



Research Article

Awareness and Perception of Resource-Poor Farmers on the Effects of Land Degradation in Agricultural Activities in Imo-State, Nigeria

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Article History: 12385 Received: 12-Nov-21 Revised: 10-Jan-22 Accepted: 22-Jan-22

ABSTRACT

Land degradation is one of the most serious environmental problems currently affecting agricultural productivity in developing countries of the tropics including Nigeria. The study was therefore carried out to ascertain the level of awareness and perception of resource-poor farmers on the effects of land degradation in agricultural activities in Imo State, Nigeria. Data were collected with the use of structured questionnaire from 350 randomly selected resource-poor crop farmers. Descriptive statistical tools involving percentages, means and frequency distribution were used to analyze the data. The result showed that almost all the farmers (94%) were aware of land degradation problem in the study area and they accepted that heavy rainfall/erosion (3.41), topography/shape of the land (3.23), deforestation (3.27) sand excavation (3.21) etc were causes of land degradation in the area. The perceived major effects of land degradation on agricultural production in the area were reduction in farm yields (3.80), increase in poverty level (3.20), reduction in soil fertility (3.85), decrease in income of farmers (3.10), food insecurity (3.71), decreasing available farmland for cultivation (3.90) among others. The study recommended soil restoration approaches to enhance the productive and protective functions of the land such as use of organic manure (3.79), avoidance of bush burning (2.98), crop rotation (3.20). Also, since the level of awareness of land degradation is very high in the study area and farmers are willing to adopt it, government should mount environmental education campaigns, particularly on land management for the farmers through extension workers in order to heighten the level of its adoption among these farmers.

Key words: Land Degradation; Awareness; Perception; Resource-Poor Farmers

INTRODUCTION

Land degradation remains an important global issue because of its adverse effect on agricultural productivity, environment, food security and livelihood. The importance of natural resources especially land to agriculture is well recognized in Nigeria given that it is the basic natural resource that provides habitat and sustenance for living organisms (Temitope, 2019). However, Africa generally is endowed with this resource which has facilitated both small scale and commercial farm activities that would strengthen food security, income and regional trade integration necessary to transform and create new opportunities for sustainable development. (African Development Bank AfDB, 2015). The economic fortune of most developing countries including Nigeria revolves largely around a sustainable exploitation and use of land resources especially in the primary industry such as agriculture (Titilola and Jeje, 2008). Agriculture is known to be a major contributor to economic growth of the country in

terms of support to livelihood and employment as well as overall impact on our gross domestic product GDP (Osabohien, *et al.*, 2020). Of recent the data on its contribution to employment in Nigeria revolves around 36% (International Labour Organization STAT, 2019) and its GDP at average of 24% between the period of 2013 to 2019 (Pwc Report, 2020). However, farming method in such region has predominately been dominated by resource-poor farmers who work land in risk prone, marginal environment typically without access to modern agricultural techniques and practices (Onuoha 2021; Farouque and Takeya 2008). However, these farmers who are of the active labour force are engaged with staple and high value agricultural activities on yam, cassava, plantain, maize, cocoyam, fruits and vegetables. Akinnagbe and Umukoro (2011) reported that in the 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 from grazing, fish pond construction, quarrying,

crop farming amongst others. These activities of resource poor and marginal farmers who are constrained by adequate knowledge of soil fertility and nutrient management further exacerbates pressure posed on land. On the other hand, intensification of cultivation resulting in the opening up of new lands exposes the top soil to the elements of degradation which eventually alters the natural ecological conservatory balances in the landscape (Senjobi and Ogunkunle, 2010). According to Akamigbo (2005), land degradation assumes varying dimensions depending on one's location. For example, inhabitants of Borno, Sokoto, Katsina and Kano states of Nigeria are worried by fear of desert encroachment while people who reside in Niger Delta are worried about oil pollution, spillage, coastal erosion and flooding. Sheet erosion is nation-wide while gully erosion is most severe and dense in certain southern states of Anambra, Imo, Abia, Enugu, Ondo, Delta and Akwa Ibom (Akinngbe and Umukoro, 2011). According to Johnson and Lewi (2007) the process of land degradation includes soil compaction, decline in soil biodiversity, organic matter and fertility, salinity and other physical and chemical alterations due to poor drainage and misuse of soils.

Land degradation is a complex problem and one of the major causes of declining agricultural productivity and continuing food insecurity in Nigeria and indeed many other developing nations. It affects the basic resources from which the rural people derive their livelihood and in most cases, lead to loss of farmlands, decrease in soil fertility, collapsing of buildings and destruction of utility installations. According to Nwaiwu (2016), these negative impacts also had contributed to increased cost and time spent on moving farm produce to markets which consequently make pricing of produce difficult. Arguably, given the fact that Imo state suffers from coastal problems and erosion devastation, efforts to network rural communities and connect them to both urban and rural markets for easy transportation of agricultural produce and inputs are being seriously undermined by land degradation as most roads have been cut off completely.

There has been a growing concern over the way natural resources generally are being depleted and exploited particularly by marginal and resource poor farmers in rural areas who may not have the appropriate understanding of its effects on the environment and food security. Although there has been a great deal of effort to address land degradation problem in Nigeria but these have failed to reverse the situation. This therefore points to urgency in efforts to scientifically highlight the extent to which farmers who inadvertently contribute and bear the greater burden of this effect become aware and consequently institute strategies that would mitigate the impact of land degradation. In the growing attempt for solutions, the international community had opted for integrated resource management in agricultural practices as important aspect of sustainable development related to food production (Nwokoro and Chima, 2017). Nonetheless, it is equally important for research to ascertain geographical peculiarities in the drive for specific solutions to the problem of land degradation among farmers in Nigeria.

It is expected that the findings of this study will contribute to government policy for remediation of

environment, farmer improved productivity, poverty reduction and food security. These outcomes eventually will support an increased gross domestic product (GDP) from the agriculture sector.

It is against this backdrop that the study assessed the level of awareness and perception of resource poor farmers on the effects of land degradation in agricultural activities in Imo State, Nigeria. Specifically, the objectives of the study were to:

- 1) determine the level of awareness of resource-poor farmers on the effects of land degradation in the area;
- 2) ascertain the dominant causes of land degradation among resource-poor farmers in the area;
- 3) identify the perceived effects of land degradation on agricultural activities among these farmers;
- 4) find out those strategies that are effective for reducing the effects of land degradation in the farming activities of resource-poor farmers in the area.

MATERIALS AND METHODS

Study Area

The study area is Imo State. Imo State is located in the South Eastern region of Nigeria and is one of the 36 States of the Federation with Owerri as its capital and largest city. It has twenty-seven (27) local government areas and lies between latitude 4°45'N and 7°15'N, longitude 6°50'E and 7°25'E with an area of around 5, 100sqkm. It is bordered by Abia State on the East, the River Niger and Delta State on the West, Anambra State on the North and Rivers State to the South (IMSG, 2010). The estimated population of Imo State as of 2017 is 4,978,758 and the population density varies from 230-1,400 people per square kilometer (National Population Commission NPC, 2006). Farming in the area is usually subsistence and crops cultivated in the area include cassava, yam, plantain, banana, maize, vegetables, cocoyam and ecological crops such as oil palm, rubber and citrus (Onuoha, 2021). The people also engage in livestock farming such as poultry, pig rearing, goat rearing and sheep production.

Sampling Procedure

Multi-stage sampling technique was used for the selection of sample. The first stage was the purposive selection of the three agricultural zones (Owerri, Orlu and Okigwe) in the state; the reason was to ensure proper representation of the state. The second stage was the purposive selection of three blocks each from the three agricultural zones of the state. The third stage involved the random sampling of two circles from each of the nine blocks, giving a total of 18 circles. The fourth stage was the random sampling of two sub-circles each from the 18 circles to give a total of 36 sub-circles. Finally, two strata of farmers were created for each of the 36 sub-circles, one group of farmers who cultivated less than 1ha of land and had no access to utilization of modern technologies (considered as resource-poor) and a second group who cultivated over 1 ha and utilize modern farming techniques (considered non-resource-poor). Ten (10) farmers were randomly sampled from the resource-poor farmer groups across the 36 sub-circles giving a total of 360 farmers. However, only 350 questionnaires were properly completed and retrieved for data analysis.

Data Collection and Analysis

Structured questionnaire was the instrument used for collection of data. The Questionnaire was administered personally to the farmers by trained enumerators. The questionnaire contained relevant questions based on the specific objectives of the study. To ensure face and content validity of this instrument, copies were issued to experts in agronomy, environmental management and research instrumentation. This was necessary to determine which items in the questionnaire actually elicited the information they were intended. Modification was subsequently made along the line of their suggestion and comments. To see if the multiple question likert type scale survey was reliable, Cronbach's alpha test was conducted in order to determine how closely related the set of test items are as a group. A score of 0.87 was determined, implying that this instrument is of good reliability.

To ascertain the causes of land degradation in the area, respondents were provided with a list of possible causes of land degradation to tick from on a 4-point Likert type scale (1 = not a severe cause, 2 = slightly severe cause, 3 = moderately severe cause and 4 = highly severe cause). The values on the Likert type scale were added to obtain 10 that was divided by 4 to obtain a mean score of 2.50. Then, any mean score equal or higher than 2.50 was perceived as a possible cause of land degradation, while a mean scores less than 2.50 was rejected a cause of land degradation in the area. To assess the effect of land degradation on agricultural production, farmers were provided with a list of possible effects of land degradation and they were asked to indicate the extent to which they perceived these variables as effects on a 4-point Likert-type scale (4 = to a great extent, 3= to some extent, 2 = to a little extent and 1 = to no extent). The values on this scale were added to obtain 10 and divided by 4 to obtain a mean score of 2.50. Any mean score, equal or higher than 2.50 was perceived as a possible effect of land degradation on agricultural production, while mean score less than 2.50 was rejected as an effect. To ascertain the strategies for improving degraded land in the areas; a list of possible coping strategies were provided on a 4point Likert type scale (4 = highly effective, 3 = very effective, 2 = effective and 1=not effective) for them to tick from and the extent of their effectiveness. The values on the scale were added to obtain 10 and divided by 4 to obtain a mean score of 2.50. Then, any mean score equal or higher than 2.50 was perceived as a coping strategy while, a mean score of less than 2.50 was rejected as coping strategy.

Data Analysis

Descriptive statistics including mean, frequency distribution and percentages were used to analyze data collected from the survey. The mean from a four (4) point Likert type scale assigned values of 4 to 1 was analyzed as given below and was to achieve specific objectives 2, 3, and 4. This was mathematically determined as:

$$(4+3+2+1)/4 = 10/4 = 2.5$$

Therefore, a mean of 2.50 was accepted while any value below 2.50 was not accepted.

RESULTS AND DISCUSSION

State of Awareness of Soil-Degradation

The state of awareness shows the level of consciousness of the people on the problem under

investigation. The result in Table 1 shows that 94% of the farmers were aware of the existence of land degradation in the area. This shows that the awareness of soil degradation among the farmers is very high. The reason for the high rate of awareness may be due to presence of gullies in most part of the state (Umahi 2011; Jimoh, 2011).

Causes of Land Degradation

Table 2 shows the mean scores of farmers' perceived causes of land degradation in the study area. The major causes of land degradation are: topography/shape of the land (3.23), increasing intensity of farming and cultivation (3.10), population pressure (2.78), burning of vegetation (2.97), construction works e.g roads, infrastructure (3.00) and deforestation (3.27) respectively. Other causes of land degradation are uncontrolled urban expansion (2.80), non-adoption of adequate soil conservation practices (3.34), over-grazing (2.67), sand excavation (3.21), heavy rainfall/erosion with (3.41), soil texture (2.90). The result showed that these major causes of land degradation align to eventually lead to soil erosion in the area. The result is in line with the findings of Mbagwu (2003) who stated that about 85% of the causes of land degradation worldwide are due to soil erosion by wind and water. Rainfall (an important climatic factor) plays a vital role in the development and distribution of plant life, but the variability and extremes of rainfall can lead to soil erosion and land degradation. Construction works such as building of new roads and uncontrolled urban expansion exposes the land to degradation. The findings are in accordance with Onu and Opara (2010) who observed that most gullies in Imo State are initiated as a direct result of poor civil engineering works rather than farming practices.

Perceived effects of land degradation by farmers on agricultural activities

Table 3 shows the effects of land degradation as perceived by resource poor farmers in Imo state. The effects of land degradation are reduction in farm yields (3.80), increase in poverty level (3.20), reduction in soil fertility (3.85), decrease in the income of farmers (3.10), food insecurity (3.71), decrease in farmland for cultivation (3.90) and destruction of wildlife and vegetation (3.00), increase in cost of production as a result of additional money spent in controlling degraded farm land (3.34) and destruction of soil structure (2.90).

These perceived effects of land degradation on agricultural activities had consistently in reality led to the recurring decline in soil fertility status and reduction in farm yields among these resources constrained farmers. Their characteristic inability to mobilize the needed capital and capacity for soil fertilization and remediation activities has made this a persistent phenomenon, which invariably calls for programming intervention by government. Many researchers have reported of the decrease in crop yields as a result of land degradation caused by erosion. Erosion can cause yield reductions of 30 to 90% in some root-restrictive shallow lands of Nigeria and loss of link roads which affects transportation of agricultural products to the markets due to roads being cut off by the gullies (Mbagwu, 2003). The findings that land degradation lead to food insecurity and poverty are in line with Lal and Okigbo (1990) who reported that in West Africa, especially in areas

Table 1: Distribution of farmers according to awareness of land degradation

Awareness	Frequency	Percentage (%)
Aware	340	94
Not aware	10	6
Total	350	100

Source: Field Survey, 2021

Table 2: Mean scores of farmers` perceived causes of land degradation in the study area

S/N Causes of land degradation	Mean (\bar{X})
1 Topography/shape of the land	3.23
2 Increasing intensity of farming and cultivation	3.10
3 Population pressure	2.78
4 Burning of vegetation	2.97
5 Construction works e.g roads, infrastructure etc	3.00
6 Deforestation	3.27
7 Uncontrolled urban expansion	2.80
8 Non adoption of adequate soil conservation practices	3.34
9 Over grazing by animals	2.67
10 Heavy rainfall/erosion	3.41
11 Sand excavation	3.21
12 Soil texture	2.90

Source: Field survey, 2021

Table 3: Mean scores of farmers perceived effects of land degradation in the study area

S/N Perceived effects	Mean (\bar{X})
1 Reduction in farm yields	3.80
2 Increase in poverty level	3.20
3 Reduction in soil fertility	3.85
4 Decrease in income of farmers	3.10
5 Causes food insecurity	3.71
6 Decrease in farmland available for cultivation	3.90
7 Destruction of wildlife and vegetation	3.00
8 Increase in cost of production as a result of money spent in controlling degraded land	3.34
9 Destruction of soil structure	2.90

Source: Field Survey, 2021

Table 4: Mean scores of farmers perceived strategies of improving land degradation

S/N Strategies	Mean (\bar{X})
1 Use of organic manure	3.79
2 Avoidance of bush burning	2.98
3 Crop rotation	3.20
4 Avoidance of blanket use of fertilizers and liming materials	2.67
5 Good drainage systems	3.30
6 Regular visits by extension workers	3.48
7 Construction of contour ridges	2.80
8 Shifting cultivation	3.12
9 Mounting regular campaigns agents that promote land degradations	3.50
10 Agroforestry systems	3.00

Source: Field Survey, 2021

with high land degradation, more than 30% of the children died before the age of five. These children predominately from resource-poor families do not have the resources to invest in soil conservation technologies to reduce land degradation leading to low farm yields, hunger and poverty.

Strategies of Improving Degraded Land in the Study Area

Data in Table 4 shows the mean scores of farmers on strategies of improving degraded land. These are use of organic manure (3.79), avoidance of bush burning (2.98),

crop rotation (3.20), avoidance of blanket use of fertilizers and liming materials (2.67), good drainage systems (3.30), regular visits by extension workers (3.48), construction of contour ridges (2.80), shifting cultivation (3.12), agroforestry systems (3.00) and mounting campaigns against agents that promote land degradation (3.50). The result on the use organic manure collaborated with the findings of Mbagwu (1984) who stated that application of 5% poultry manure, compost manure, rice husk and saw dust as amendment are more effective in restoring degraded lands than a combination of high doses of 120, 30 and 120 kg ha⁻¹ NPK in Nigeria. Also, crop rotation, shifting cultivation, avoidance of bush burning and agro-forestry systems will help to minimize the effect of land degradation by providing a protective cover, reducing the rate of soil moisture loss through evaporation from soil surface, improving soil organic matter, total nitrogen, cation exchange capacity, improving soil structure, infiltration and water retention capacity.

Mounting campaigns against agents that promote land degradation and regular visits by extension workers were also found to be strategies to minimize land degradations. Nenna (2011) stated that extension services bear great potentials for improving the productivity of farmers and promoting the right attitude among the natural resources managers.

Conclusions

The study investigated the awareness and perception of resource-poor farmers on the effects of land degradation on agricultural activities in Imo state, Nigeria. Results from the study showed that these farmers in the study area are fully aware of the existence of land degradation. The study further revealed that farm-families in these communities where this land degradation occurs consider it as a serious environmental and economic challenge and listed the major causes of land degradation in the area as heavy rainfall/erosion, topography/shape of land, sand excavation, uncontrolled urban expansion, population pressure, soil texture, deforestation, etc. The effects of land degradation from the study are food insecurity, reduction in soil fertility, destruction of soil structure, increase in poverty level, reduction in income etc.

However, to enhance the productive and protective functions of the land for this category of farmers in the area, the use of organic manure, practicing of crop rotation and agroforestry systems etc were seen to be helpful strategies to reduce land degradation. The study also recommended that since the level of awareness of land degradation is very high in the study area and farmers are willing to adopt soil reclamation and remediative practices, government should deliberately mount environmental education campaigns, particularly providing special grants on land management for these marginal farmers who are constrained by productive resources.

Conflict of Interest

The authors declare they have no conflict of interest.

Authors' Contributions

Uneze, C.U conceived the study and was in charge for the overall direction and planning. Onuoha, C acquired the data and performed the computational analysis as well as its interpretation. Both authors discussed the results and contributed to the writing of the manuscript.

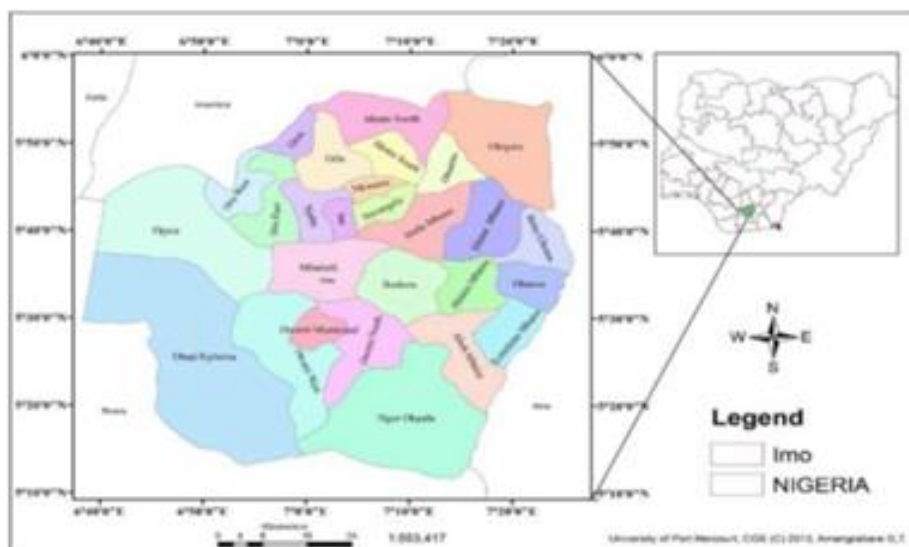


Fig. 1: Map of Imo State showing the Local Government Areas.

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