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TECHNICAL EFFICIENCY OF FOOD CROP FARMERS IN OSUN STATE NIGERIA

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Abstract

The study examined the technical efficiency of food crop production in Osun State, Nigeria. Multistage sampling technique was used to select 240 maize farmers in the study area. Interview schedule was used to elicit needed information such as age, land conservation practices adopted and production characteristics of maize farmer in the study area. Data were analyzed using descriptive statistic and stochastic production function model (SPF). The result revealed that 90.2%, 65.5% and 60.0% were male, married and had secondary education respectively with mean household size and farm estimated at 7 persons and 7 hectares respectively. About 55.0%, 40.0%, and 10.2% adopted mixed farming, fertilizer application and bush fallowing respectively as means of farm conservation. SPF showed that farm size ($p < 0.01$), labour ($p < 0.01$) and cost of inputs ($p < 0.01$) had a significant influence on technical efficiency of food crop production while age ($p < 0.1$) and level of education ($p < 0.01$) had significant influence on technical inefficiency of food crop production in the study area. The study concluded that farm size, labour and cost of planting materials affect technical efficiency of food crop production while age and level of education were the major determining factors affecting technical inefficiency of food crop production the study area. The study recommended that government should encourage research to specified their researches on how to improve food crop production in the study area especially in the area of enhancing production efficiency of food crop farmers.

Keywords: Age, Farm Size, Technical efficiency, Inefficiency

Introduction

The roles of the agriculture in Nigeria economy sector cannot be over emphasis including provision of food for the population and employment opportunity. The sector has been the largest employer of labour with more than 75% of the nation's population involved in one form of agriculture-related activities or another. Oluwatayo *et al.*, (2008) reported that land to the farmer is like home and work place and shares it with the entire biotic complex. As important as land is to farmers' livelihood, Arimi (2014) observed that subsistence farmers witnessed many constraints on food crop production. These constraints are classified under three headings; economics, social and ecological constraints. The economic obstacles include inadequate capital and financial incentives, poor efficient way of transforming input to output in agriculture; social constraints include land tenure, inavailability of infrastructures and low educational level of farmers. Moreover, these two processes are clearly related. Many poor African pastoralists and farming households respond to declining land productivity by abandoning existing degraded pasture and cropland, and moving to new land for grazing and crop cultivation. Due to the fact that the pattern of land use will often result into depletion of soil nutrients, appropriate management practices have to be adopted there by over-emphasising on their efficiency in production. Oluwatayo *et al.*, (2008) noted the need for appropriate motivation strategies, proper and efficient way of transforming input to output in agricultural sectors should be encouraged so as to meet the ever increasing population of the nation and ever degrading soil fertility. This was traced to the fact that clay in most tropical soil, referred to as low activity clay (LAC) does not expand and contract readily with moisture changes and the soil becomes susceptible to soil compaction. Also, LAC soils have a low Cation Exchange Capacity (CEC). This is due to high temperature; which makes organic matters in tropical soil to be susceptible to rapid mineralization.

Problem statement

The study was informed by the declining food crop production in Nigeria as a result of poor production efficiency of farmers. Food crop production in Nigeria no longer keeps with population growth. Thus creating a wide gap between the demand and supply of food (Abdulrahman, 2013). The growth of Nigeria economy with reference to agriculture has been import driven rather than production driven. Consequently, there is a growing advocacy for improving Nigeria agricultural production so as to achieve sustainable food security. According to Abdulrahman (2013), a lot of effort has been directed at finding appropriate institutions for organizing millions of small scale farmers towards achieving food security (through increased food crops production) and agricultural productivity. Food production could be affected by the farmer's age, access to credit, gender, farm size, educational level, land management and practices. It is on record that 50% of world's population is dependent on subsistence agriculture. The effect of this is high, underfeeding and malnutrition throughout the nation.

Moreover, Nigeria is witnessing an upward trend in price of foodstuff, which should not be attributed to inflationary tendencies alone. The price increase is mainly due to decrease in production coupled with general poor technical efficiency of farmers. For example, cassava products was reported to be declining by less than 10% for reasons connected with losses from livestock and inefficient mode of crop propagation (Amaza and Olayemi, 2010). Hence, there is every need to increase food crop production due to increase in human population so as not to cause hunger and starvation among the teeming population by providing solution on how to improve the technical efficiency of food crop production in Nigeria.

The study was conceived to determine the technical efficiency of food crop production in Osun State, Nigeria. Hence, the specific objectives were to describe the socioeconomic characteristic of maize farmers, examine the type of land conservation practices by the farmers and determine the factors affecting the technical efficiency of food crop production in the study area

Methodology

The Study area

The study was carried out in Osun State, South Western Nigeria. It is an inland state in south-western Nigeria, with its capital at Osogbo. It is bounded in the north by Kwara state, in the east by Ekiti State and partly by Ondo State, in the south by Ogun State and in the west by Oyo State. It has a tropical climate with rainforest vegetation on its southern part and a derived savannah on its northern end. It has an estimated land area of 9,251 square kilometres. The estimated human population is 3,416,959 (2006 population census) and it is characterized commercially by a dual economic focus, the burgeoning industrial sector and a dominant agricultural sector.

Sampling Techniques

Multistage sampling technique was used to select 240 food crop farmers from 18 communities in two agricultural zones of Osun State (Ife and Iwo).

First stage involved the selection of two Zones which are Ife and Iwo randomly. Second stage involved simple random selection of three (3) and two (3) blocks from each of the two ADP zones respectively making 6 blocks. Stage three involved random selection of four (4) cells from each of the 6 blocks making 24 cells. While the last stage involved random selection of ten (10) food crop farmers from each of the 24 cells making 240 food crop farmers. Data were analysed using frequency count, percentage, mean and Stochastic Production Function (SPF)

Results and discussion

Socioeconomic characteristics of respondents

The socioeconomic distributions of the respondents were presented in Table 1. This reveals that majority (94.17 percent) of food crop farmers were below 60 years with the mean age of 47 years. This implies that most of the respondents are in their economically active age and are expected to be energetic and productive. The result was in conformity with Oluwatayo *et al.* (2008) who pointed out that individuals were more active under the age of 50 years. Also, majority (72.5 percent) of the food crop farmers were married with mean household size of 7 persons. Also, based on religion distribution of the respondents, majority (60.0 percent) were Christians. The

educational status revealed that many (50.8 percent) had secondary school education as against 10.8 percent without formal education. The mean farming experience and farm size were estimated at 9.6 years and 4.2 hectares respectively. This is contrary to Dipeolu *et al.* (2009) where majority of food crop farmers had no formal education while Arimi (2014) reported that majority of Nigeria's farmers are still subsistence in nature. Also, majority (72.5 percent) of food crop farmers had contact with extension agents once a year. This finding aligned with Fabusoro *et al.* (2008) that shortage of extension personnel hindered the delivery of good agricultural extension services.

Table 1: Distribution of the respondents according to the socioeconomic characteristics in the study area

Socioeconomics characteristics	Frequency	Percentage	Mean
Sex			
Male	216	90.20	
Female	24	9.80	
Age			
Less than 30	52	21.67	
31-40	48	20.00	
41-50	88	36.67	47
51-60	38	15.83	
61 and above	14	5.83	
Marital status			
Married	157	65.50	
Single	52	21.67	
Divorced	27	11.25	
Widowed/widow	2	0.83	
Separated	2	0.83	
Religion			
Christianity	144	60.00	
Islam	88	36.67	
Traditional	8	3.33	
Level of education			
Non-formal	26	10.83	
Primary	40	16.67	
Secondary	122	50.83	
Tertiary	52	21.67	
Household size			
1-2	68	28.33	
3-6	28	11.68	
7-10	14228	59.16 7	
10 and above	2	0.83	
Farm size			
1-5 hectares	24	10.00	
6-10 hectares	190	79.17 7	
Above 10 hectares	26	10.83	
Farming experience			
1-5 years	66	27.50	
6-10 years	94	39.17	9.6
11years and above	80	33.33	
Contact with extension agent			
None	4	1.67	
Once	174	72.50	

More than once	62	25.3
Total	240	100

Source: Field Survey, 2018

Land conservation practices by the respondents

Land conservation practice adopted by maize farmers in Table 2 reveals that 47.28% of the respondents engaged in crop rotation, 10.2% of the respondents engaged in Bush fallowing, 55.00% of the respondents engaged in Mixed cropping, 9.12% of the respondents engaged in Planting cover crop while 6.7% of the respondents engaged in Mulching. This implies that majority of the respondents were engaged in diverse land conservation practices in the study area.

Table 3: Distribution of respondents according to land conservation practices adopted in the study area

Land conservation methods	Frequency	Percentage
Crop Rotation	106	47.28
Bush Fallowing	22	10.2
Mixed Cropping	126	55.00
Planting Cover Crop	27	9.12
Mulching	14	6.7
Fertilizer Application	98	40.0
Total	240	100

Source: Field Data, 2018

Maximum Likelihood Estimates of the Stochastic Production Function of Maize farmers

Table 3 presents the maximum likelihood estimates (MLE) of the production function of maize farmers in Osun State. The variance parameter of sigma-square for maize farmers was estimated at 0.612. The sigma-square attests to the goodness of fit and correctness of the distributional form of the model while the gamma value (0.612) which was significant at 5% revealed the systematic influences that were unexplained by the production function and the dominant sources of random error. It implies that about 61.2% percent of the variance in output of food crop production in Osun State is due to the differences in their technical inefficiencies or technical efficiencies. The result showed that hired labour ($p < 0.01$), cost of planting inputs ($p < 0.01$) and farm size ($p < 0.01$) in hectares had positive significant influence on maize production at 1 percent level of significance. However, the contribution of farmers' personal characteristics such as Age, Years of education, Farming experience, Household size and Sex to farm inefficiency were also examined. However, age of the household head ($p < 0.1$) and level of education of the respondents ($p < 0.01$) that had negative influence on farmers' inefficiency model. It implies that age and level of education were predominant factors in food crop production in the study area.

Table 3: Stochastic Frontier Production Function Model result of Maize farmers' production

Variables	Coefficient	Standard error	t-value
Constant	0.7231***	0.3115	3.1460
Farm size	0.4510***	0.1521	2.96515
Labour (Man days)	0.7211***	0.2007	3.5929
Fertilizer (Kg)	0.2981	0.3092	0.9641
Agrochemicals (Kg)	1.0134	0.7022	1.4431
Planting material/input (₦)	0.0607***	0.0332	2.9234
Inefficiency Model			
Constant	2.1311**	1.0763	1.9800
Sex	0.5671	0.5231	1.0841
Age	0.0133***	0.0028	3.0292
Education	-0.2091	0.3121	-0.6699
Farm Experience	-0.7711	0.9899	-0.7789
Household size	-0.2219	0.3441	-0.6448

Educational level	-0.1222***	0.0522	-4.7394
Diagnostic Statistics			
Stigma-square (δ^2)	0.617	0.345	0.467
Gamma (γ)	0.612**	0.311	2.061
Log Likelihood	-94.21		
Chi Square	27.31***		

Source: Field Survey, 2018

*** implies significant at 1 percent, ** implies significant at 5 percent

Conclusion and recommendation

The study concluded that majority of the respondents were still in their economic stage, married and expected to be productive. The result of SPF revealed that hired labour, cost of planting material and farm size (in hectares) exert a positive influence on farmers' technical efficiency in the study area.

The study recommends that researchers should be result oriented, specified their researches on how to improve food crop production in the study area especially in the area of improving the efficient ways of transforming input to output. Also, there should be generally awareness on how to improve the quality of farm management practices currently in practice.

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