CAUSES AND EFFECTS OF LAND DEGRADATION ON CROP PRODUCTION IN ILLELA LOCAL GOVERNMENT AREA OF SOKOTO STATE, NIGERIA

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ABSTRACT
Land degradation has remained one of the most serious problems currently affecting crop production in Illela Local Government Area (LGA) of Sokoto State, Nigeria. This study analysed the causes and effects of land degradation on crop production and techniques for the restoration of degraded land in the area. Data for the study were obtained using a structured questionnaire from 113 randomly selected farmers using a two-stage sampling procedure. Data were analysed using mean, frequency counts and percentages. The results showed that desertification (39.7%), deforestation (28.4%) and erosion (14.3%) were the major causes of land degradation in the study area. An increase in cost of production (15.0%), a decrease in market turnover (15.0%) and decrease in farm income decrease in farm income (14.1%) were the major effects of land degradation on the farmers in the area. The farmers used a variety of strategies such as the use of cover crops (95.6%), ridging of farms (93.85) and use of organic manure (85.0%) for the reclamation of their degraded farmlands. It was concluded that desertification, deforestation and erosion were the major causes of land degradation in the study area, which had several devastating effects on the farmers particularly an increase in the cost of production, a decrease in farm income and food shortage. It is therefore recommended that farmers should sustain the temperature by using cover crops, ridging and organic manure to reclaim their degraded farmlands. All stakeholders in agricultural and rural development should complement the efforts of the farmers in reclaiming their degraded farmlands through interventions and empowerment.
Keywords: Land degradation, Land reclamation, Organic manure

INTRODUCTION

The land is a vital resource to humankind, like air and water. Land degradation-the deterioration or loss of the productive capacity of the soils for present and future-is a global challenge that affects everyone through food insecurity, higher food prices, climate change, environmental hazards, and the loss of biodiversity and ecosystem services [Global Environment Facility (GEF), 2023]. It is the result of complex interaction among, physical, chemical, biological, socio-economic and political issues of local, national or global nature. It affects the economy and also has many negative impacts on agricultural productivity by reducing the fertility of agricultural land (Tilauhun and Zewide, 2021).

Land degradation is one of the world's most pressing environmental problems and it will worsen without rapid remedial action. Globally, about 25 percent of the total land area has been degraded. When land is degraded, soil carbon and nitrous oxide are released into the atmosphere, making land degradation one of the most important contributors to climate change. It is happening at an alarming pace, contributing to a dramatic decline in the productivity of croplands and rangelands worldwide. Scientists recently warned that 24 billion tons of fertile soil was being lost per year, largely due to unsustainable agriculture practices. If this trend continues, 95 percent of the Earth's land areas could become degraded by 2050 (GEF, 2023).

According to Tilauhun and Zewide (2021), Land degradation has two causes direct causes of land degradation and indirect causes of land degradation. The direct cause of land degradation is the mismanagement of the land by man. The indirect causes of this mismanagement may be land tenure regulations, policies related to export-import, land politics, drought, poverty, poor advisory and extension services, and population pressures.

Agricultural production provides more than 40% of Nigeria's annual GDP, absorbs about 68% of the labour force, and provides over 80% of the food needs of the country. However, the small-scale farmers who drive agricultural production are facing challenges in getting suitable land as a result of incessant growth in population, land degradation, and one-sided planning in the use of available land (Titilola and Jeje, 2008).

One of the challenges facing Nigeria is the production of sufficient food and fibre to meet the needs of her increasing population (Alao and Shuaibu, 2011). The rapidly expanding population and consequent pressure on land for socioeconomic, agricultural and industrial development as well as

increasing human interference on the forests and the environment have put the future of Nigeria's forest and agricultural land in great danger (Bifarin *et al.,* 2013). Despite the vast arable land, conducive climate and different agricultural programmes, the hope of Nigeria to attain self-sufficiency in food production has not been realized (Idachaba, 2006). The increase in world population and other non-agricultural land uses are putting additional pressure on land, hence there is progressively less land for food production while demand for food and other agricultural products is increasing, requiring more land which is not available since the earth's land is finite (El-Swaify, 2002). Increasing food production to keep pace with the demand, while retaining the quality of land and the ecological balance of the production system is a current challenge to agricultural research and policy in Nigeria (Onu, 2011).

Most countries of the world are currently uniting against selected developmental problems such as poverty, hunger, malnutrition, disease, food insecurity, gender inequality and environmental degradation. Land degradation has impacted much on rural people's livelihoods, especially in agricultural production. There is currently scanty information on the causes and effects of land degradation especially in Illella LGA, located at the end of northern Sokoto State.

It is in this regard that this study was designed to determine the causes and effects of land degradation on farmers in Illela LGA of Sokoto State, Nigeria. It also determined the strategies for the reclamation of degraded farmlands.

METHODOLOGY

The study was carried out in Illela LGA, Sokoto State, Nigeria. Illela LGA shares a border with the Republic of Niger to the North. It is among the LGAs that make up the Northern Agricultural Zone of Sokoto State. It lies within latitude 13º 43¹N and 13º 57¹N and longitude 5º18¹E and has a total area of 1,246 square kilometres, while the total population is projected at 259,100 people (NPC, 2022). Illela LGA is characterized by 3-4 months of rainfall, from June to September or October and 7-8 months of dry season from October to May. The climate of the State is largely controlled by two opposing air masses, the moist tropical maritime from the North, across the Sahara, which is dry and dusty and brings harmattan (Onu, 2011).

A two-stage sampling procedure was used to obtain the sample for this study. In the first stage, four out of 11 villages in Illela LGA were purposively selected due to the high level of land degradation occurrence using a purposive sampling technique. They are Gidan-Hamma, Kalmalo, Gidan-Katta and Araba. In the second stage, 113 out of 1129 registered farmers were randomly selected to give the study sample. The selection was done using a simple random sampling technique. Data for this study were obtained with the use of a structured questionnaire administered to the respondents. The data were analysed using both descriptive and inferential statistical tools such as mean, frequencies and percentages.

RESULTS AND DISCUSSION

Causes and effects of land degradation

The result shows that 39.7% of the respondents reported desertification as the main cause of land degradation in the area, 28.4% reported deforestation and 14.3% reported erosion (Table 1). This implies that desertification, deforestation and erosion were identified by the respondents as the major causes of land degradation in Illela LGA. It is important to make the farmers understand that improper cultivation of land, urbanization and overgrazing (especially by the Fulani herdsmen who have now moved down southeast massively) can cause land degradation. It implies that there is a wide variation in the causes of land degradation in the area. This result is in line with the findings of Umahi (2011) and Mbagwu (2003) who reported that land degradation was caused by erosion, deforestation and overgrazing of land and others.

The result also showed that 15.0% of the respondents believed that land degradation increased the cost of crop production and decreased in market turnover of the crop produce. Also, 14.0% of the respondents reported a decrease in farm income due to land degradation, 12.6% reported food shortage, 10.9% indicated land shortage and 10.4% reported a reduction in land productivity. The result implies that land degradation has several devastating effects on agricultural production as well as the socioeconomic life of the farmers. The effects may combine to make life difficult in the area. The result is in line with the findings of Sara and Satya (2009) and the European Commission for Agriculture (ECA) (2006), who reported that shortage of food, increase in the cost of production, decrease in farmer income, decrease in market turnover and others are the effects caused by land degradation.

Relationship between causes and effects of land degradation

Linear regression estimates for the relationship between causes and effects of land degradation is presented in Table 2. There is a positive and significant ($p < 0.00$) relationship between causes

and effects of land degradation on farmers. Concerning the overall fit of the regression model, the obtained R^2 adjusted (0.832) suggests that the predictor variable (causes of land degradation) was significant in explaining the dependent variable (effect of land degradation on farmers). This implies that the causes of land degradation (mainly desertification, deforestation and erosion) had strong and positive effects on the farmers (mainly increase in cost of production, decrease in farm income and food shortage).

Table 1: Distribution of the respondents according to causes and effects of land Degradation (n=113)

Causes of land degradation	Frequency	Percentage
Overgrazing	13	9.2
Erosion	20	14.3
Deforestation	40	28.4
Flooding	1	0.7
Bush-burning	1	0.7
Desertification	56	39.71
Urbanization	10	7.1
Effects of land degradation		
Food shortage	75	12.6
Reduction in land productivity	62	10.4
Soil nutrients loss	45	7.6
Shortage of land	65	10.9
Increase in cost of production	89	15.0
Decrease in farm income	84	14.1
Loss of off-side cost sedimentation	24	4.0
Increase in cost of reclamation	61	10.3
Decrease in market turn over	89	15.0

Source: Field survey, 2019
*Multiple responses

Table 2: Relationship between causes and effects of land degradation on farmers

Variable	Coefficient	Standard error	t-ratio	P[|T|>t]
Constant	-0.609	0.194	-3.144	0.002
Causes of land degradation	0.853	0.036	23.580	0.000***
Adjusted R-squared = 0.832				

***Significant at 1% level

Strategies for reclamation of degraded land

Table 3 reveals that the respondents reported afforestation (76.1%), zero-tillage (80.5%) and controlled grazing (83.2%) as very effective methods of reclamation of degraded land. Other very effective methods include avoiding bush burning (95.6%), ridging of farms (93.85) and use of organic manure (85.0%). The use of cover crops (95.6%) was also considered effective by the respondents. It implies that the farmers used a variety of methods in the reclamation of degraded farmland. However, an increased campaign for sustained use of measures is necessary. This result agrees with the findings of Oyakale (2008), who reported that farmers in his study area use Afforestation, zero tillage, controlled grazing, avoiding bush burning, use of cover crops, ridging of farmland and others in the reclamation of degraded land.

Table 3: Distribution of respondents according to their strategies for reclamation of degraded land

Strategies	Very effective	Effective	Ineffective
Afforestation	76.1	23.9	0.0
Zero tillage	80.5	16.8	2.7
Controlled grazing	83.2	15.9	0.9
Avoiding bush burning	95.6	4.4	0.0
Use of cover crops	4.4	95.6	0.0
Ridging of farmland	93.8	5.3	0.9
Use of organic manure	85.0	14.2	0.9
Agro forestry	38.9	47.8	13.1

Source: Field survey, 2019

CONCLUSION

The study concluded that desertification, deforestation and erosion were the major causes of land degradation in the study area. Land degradation has several devastating effects on the farmers particularly about increase in the cost of production, a decrease in farm income and food shortage. They, however, minimised the effects through various measures in the reclamation of the degraded farmlands, including controlled grazing, tillage control, and use of organic manure, among others.

RECOMMENDATIONS

Based on the findings of the study, it is recommended that farmers in the study area should sustain the tempo in the use of measures to reclaim their degraded farmlands. All stakeholders in agricultural and rural development such as the Ministry of Agriculture, Agricultural Development Programme and International Funds for Agricultural Development in the State should complement the efforts of the farmers in reclaiming their degraded farmlands through interventions and empowerments.

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