hectares of farm land. Again the Cobb-Douglas function produced the lead equation with the independent variables been significant at both 1% and 5% critical level. All the explanatory variables were positively correlated except farm machinery and household size and were not significant at 5% alpha level. About 84.0% of the total variation in total factor productivity was explained by the explanatory variables investigated. Majority of the respondents indicated inadequate capital (91.1%) and poor access to farm inputs (89.4%) as their major production constraints. Similarly, a call on the government to address the challenges of these farmers were recommended to enable the farmers increase output and consequently enhance productivity.

Keywords: Farm Inputs, Total Factor Productivity, Farmers, Multiple Regression and Production Constraints

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Introduction

Agricultural productivity increases more in developed countries compared to less developed countries. This is due to high investment in research and development of labour, land, capital and improvement in the use of inputs such as fertilizer, machinery, improved seedlings etc (Agriscope, 2008). Barrett, *et al.*, (2002) noted that growth in agricultural productivity depends primarily on technological change, improved input use efficiency and conservation of natural resources and these in turn, depend crucially upon investments in agricultural research, development, extension services and human capital. According to Bockel, (2002), farmers' productivity grew rapidly at 3.98% between 1990 to 2001 due to mechanization and use of farm inputs such as fertilizers, herbicides, pesticides, improved seedlings etc. Barrett, *et al.*, (2004) also noted that improvement in farm inputs such as labour, land and capital improves the productivity of farmers in general. However, efficient use of farm inputs is essential in ensuring continued productivity growth. For example, Nigerian agriculture has recorded a consistent increase in productivity growth in the past decades. Much of this growth has resulted from increased use of farm inputs such as fertilizer, fuel, feed, land and labour etc (Awoyinka, *et al.*, 2009). Recent studies have also shown that improvement in farm input access increases agricultural productivity of farmers and consequently farmers' income (Akintayo and May, 2010). Increasing agricultural productivity is critical in stimulating the rate of economic growth. With increasing food scarcity, policies to increase farm productivity have been proposed and this requires timely and adequate supply of essential farm inputs to farmers (Dorward, *et al.*, 2004).

Lamb, (2003) reported that productivity of farmers over the years have been fluctuating due to poor access and high costs of farm inputs. Larson, (1993) and Pender, *et al.*, (2001) also noted that poor investments in farm inputs have been a major factor impeding the productivity of farmers. Most times, these inputs are too exorbitant for farmers to access thereby limiting production. Hence, productivity of farmers can be improved by subsiding the cost of farm inputs and making them available, affordable and accessible to farmers in general (Moser and Barrett, 2003). However, the study focused specifically on the socio-economic characteristics of farmers, effects of farm inputs on farmers' productivity and constraints impeding farm productivity in the area.

Materials and Methods

This study was conducted in Imo State, Nigeria. The area has a population density of 3,934,899 people (NPC, 2006 census) and lies within latitudes 4°45'N and 7°15'N, and longitude 6°50'E and 7°25'E and covers an area of 5,100sq km. It is bordered by Abia State to the East, River Niger and Delta State to the West, Anambra State to the North and Rivers State to the South. The people of the area engage in farming activities and other non-farm activities. Major crops produced are cassava, maize, yam, cocoyam, melon, okra, and vegetables while some have palm plantation, plantain plantation, and pineapple orchard etc. Some also deal on animal production such as poultry, goat and sheep rearing and occasionally snail and rabbit production.

The State is made up of three agricultural zones namely; Owerri, Orlu and Okigwe. Multi-stage random sampling technique was used to select the respondents with the aid of a well structured questionnaire and interview schedule. Two local government areas were randomly selected from each of the three agricultural zones, making six (6) local government areas. The local government areas were Ohaji-Egbema and Ikeduru from Owerri zone, Oru East and Orsu from Orlu zone while Obowo and Onuimo were selected from Okigwe zone. From each of the local government areas, two communities were randomly selected making a total of twelve (12) communities. A list of arable crop farmers in each of the three agricultural zones formed a sample frame. Hence, 12 arable crop farmers were randomly selected from each community to give a good representation of the zones. This gave a total number of 144 respondents but out of this sample, only 123 questionnaires were found useful for data analysis. Data were analyzed using simple descriptive statistics and other econometric tools. The socio-economic characteristics were analyzed using descriptive statistics such as percentage, frequency counts, and mean. The multiple regression model was employed to determine the effects of farm inputs on productivity of farmers.

Results and Discussion

Table 1 show that 52.0% of the farmers were males while 48.0% were females. This implies that the male folk dominated the farming area and this is in line with Osuji, *et al.*, (2012). Majority of the farmers (40.0%) falls within the age group of 51-60 years with a mean age of 56 years. This implies that the farmers are ageing but still have the ability to carry on their farming activities. This corroborates with the findings of Nwaru, (2004). Again, majority (89.4%) of the farmers had household size of 1-5 persons with an average size of 4 persons which could serve as a source of cheap labour to the farmers. This corresponds to Oladejo, *et al.*, (2011). The farmers in the study area had an average farming experience of about 20 years. This is an indication that farmers in the study area have acquired enough farming experience that can earn them opportunity to effectively employ new farming techniques and be more responsive to sustainable conservation practices that can make meaningful and substantial impact on agricultural production. This validates the findings of Ejike and Osuji, (2012). Average farm size cultivated in the area is about 1.0 hectares which an indication of fragmented nature of farm holdings in the study area. This affirms the reports of Osuji, *et al.*, (2012). Furthermore, majority of the farmers (50.4%) had secondary education and this implies that at this stage of their educational attainment they are reasonable enough to evaluate and adopt new farming techniques for increased production. This is in conformity with Amos, *et al.*, (2004).

Table 2 shows that the multiple regression model was employed to determine the effects of farm inputs on productivity of farmers. Double-Log functional form was chosen as the lead equation based on its ability to produce the lowest standard error, highest value of co-efficient of multiple determination (R^2), a quite number of significant

explanatory variables and conformity to a priori expectation. The regression result shows that the explanatory variables such as X_1 (Farm land), X_2 (Extension service), X_3 (Organic manure used), X_4 (Inorganic manure used), X_5 (Labour used), X_6 (Planting materials), X_7 (Agro-chemicals used), and X_8 (Capital used) were significant both at 1% and 5% statistical level and positively related to total factor productivity. About 84.0% of the total variations in total factor productivity was explained by the independent variables investigated. The F-value was significant at 1% which implies the overall fitness of the regression model. X_1 (Farm land), was positive and significantly related to total factor productivity. This implies that more use of farm lands increases total factor productivity of farmers in general. This is in line with Osuji, *et al.,* (2013). X_2 (Extension service) was also positive and significantly related to total factor productivity. This implies that farmers' accessibility of extension services enhances their knowledge in adopting improved farming techniques which increases productivity. This is in conformity with Okoronkwo and Ume, (2013). X_3 (Organic manure used) was positively related to total factor productivity and this implies that, the use of organic manure such as animal waste/droppings increases the fertility of the soil, which leads to increased output. This is also in conformity with Drost, *et al.,* (1996). Furthermore, X_4 (Inorganic manure used), X_5 (Labour used), X_6 (Planting materials), X_7 (Agro-chemicals used), and X_8 (Capital used) were all positive and significantly related to total factor productivity. This implies that increase in the use of these inputs directly increases total factor productivity of the farmers. This is in line with a priori expectation and also in conformity with Ukoha, *et al.,* (2010) and Bamidele, *et al.,* (2008). However, X_9 (Farm machinery) was negative and not significant at both 1% and 5% critical level. This implies that farmers in the area do not have access to farm machinery probably due to its high cost and technicality involved. This corresponds with the findings of Ejike and Osuji, (2013). Also, X_{10} (Household size) was negative and not significant at both 1% and 5% critical level. This also implies that farmers in the area probably were not able to utilize their household size efficiently. This corroborates with the findings of Akpan, *et al.,* (2011).

Table 3 shows that 91.1% of the farmers were faced with lack of capital as a major production constraints followed by high cost of farm inputs (89.4%), high cost of labour (87.0%), and unproductive farm land (80.5%). Other identified constraints were inadequate storage facilities (61.8%), pest and disease infestation (50.4%), poor weather conditions (41.5%), poor access to extension services (30.9%) and erosion menace (27.6%). This implies that the identified constraints perceived by the farmers contributed to the low productivity recorded in the study area. This corroborates with Osuji, *et al.,* (2012)

Conclusion and Recommendations

The findings of this study shows that the farm inputs investigated had a positive influence on total factor productivity of farmers in the area. Although the total factor productivity among the farmers varied probably due to poor access to farm inputs and also due to the identified constraints faced by the farmers in the study area. However, for maximum productivity to be attained there is need for the government to provide credit facilities to the farmers at a reduced / no interest rate to enhance output and productivity. Also, appropriate government policies should be directed towards the provision of farm inputs at a subsidized rate hence, making them available and accessible to the farmers for increased output.

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Tables

Table 1: Distribution of respondents according to socio-economic characteristics

Variable	Frequency	Percentage (%)	Mean
Gender			
Male	64	52.0	
Female	59	48.0	
Age (Years)			
31 – 40	12	9.8	55.5
41 – 50	25	20.3	
51 – 60	49	40.0	
61 – 70	37	30.1	
Household Size (Number of Persons)			
1- 5	110	89.4	4
6-10	12	9.8	
11-15	1	0.8	
Farming Experience (Years)			
1-10	16	13.0	20.0
11-20	44	35.8	
21-30	54	44.0	
31-40	9	7.3	
Farm Size (Ha)			
0.1-1.0	76	61.8	1.0
1.1-2.0	37	30.1	
2.1-3.0	10	8.1	
Educational Status			
No Formal Education	19	15.4	
Primary Education	37	30.1	
Secondary Education	62	50.4	
Tertiary Education	5	4.1	

Source: Field Survey, 2013

Table 2: Multiple regression estimates of effects of farm inputs on productivity of farmers in Imo State.

Variables	Co-efficients	T-Values	Significant Levels
Constant	407.1208		
X_1, Farm land	0.0710	3.2061	**
X_2, Extension service	0.8231	2.8125	**
X_3, Organic manure used	0.0223	2.4763	*
X_4, Inorganic manure used	0.0099	3.0270	**
X_5, Labour used	0.6441	2.5084	*
X_6, Planting materials	0.0342	4.3567	**
X_7, Agro-chemicals used	0.6770	2.2078	*
X_8, Capital used	0.5075	3.3653	**
X_9, Farm machinery	- 0.0089	-1.8057	NS
X_{10}, Household size	- 0.0364	-1.0965	NS
R_2	0.8402		
F value	134.354		**
$t_{0.01, 112}$	2.617		
$t_{0.05, 112}$	1.980		
$F_{0.01}$	2.47		
n	123		

Source: Field Survey, 2013

** = Significant at 1% level

* = Significant at 5% level

NS = Not Significant

Table 3: Distribution of respondents according to identified constraints impeding farm productivity in the study area.

Identified constraints	**Frequency ****	**Percentage**
Inadequate capital	112	91.1
Inadequate storage facilities	76	61.8
Unproductive farm land	99	80.5
Poor access to farm inputs	110	89.4
High cost of labour	107	87.0
Poor weather conditions	51	41.5
Pest and disease infestation	62	50.4
Poor access to extension services	38	30.9
Erosion menace	34	27.6

**Multiple responses recorded
Source: Field Survey, 2013