



**ADOPTION OF LAND DEGRADATION MANAGEMENT STRATEGIES AND ITS EFFECTS ON
INCOME OF RICE RURAL FARMING FAMILIES OF NIGER STATE, NIGERIA**

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ABSTRACT

This study examined adoption of land degradation management strategies and its effect on income of rural farming families of Niger State, Nigeria. Multi-stage sampling technique was employed to select 120 respondents. Primary data collected with the aid of structured questionnaire were analyzed using descriptive and inferential statistics. The result obtained revealed mean age of 39.7 years, household size of 9 persons and farming experience of 12.4 years. All the respondents had access to training on land degradation management strategies, while bonding (85%), planting of grasses (75%) and terracing (51%) were the most adopted land degradation management strategies. Poisson regression estimates revealed Pseudo R² value of 0.2146 and chi-squared statistic of 534.58 significant at 1% probability level indicating goodness of fit of the model, while z-values showed that age (6.01), household-size (-10.89), farming experience (2.21), farm size (-6.82), output (6.48), extension visits (4.17) and access to training (12.34) were statistically significant at 1% and 5% probability level, respectively. Thus, influences land degradation management strategies adoption. Major constraints identified were loan and financial acquisition problem, and labour and youth migration (100%) ranked 1st, followed by Government policies and land tenure problem (98.3%) ranked 3rd. The z - test result with t-value of 20.459 at 1% probability level revealed significant difference in income before (₦199,504) and after (₦168,508) land degradation. The rural rice farming families mostly adopted bonding and planting of trees or grasses as land degradation management strategies. Therefore, Government should provide enabling environment for stakeholders to contribute their quarter in alleviating land degradation problem.

Keyword: Land degradation, management strategies, rural rice farming families, income

INTRODUCTION

Rice is the most important and extensively grown food crop as well as major staple food grain crop in the world. Rice importation has constituted a vital share of Nigeria agricultural import (Ogundele *et al.*, 2006). According to Oluwatayo *et al.* (2009), Nigeria is the highest importers of rice in Africa, and the second highest in the world and as a result of considerable national interest in the commodity; several efforts have been made to improve rice production so as to enhance the output and consequently the income of the farmers in Nigeria. However, land being limited in supply is pressured and competed for by several users including crop production. The intensification of cultivation resulting in the opening up of new lands exposes the top soil to the elements of degradation and alters the natural ecological conservatory balances in the landscape (Senjobi and Ogunkunle, 2010).

Land degradation is one of the most problematic issues affecting agricultural production (output) and income in developing countries of the world including Nigeria. Land degradation, a

decline in land quality caused by human activities, will remain high on the international agenda in the 21st century. According to Onumadu and Osahon (2014), more than 80 percent of the small-holder farmers in the world are food insecure and depend on land as their primary source of livelihoods. In developing countries like Nigeria where a large proportion of human population depends almost entirely on land resources for their sustenance, there is increasing competing demand for land utilization for productive uses such as grazing, fish pond construction, quarrying, food crop (rice) farming amongst others (Eni *et al.*, 2010).

People can be a major asset in reversing trend towards land degradation. A wide scale knowledge on land degradation strategies could be employ in managing the extent and effect of soil erosion on crop productivity potential (Ibitoye, 2010). Meanwhile, land degradation poses a threat to rice output and income of small-scale farmers. In the light of this, the research will carefully and critically address these objectives; describe the socio-economic characteristics of small-scale farmers in study area, examine the land degradation

strategies adopted by farmers, determine the factors influencing farmers' adoption of land degradation strategies, examine the effect of land degradation on income of the farmers and identify the constraints to faced by the rice farmers in the study area. The hypothesis tested was that there is no significant effect of land degradation on the income of the farmers.

METHODOLOGY

The study was conducted in Niger state, Nigeria. The state is located between Latitude 8° 22' and 11° 30' North and Longitude 33° and 7° 20' East of the equator. Climate and ecological conditions of the area is favourable with rainfall range of 762 – 1016 mm annually. The average temperature is about 27.78°C (Niger State Geographic Information System (NSGIS), 2015). The majority of the population are into crops and animals production. Multi-stage sampling technique was adopted for the selection of respondents for this study. In the first stage, Lavun and Katcha Local Government Areas were randomly selected, followed by random selection of 3 extension blocks in stage two, random selection of 2 extension cells in stage three and 10 rice farmers in the last stage to get 120 respondents. Structured questionnaire was administered by the researchers with the assistance of trained enumerators to obtained primary data. Data collected were analyzed using descriptive and inferential statistics such as z-test and poisson regression model were used for the data analysis.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Results in Table 1 revealed that more than half (57.2%) of the respondents were in the age bracket of 26 – 35 years with a mean age of 34 years. This implies that they are in their active and productive stage of life. Also, 58.4% of the

respondents were males, while 41.6% were females implying male dominant in rice production. More than half (54.5%) of the respondents were married, while 29.9% were single, 11.7% were widowed and 3.9% were divorced. In terms of household size, majority (75.3%) of the respondents had household size between 1 – 5 people with a mean of 4 people implying that the respondents had relatively fair household size. Also, majority (84.4%) of the respondents acquired tertiary education with a mean of 14 years of formal schooling. This implies that the respondents are highly educated which could easily influences their ability to adopt land degradation management strategies. Majority (85.7%) of the respondents had farming experience of between 1 – 5 years with a mean of 6 years farming experience. This implies that they have been into rice production for not too long. Experience is an asset in farming which inspires farmers' rational decision-making process with respect to land degradation management strategies.

Land degradation strategies adopted by respondents

The result in Table 2 revealed the land degradation management strategies adopted by respondents in the study area based on three levels of adoption (aware, tried and adopted). Bonding management strategies revealed highest percentage in terms of awareness (91.67%), trial (85.00%) and adoption (84.17%). This is followed by planting of grasses with 84.17% awareness, 75.00% trial and 72.5% adoption. The least land management strategies was uses of organic fertilizer with 52.50% awareness, 12.50% trial and 6.67% adoption. However, there was high percentage of awareness for all the land management strategies under consideration with only bonding and planting of grasses recording the highest percentage of adoption.

Table 1: Distribution of respondents based on socio-economic characteristics (n=120)

Descriptions	Frequency	Percent (%)	Mean
Age (years)			
< 26			
26 – 55	24	31.2	34
> 55	44	57.2	
	9	11.6	
Gender			
Male	45	58.4	
Female	32	41.6	
Marital Status			
Single	23	29.9	
Married	42	54.5	
Divorced	3	3.9	
Widow	9	11.7	
Household size (number)			
1 – 5	58	75.3	4
6 – 10	19	24.7	
Education Status			
Primary	3	3.9	14
Secondary	7	9.1	
Tertiary	65	84.4	
Farming experience (years)			
1 – 5	66	85.7	6
6 – 10	11	14.3	

Source: Field Survey, 2018

Table 2: Land degradation management strategies adopted by the respondents

Variables	Aware	Tried	Adopted
Planting of grass	101 (84.17)	90 (75.00)	87 (72.5)
Afforestation	96 (80.00)	70 (58.33)	37 (30.83)
Bonding	110 (91.67)	102 (85.00)	101 (84.17)
Terracing	80 (66.67)	62 (51.67)	51 (42.50)
Crop rotation	73 (60.83)	17 (14.17)	10 (8.33)
Use of organic fertilizer	63 (52.50)	15 (12.50)	8 (6.67)

Source: Field Survey, 2018

Factors influencing respondents' adoption of land degradation strategies

The result of poisson regression estimates on the factors influencing farmer's adoption of land degradation strategies as presented in Table 3 revealed Pseudo R² of 0.2146 implying that about 21.5% of variations in the adoption of land degradation management strategies were explained by the independent variables included in the model. The chi-squared statistic 534.58 was significant at 1% level of probability indicating fitness of the model. From the z-values, seven out of the eight variables included in the model were statistically significant at 1% and 5%. The z-value of age (6.01)

was positive and significant at 1% probability level implying that age of the respondents directly influences the adoption of land degradation management strategies in the study area. The z-value of household size (-10.89) was negative and significant at 1% probability level implying that household size inversely influences adoption of land management strategies. The z-value of farming experience (2.21) was positive and significant at 5% probability level implying that farming experience of the respondents directly influences the adoption of land management strategies. More so, the z-value of farm size (-6.82) was negative and significant at 1% probability level

implying that size of farmland inversely influences the adoption of land degradation management strategies. The z-value of the output (6.48) was positive and significant at 1% implying that output of the respondents directly influences the adoption of land management strategies. The z-value of extension visit (4.17) was positive and significant

at 1% probability level implying that extension visits directly influences the adoption of land degradation management strategies. The z-value of access to training (12.34) was positive and significant at 1% probability level implying that access to training directly influences the adoption of land degradation management strategies.

Table 3: Poisson estimates of factors influencing land degradation strategies adopted

Variables	Coefficient	Z-value	P-level	Decision
Age	0.0064	6.01	0.000***	Significant
Household size	-0.0181	-10.89	0.000***	Significant
Education	-0.0020	-1.59	0.112	Not Significant
Farming experience	0.0027	2.21	0.027**	Significant
Farm size	-0.4143	-6.82	0.000***	Significant
Output	0.0048	6.48	0.000***	Significant
Extension visit	0.0492	4.17	0.000***	Significant
Access to training	0.2335	12.34	0.000***	Significant
Constant	5.2287	98.07	0.000***	Significant

Source: Field Survey, 2018

Note: Pseudo R² = 0.2146, Chi-squared = 534.58, ***implies significant @ 1%, while **implies significant @ 5%

Constraints to faced by the respondents

The result in Table 4 revealed the constraints faced by the respondents in the study area were loan and financial acquisition problem (100.0%), labour and youth migration (100.0%) ranked 1st, followed by problem of Government policies (98.3%), inadequate improved varieties (98.3%) and inadequate extension services (50.0%) ranked 3rd and 5th, respectively, among the constraints hindering adoption of land degradation

management strategies. Other constraints were problem of fertilizer and agro-chemical (46.7%), pests and diseases infestation (41.7%), problem of processing (38.3%) and land tenure problem (33.3%) ranked 6th, 7th, 8th and 9th, respectively. This implies that rice farmers faced diverse problems in the process of adopting land degradation management strategies which could have negative influences on the respondents' productivity as well as their standard of living.

Table 4: Constraints faced by the respondents

Constraints	Frequency	Percentages	Rank
Pests and diseases infestation	50	41.7	7 th
Land tenure problem	40	33.3	9 th
Loan and financial acquisition problem	120	100.0	1 st
Labour and youth migration	120	100.0	1 st
Inadequate extension services	60	50.0	5 th
Problem of fertilizer and agro-chemical	56	46.7	6 th
Problem of processing	46	38.3	8 th
Problem of Government policies	118	98.3	3 rd
Inadequate improved varieties	118	98.3	3 rd

Source: Field Survey, 2018

Hypothesis testing

The hypothesis tested in the study was that there is no significant effect of land degradation on the income of the farmers. To achieve this, income

of the respondents before and after experiencing land degradation was obtained. This was subjected to z-test which revealed value of 20.459 at 1% probability level implying significant difference in

income before (₦199,504.2) and after (₦168,508.3) land degradation. The result also shows that the income of the respondents was

significantly lower after land degradation. Thus, land degradation had significant effect on the income of the respondents.

Table 5: Z-test estimates of the hypothesis

Item	Period	Mean	Std. Dev	t-value
Income	Before	N199,504.2	130,179.5	20.4592***
	After	N 168,508.3	119,112.1	

Source: Field Survey, 2018

CONCLUSION AND RECOMMENDATIONS

From the findings of this study, it could be concluded that Most of the respondents in the study area were young and active in rice production and the most adopted land degradation management strategies was bonding and planting of trees. The age, household size, experience, farm size, output, extension contact and access to training influences number of land degradation strategies adopted. Major constraints associated with rice production were loan and financial acquisition problem as well as labour and youth migration. There was significant effect of land degradation on the income of the respondents. It was therefore recommended that, Government should formulate policies that will curb land degradation and provide enabling environment for stakeholders to contribute their quarter in alleviating land degradation problem. Governments at various level should ensure adequate training of rice farmers on management of land degradation.

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