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PREVALENT CROPPING PRACTICES AND TECHNICAL EFFICIENCY OF CROP FARMS IN THE NIGER DELTA OF NIGERIA

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ABSTRACT

This study examined Technical efficiency of crop farms in the Niger Delta of Nigeria. Data for this study were collected from 9 villages in oil and gas producing Local Government Area of Edo State with the aid of a questionnaire. Descriptive statistics and Stochastic Frontier Analysis (SFA) were used for data analysis. The study revealed that the mean age of respondents was 52 years with the male respondents out numbering the females. Mixed cropping practices were the most prevalent in the area. The results from the stochastic frontier analysis revealed that the size of land and cost of inputs were the significant factors affecting crop production in the area. The study recommends that farmers in the area be assisted to have better access to land and other inputs required for crop production, that people of ages below 35 years be encouraged to go into agriculture, extension services be provided to farmers to enhance efficiency of crop farms in the study area.

Keywords: Cropping, efficiency, Crop Farms, Niger Delta,

1. INTRODUCTION

Since the early 1970's, the Niger Delta region has become the bedrock of Nigeria's oil production. The region accounts for about 97% of the Nations' total revenue. But prior to the discovery of crude oil, the Niger 'Deltans' made their living via the exploitation of land, water and forest resources as farmers, fishermen, lumbermen and hunters respectively (Etiosa and Anthony, 2007; Omofonmwan and Odia, 2009). However, the devastating impacts of oil industries and their activities on farmlands, crops, economic trees, creeks, lakes and other components of the environment have been so severe to the extent that people can no longer

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engage in productive farming activities of which the mostly affected groups are women and children (Etiosa and Anthony, 2007).

A major problem of oil exploration in the region is oil spillages which have degraded most agricultural lands leading to increasing soil infertility due to the destruction of soil micro-organisms and dwindling agricultural productivity (Odjuvwuederhie *et al*, 2006). Consequently, farmers have been forced to abandon their land and to seek non-existent alternative means of livelihood. The aquatic ecosystems have also been affected with the pollution of traditional fishing grounds thereby increasing hunger and poverty among fishing households in the region. Additionally, land which forms the basis for agriculture is no longer abundant and if available its productive potential is being reduced due to degradation which supports the assertion of Young (1998) that sustainability, which involves the production and conservation of resources to meet the need of future generation is key to land management which is reflected in the character of soil and prevailing economic conditions and if tampered with will cause disaster in the time to come.

Etiosa and Anthony (2007) assert that three major agricultural activities are still prevalent in the Niger Delta area of Nigeria. These include crop farming, fishing and hunting. They further noted that lumbering activities could also be traced to the mangrove area of the region. It is therefore evident that irrespective of land and environmental constraints in the area, farmers have not totally given up agricultural activities. Amaechi (2009) commended the doggedness of farmers to survive despite continuous reduction of agricultural lands in the area by the activities of oil exploration and land exploitation and opine that farmers in the Niger Delta region must have adapted several measures to continue agricultural production.

From the foregoing, it is clear that agricultural production cannot sustain people's livelihood while at the same time the natural resources that agricultural production depends on is devastated. In the Niger Delta, the discovery of oil since the 1950's have brought along with it negative socio-economic and environmental problems leading to gross land degradation and consequent infertile lands that are almost 'good for nothing' in the support of plant life. However, farmers within this region have been and are still involved in crop farming despite all the land and environmental issues and problems they encounter.

It is then necessary to ask; who are the farmers in the Niger Delta? How viable are farms in the Niger Delta? Are these crop farms viable and efficient? What are the factors influencing the variation in efficiency? Against the above background, this research is set to examine the socio-economic characteristics of farmers, profile the prevalent cropping practices and estimate the technical efficiency of crop farms in the Niger Delta region of Nigeria: case study of Edo State.

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2. METHODOLOGY

The study area

This study was carried out in Edo State, Nigeria. The State lies within the geographical coordinates of Longitude 050 04` East and 060 43` East and Latitude 050 44` North and 070 34` North of the Greenwich. It is bounded in the North by Kogi State, in the South by Delta State, in the West by Ondo State and in the East by Kogi and Anambra States (Wikipedia, 2017). She has 3 Agricultural Development Programme (ADP) Zones with Edo South ADP zone containing the 7 LGA (blocks) from which 3 are oil and gas producing blocks (Omoregbee and Ekpebu, 2013; EDSOGPADEC, 2017). The State is characterized by a tropical climate, which ranges from humid to sub-humid at different times in the year. The three distinct vegetations identified in the State are Mangrove Forest, Fresh Swamp and Savannah vegetations. The mean annual rainfall in the Northern part of the State is between 127cm-152cm while the Southern part of the State receives about 252cm-254cm of rainfall annually, with average temperature ranging from a minimum of 240c to a maximum of about 330c. The State has an estimated population of about four million people (NPC, 2006). Edo state is one of the nine (9) states making up the Niger Delta of Nigeria.

Sampling techniques

The target population for the study was crop farmers from the three oil producing local government areas out of the 7 blocks making the Edo South Agricultural Development Project (ESADP) zone of Edo State. The selection of sample involved a two stage-wise random sampling approach. In the first stage, a random selection of three villages in each of three oil and gas producing local government was made. The second stage comprised the selection of arable crop farm households from each selected community. The number selected across each village was based on the spread of the farmers. In all, a total of 120 farm households were used for the study.

The literate farmers among them were given the questionnaires to fill while the illiterate were personally interviewed by the researcher. After scrutiny of returned questionnaire 100 questionnaires were used for this research.

Data Collection and instruments

Data were collected from two sources namely primary and secondary. The primary data was obtained through the use of questionnaires. Also some data were collected from textbooks, journals and from the internet.

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Methods of Data Analysis and model specification

The major analytical techniques and tools used in this research were Descriptive statistics of frequency tables and percentages and Stochastic Frontier Analysis (SFA)

Stochastic Frontier Analysis (SFA)

SFA adopted from (Seiford and Thrall;1990 and Coelli *et al* (1998) was used to estimate the technical efficiency of the crop farms of farmers in the area.

Thus the SFA model is specified as

$\ln Q = a_o + a_1 \ln x_1 i + a_2 \ln x_2 i + a_3 \ln x_3 i + \ldots\ldots\ldots + (V_i - U_i)$

Where:

ln = Natural log

Q =total output (kg)

X_1 =Farm size (Ha)

X_2=labour (hours)

X_3 =Labour cost

X_4 = Input cost

V_i = random error

U_i = non-negative random variable which is the technical inefficiency.

3. RESULTS AND DISCUSSION

Socio-economic Characteristics of the respondents.

The socio-economic characteristics of the crop farmers in the study is shown in table 4.1, which is expected to play an important role in the economic performance of the farmers.

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Table 2: Socio-Economic characteristics of farmers in the study area

Characteristics	Frequency (N=100)	Percentage
Age (years)		
20 –30	1	1.0
31 – 40	8	8.0
41 – 50	33	33.3
51 – 60	46	46.0
61 – 70	11	11.0
>71	1	1.0
Mean = 52 years		
Marital status		
Single	4	4.0
Married	77	77.0
Divorce	7	7.0
Widowed	12	12.0
Gender of respondents		
Male	68	68.0
Female	32	32.0
Level of Education		
No formal education	14	14.0
Adult Education	16	16.0
Primary Education	10	10.0
Post primary Education	37	37.0
Tertiary Education	22	22.0
Others	1	1.0
Years of Experience		
1 – 10	4	4.0
11 – 20	26	26.0
21 – 30	52	52.0
31 – 40	18	18.0
Membership of cooperative		
Yes	81	81.0
No	19	19.0
Benefit of Coop. members	**(N=81)**	
Provision of Exten. Services	6	6.0
Subsidies of inputs	35	35.0

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Communal labour provision	38	38.0
Others (Specify)	2	2.0

Source: Field Survey, 2017.

Tables 2 showed that majority of the respondents (46%) were within the age bracket 51 – 60 years. The mean age is 52 years. This suggests the need to encourage younger people to engage in crop farming. The table also showed that 77% respondents were married while 4% were single. Similarly 68% of crop producers were male and 32% were female. This is because the female folk within this region are basically into processing and marketing of agricultural produce. The male-female margin producer ratio shows that crop production enterprise is not popular among the women folks. This may be due to high labour and energy demand in crop production.

The result also revealed that 86% had some form of education while 14% had no formal education. The implication of this is that crop farmers are likely to readily adopt new technology and innovation in their production process. The average years of experience of the respondents in the study area was found to be 24 years. Although less than five percent (5%) of the respondents have less than 10 years of experience, showing that new entrants are also involved.

Furthermore the table shows that 81 respondents are members of one cooperative society or farmers/agricultural association/group. Provision of subsidized inputs (35%) and contribution of communal labour (38%) were the major benefits of membership of cooperative society in the study area.

Prevalent cropping system(s) practiced by farmers in the study area

Table 3 show the prevalent type of cropping system(s) carried out by farmers in the Edo state.

Table 3: Cropping system(s)

	Frequency	**Percentage**
Sole cropping	10	10.0
Intercropping	18	18.0
Mixed cropping	72	72.0
Total	100	100.0

Source: Field Survey, 2017.

The study reveals that over seventy (72%) farmers were into the practice of mixed cropping. While ten (10%) practiced to sole cropping while eighteen (18%) farmers were into

mixed/Intercropping as their farming/cropping practices respectively which confirms the work of Allison-Oguru *et al* (2008) where it was made clear that farmers in the Niger Delta especially those into crop agriculture are into the above mentioned crop practices which are not limited to the region but prevalent in the world confirming early researches done to determine if these farming practices are prevalent in the region. These practices are said to have prevailed over the years because of some benefits which peasant farmers have continued to derive from these cropping systems. Another reason for the high percentage of the farmers involvement in the practice of mixed/intercropping could be the desire to maximize the use of available arable land since arable land have continued to decrease and become unavailable due to the incessant and continuous growth of population in the region and poverty occasioned by soil degradation due to oil exploitation and consequent oil spills in the region.

The results of the Stochastic Frontier Analysis (SFA)

The results of the SFA is presented in Table 4

Table 4: Maximum likelihood estimates of the SFA

Variable	Parameters	Coefficient	Standard error	t-ratio
Constant	b_0	244137.300	3.621	67424.080
x_1	b_1	3870.299*****	35.975	107.584
x_2	b_2	11.890	139.478	-0.085
x_3	b_3	0.113	0.261	0.434
x_4	b_4	1.451*****	0.438	3.314
Sigma-squared(6^2)		42526466000	1.000	42526466000
Gamma(&)		0.0000001	0.00065	0.00015
Log likelihood function	-1359.509			

Source: Field survey, 2017

Key: ***** significant at 1%

Technical Efficiency

In carrying out the assessment of technical efficiency of crop farms in the study area, four (4) variables were specified in the model. These four variables include Farm size (x_1), Labour (x_2), Labour cost (x_3) and input cost (x_4).

As shown in the table 4, two of the variables have significant influence on the technical efficiency of crop farms in the study area. Farm size and input cost are the variables that can

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increase the technical efficiency of crop production of farmers in the study area. This means that an increase in size of land will result to an increase in output of crop farms in the study area. Also if there is an increase in the amount of inputs such as planting materials and herbicides this will eventually results to an increase in output of crop production of crop farms in the study area.

The coefficients of land and input cost are significant and positively related to the efficiency of crop farms production. This is in line with apriori expectation.

The model also revealed that the use of more land area for crop production in the area will have more effect in increasing of output i.e. more land area should be used in the production process.

Table 5: Distribution of farmers according to their technical efficiency (TE)

Level of TE (%)	No. of farmers	Percentage (%)
< 60	-	-
60 – 69.99	3	3
70 – 79.99	8	8
80 – 89.99	18	18
90 – 99.99	71	71
Sample	100	100

Source: Field survey, 2017

Table 5 shows the minimum estimated efficiency of crop farms to be between 60 and 69.99% and the maximum efficiency to be within the range of 90 and 99.99%. The technical efficiency estimates show that the farmers have a mean efficiency of 92.6% and that is about 93% of the variation of crop farms output. This shows that farmers in the study area are 93% efficient and 7% inefficient. The mean value indicates that if input usage is increased by7% (i.e. 100 – 93) there will be increase in output of crop farms in the study area. Thus opportunity still exists for increasing productivity and output of the utilization of productive resources. Their efficiency can further be increased by using more inputs such as land, planting materials (such as seed, stem cuttings, yamsetts e.t.c.), herbicides and fertilizers and this they can do by making the best use of available resources.

4. CONCLUSION AND RECOMMENDATIONS

The study profiled prevalent cropping practices and estimates the technical efficiency of crop farms in the Niger Delta of Nigeria. Results from the study indicated that crop production in the area was carried out majorly by men (68%) most of which are above forty years of age. Seventy – seven percent (77%) of the farmers were married and about 86% were literate. About 93% of

the farmers have more than 10 years of farming experience. Farmers with household size between 11 and 20 constitute about 40% of the respondents. About 81% of the farmers belong to a cooperative society. The study further revealed that the major factors affecting efficiency of crop farms in the area are land size and cost of input and that the mean technical efficiency of crop farms in the study area was found to be 93%.

In view of the economic importance of crop production to the economy of Nigeria and based on the results from this study, this study recommends the following with a view to improving crop farms production in the Niger Delta.

- Farmers in the study area should be assisted to have better access to land and other inputs required for crop production in the study area.
- That young people of ages below 35years be encouraged to go into agriculture.
- Education and training and more of extension services should be provided to farmers in the area to enhance efficiency of their production.
- Input should be subsidized for farmers in the study area to reduce their cost of production and thereby increase productivity.

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