SUSTAINABLE LAND MANAGEMENT PRACTICES AND STAPLE CROP PRODUCTIONS AMONG SMALL HOLDER FARMERS IN EBONYI STATE NIGERIA

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Abstract

The study assessed the sustainable land management practices in staple crop production among farmers in Ebonyi state, Nigeria. Multi stage random sampling was adopted to select a total of one hundred and twenty farmers for the study. Data was collected through the use of a well structured questionnaire. Descriptive statistical tools, four point likert- type scale and binary logistic regression model were used to analyze data. The study revealed that crop rotation was mostly adopted by all the staple crop farmers while irrigation was the least adopted by only 4.4% of the respondents. Farm size, age, education, number of contact with extension agents, household size and number of plots of the respondents were the significant factors affecting the adoption of sustainable land management practices among the farmers. Major constraints to the use of sustainable land management practices were : inadequate fertilizer, poor knowledge of improved agricultural practices, poor transportation, low produce prices among others. The study recommended the training programme for the use of appropriate land management practices, Government's implementation of policies that encourage land tenure system of farmers.

Key words: Sustainable, land management, staple crop

INTRODUCTION

1.1 Background of the Study

The fundamental value of agriculture in the development and growth of the Nigerian economy is indicated in its contribution of food for the teeming population, raw materials for industries, employment for the unemployed, income, market opportunities for industrial output and reduction in poverty (Babalola, 2018). Agriculture remains a major activity in most countries except in the industrialized world. Hence, crop production, forest products gathering, fishing and extensive grazing are substantially contributing to the Gross National Product (GNP) of these countries. At present, more than 44% of the economically active people in the world are

employed in agriculture. For Africa, this is even more than 57%, (Tsue, Nweze and Okoye, 2015).

Land is an important resource in agriculture. Recent estimates indicate that nearly 2 billion hectares of land worldwide, an area twice the size of China, are already seriously degraded, some irreversibly (F.A.O. 2010). About 16%, representing over 494.2 million hectares of land is degraded in Africa with an annual monetary value of lost production of $65 million (Brown, Nuberg and Liewellyn, 2018). In Ebonyi State, land degradation, particularly through erosion, threatens the sustainability of agricultural development, as it causes food crises through stagnant and declining productivity of land, loss of crops and the environment. Projected reductions in crop yields as a result of land degradation in some Sub-Saharan Africa countries could be as much as 50 percent by 2025, while crop net returns could fall by as much as 90 percent by 2030, with small scale farmers being the most affected (Agboola,2016). This will inevitably affect food security adversely. Thus, combating land degradation has become an urgent priority in global efforts to encourage commercial farming and ensure food security of millions of people.

SLMP is generally marked by the adoption of appropriate land management practices that enable land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of land resources (Omovbude, 2017). Sustainable land management practices (SLMPs) helps to integrate land, water, biodiversity and environmental management to meet the rising food and fibre demands, while sustaining ecosystem services and livelihoods (World Bank, 2006). Efficiency is the heartbeat of agricultural production because the scope of production can be expanded and sustained by farmers through use of resources (Aminu 2018,). Efficiency can be measured with respect to maximization of output, minimization of cost or maximization of profits. Since increased productivity is directly related to production efficiency it is therefore, important to know how the efficiency of crop production will be raised in order to help them reduce inefficiency and effectively formulate policy to improve farmers' performance. Thus, ascertains the extent output would be increased using sustainable land management practices and at the same time compensate for nutrient loss and environmental stress (Gazalillssahaku, 2019).

1.2 Problem Statement

Soil nutrient depletion and land degradation remained devastating in spite of several measures aimed at reversing this ugly situation confronting food sufficiency in Nigeria (Akinnagbe&Umukoro, 2011.This scenario is equally disturbing in Sub-Sahara Africa, where 17%, representing about 494.2 million hectares of land with estimated annual monetary production value of $65million is lost due to land degradation problems (Ezeaku and Davidson, 2013). As a result, soil fertility has been under milking pressure by man and natural forces like erosion to the extent that its values as a major agricultural resource is under great threat. However, the activities of farmers and other stakeholders to reverse this trend using many soil management practices have not been effective so that the sustainability of food supply chain into the future is unpredictable.

The degree of land degradation is very high and is on the increase in Nigeria particularly in the Southeastern part of the country whose soil has limited resilience to soil erosion and degrading activities (Abdulazeez, 2014). Varied and conflicting land use types such as agriculture, forestry, settlement, infrastructure and industry equally subject available scarce land

to serious exploitation and depletion (Chukwuone & Amechina, 2018).This clearly shows that land degradation, resulting from unsustainable land management practices is a threat to the environment and to the livelihood of rural inhabitants with attendant negative impacts on the agricultural efficiency and food security (Muge and Dianne 2011). This study will examine the sustainable land management practices of staple crop farmers in Ebonyi State Nigeria.

1.3 Purpose of the Study

The main of this study was to assess sustainable land management practices on staple crop production among small holder farmers in Ebonyi State Nigeria.

Specifically the study sought to:

i. describe the sustainable land management practices of the farming in the area;
ii. determine the factors affecting farmers' choice of specific SLMPs;
iii. identify constraints to adoption of SLMPs and efficiency.

1.4 Significance of the Study

The results of this study could benefit farmers, rural and agriculture development offices, policy-makers, and other governmental organizations that operate in the field of SLM by revealing the existing situations in the study area. It also enhances knowledge of the adoption of SLM practices that contribute to improving agricultural production by reducing land degradation at the farm level. The understanding of the effect of current farming practices adopted by farmers on land in the study area would provide an empirical guide for identifying any gap that may exist in current management practices employed and intervention required towards efficiency in crop production.

1.5 Scope and Limitation of the Study

This study was carried out in Ebonyi State Nigeria.

1.6 The research questions that guided the study were as follows:

1. What are the sustainable land management practices adopted by farmers in the area;
2. What are the factors affecting farmers' choice of specific SLMP;
3. What are the constraints to adoption of SLMPs.

Materials and Methods

This study was carried out in Ebonyi State Nigeria. The area is agrarian in nature with a population of 3,242,500m (NPC, 1991). The population of the study was based on the projected population of 4,215,250million from a population of 3,242,500m (NPC) at 30%. Multi-stage random sampling was used to select respondents for the study. In the first stage, two agricultural zones were randomly sampled. In the second stage, two (2) local government areas were selected from each of the agricultural zones giving a total of four LGAs. Subsequently, two farming communities were randomly selected from each local government area making a total of eight farming communities. Lastly, fifteen (15) crop farmers were randomly selected from each farming community giving a sample size of 120 farmers.

Data for this study was collected from primary sources through the use of well-structured and pre - tested questionnaire. The content validity of the instrument was ascertained by testing the adequacy and relevance of the questionnaire items to the objectives to ensure that it possesses both face and content validity. The reliability of the instrument was established through test and re-test technique. Descriptive statistical tools used to analyze data were means, frequency and

percentages. A four point Likert- type scale was employed to investigate constraints to adoption of sustainable land management practices. The scale was graded as follows: Not severe =1, Less severe =2, Severe =3, and Very severe =4. Binary logistic regression model was used to examine factors affecting farmers' choice of specific land management practices.

Result and Discussions

Research Question One:

What the sustainable land management practices adopted by farmers

Table 1: Distribution of respondents according to sustainable land management practices adopted.

Sustainable land management practices	**Frequency**	**Percentage**
Crop Rotation	75	33.3
Crop rotation with legumes organic manure	5	2.2
Crop Rotation and irrigation	2	0.9
Fertilizer and crop Rotation and organic manure	10	4.4
Mulching cover crops, crop rotation and organic manure	11	4.9
Cover crop, irrigation, crop rotation with legumes	3	1.4
Cover crops, crops rotation and irrigation fertilizer and Organic manure	41	18.1
Organic manure mulching, crop rotation	10	4.4
Inorganic fertilizer crop rotation and organic manure	24	10.6
Inorganic fertilizer organic manure, crop rotation	21	9.3
Inorganic fertilizer and crop rotation, organic manure	19	8.4
Inorganic fertilizer and irrigation, crop rotation	25	2.1
Total	**226**	**100**

Source: filed survey, 2024

Various sustainable land management practices adopted by staple crop farmers include crop rotation with or without legumes, mulching, use of cover crops, irrigation, organic manure and application of inorganic fertilizer as presented in table 1. More than half of the respondents (65.8%) engaged in a minimum of three management practices. Crop rotation was the major crop management system adopted by all (100%) the stable crop farmers. Conversely, irrigation was the least adopted practice with only 4.4% of the respondents. This may be connected to the high cost of irrigation. Crop rotation was adopted by 33.3% of the farmers as a sole management practice. Only 3.6% of the respondents practice crop rotation with legumes. This implies that majority of the farmers wrongly apply crop rotation without legumes. Inorganic fertilizer was applied by 48.5% while only 6.6% use organic manure. Majority of the farmers (55.7%) apply both organic and inorganic fertilizers. The implication is that staple crop farmers adopt sustainable land management practices in production. This is because both organic and inorganic manure constitute integrated land management system.

Research Question Two:

What are the factors affecting farmers' choice of specific sustainable land management practices?

Table 2: Factors affecting choice of specific land management practices of farmers

	Land Management Practice				
Variables	Crop rotation	Cover cropping	Brush fallow	Mulching	Use of fertilizer
Farm Size (x_1)	-0.398***	0.251	-0.012	0.727*	0.069
Age(x_2)	0.05***	-0.024	0.001	0.20**	-0.0065
Educator (x3)	0.103	0.034	0.001	0.089	0.150**
Contacts with Extension		-0.33*	0.569*		0.321**
Agents (x4)	-0.649*	-0.288*			
Number of farm plots (x5)	-1.675*	-1.358**	-0.567	2.612*	-0.58
Household size (x6)	-0.219***	-0.078	-0.021	0.134***	0.086
Constant	4.569	2.787	-0.356	-4.869	-1.546
P^2	0.512	0.327	0.156	0.554	0.398

Source: Data analysis, 2024

Result of binary logistic regression to determine the effect of socioeconomic factors that affect the choice of a specific land management practices among the respondents is shown in table 2. 51.2%, 32.70% , 15.6%, 55.4% and 39.8% of variations in the use of crop rotation, cover cropping, bush fallow, mulching use of fertilizer respectively were explained by the independent variables as shown by their pseudo R-square (R^2) values. Variables that have significant effect choice of land management practices are farm size, age, education, education, extension contacts, number of plots and household size of respondents.

Farm size positively influenced the use of mulching at 1% significance level implying that farmers with large farm size had higher probability to use mulching. Crop rotation was negatively influenced by farm size at 10 % level implying that as farm size decreases farmers may likely increase their choice of crop rotation. The age of the household head was positive and significant at 10% probability level for the use of crop rotation. This implies that the older and more experienced farmers will likely increase the use of crop rotation.

The educational level of the farmers also positively influenced the use of fertilizer by the respondents. This was found to be significant at 5% level of significance. The more educated the farmers are, the higher their likelihood for the use fertilizer. While the coefficient of number of contacts with extension agents was negative for crop rotation, cover cropping and bush fallow, it was positive for mulching and the use of fertilizer. This implies that the practice of Mulching and use of fertilizer will likely increase as the number of contacts with extension agents increases. Conversely, as the farmers contact with extension workers reduce the famers' probability of using crop rotation, cover cropping, bush fallow will likely increase. This implies that the farmers will likely rely more on their indigenous knowledge and practices with reduced level of extension contact.

Number of farm plots cultivated positively influenced the use of mulching. As such, farmers will likely use more of mulching as their farm plots increase in number. This *may* be due to increased labour requirements in higher number of farm plots which the farmers may not be able to afford.

Research Question Three:

What are the constraints to adoption of sustainable land management practices?

Table 3 : Distribution of respondents according to constraints faced in the adoption of sustainable agricultural practices

	Frequency of Respondents Based on Perception						
Constraints to Use of Sustainable Practices	very Serve	Serve	Less Serve	Not Serve	Likert Total	Rank Mean Score	
Inadequate supply of fertilizer	88	21	8	3	120	3.57	1
Non-availability of Labour	58	55	7	0	120	3.4	2
Non-availability of credit	46	66	8	0	120	3.38	2
Inadequate Knowledge of Modern Tech.	60	43	17	0	120	3.32	3
High labour cost	44	69	4	3	120	3.32	4
Transportation problems	25	67	23	5	120	2.96	5
High Cost of irrigation water	28	65	19	8	120	2.95	6
Low produce price	38	43	39	0	120	2.95	7
High cost of soil management	17	53	49	1	120	2.75	8
Inadequate improved variety of seed/ Planting materials	19	42	51	8	120	2.63	9
Insufficient land availability	20	12	35	53	120	1.98	10
Insufficient Extension services	18	14	22	66	120	1.78	11

Sources: field survey 2024

Famers are often faced with various challenges in the use of sustainable practices in staple crop production. 90% of the respondents with a mean score of 3.57 asserted that inadequate supply of fertilizer was the most severe constraint. This often results in low level of application due to inadequate access to fertilizer among the farmers. Other problems considered to be severe are inadequacy of credit and labour (both with mean score of 3.4. Inadequate knowledge of improved method and high cost of labour were also rated high with average scores of 3.38 and 3.32 respectively. The inadequate knowledge of improved methods may be a result of the poor level of extension contact as earlier reported. Other constraints included cost of transportation, high cost of adoption, low produce price and poor transportation. The low produce price reported may make it difficult for the farmers to afford the various costs associated with land management practices. Contrary to expectation, the least severe problem reported by the respondents was insufficient extension service. Even though, the negative impact of inadequate extension contact is already implied in inadequate knowledge of improved method of land management.

Conclusion and Recommendations

The study assessed the effect of sustainable land management practices on staple crop production among small holder farming households in Ebonyi State, Nigeria. Findings from the study revealed that while farmers engaged in a number of sustainable agricultural practices, the

majority who constitute about *95%* of the farmers do not adopt sustainable practices in staple crops production. The following recommendations were made based on its findings:

i. Adoption of integrated land management in staple crop production among farmers.

ii. Improved extension delivery with specific emphasis on sustainable agricultural practices.

iii. There should be better ownership system that discourages land fragmentation.

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