E-ISSN: 1115 – 831X P-ISSN: 3027-2963
MPRI-JAVS | INTERNATIONAL JOURNAL OF AGRICULTURAL AND VETERINARY SCIENCE
VOL. 05 NO. 1 - JULY, 2024

COMBATTING LAND DEGRADATION AND SUSTAINABLE AGRICULTURE: A CASE STUDY OF FUNE LOCAL AREA OF YOBE STATE, NIGERIA

MOHAMMED BABAGANA
Yobe State College of Agriculture, Science and Technology, Gujba.

Abstract

Land degradation is a global environmental problem that affects every part of the world which has been described to be more serious in sub-Saharan African region. Desertification which is further exacerbated by severe drought is the major form of land degradation in the dry lands and is as well the major form of land degradation in the 11northern most states in Nigeria including Yobe State posing serious threats to sustainable agriculture. Hence, objectives of the study are to identify routine farming practices being adopted by crop farmers in Fune LGA, identify agricultural land degradation combatting measures adopted by farmers for ensuring sustainable agriculture in Fune LGA and finally to suggest suitable strategic environmental friendly techniques of combatting land degradation with a view of achieving sustainable agriculture. Descriptive Survey design involving mixed methods was adopted targeting 353 respondents (crop farmers) in 5 villages selected for the study. Slovene's formular was used to determine the sampling size while Convenient, Purposive and Snowball were used as the sampling techniques. A total of 45 farms were visited for physical observation of measures taken by farmers for combatting land degradation and boosting productivity. Closed Ended Questionnaires, Focus Group Discussion and Observation Checklist were used as data collecting tools while Content Analysis and Descriptive Statistics were used for data analysis. Pearson Linear Correlation Coefficient (PLCC) was also used to determine the relationship between land degradation and unsustainable farming practices. The study lasted for 3 months starting from April-June, 2024. Results indicated that in their bid to boost soil fertility, crop farmers in Fune L.G.A. engage in more

Key word:
Combatting Land Degradation, Sustainable Agriculture, Fune Local Government Area

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

environmentally devastating practices such as excessive tillage; overuse of inorganic chemicals, mono-cropping etc. which lead to further degradation of agricultural lands with significant fall in productivity. Most of the farming practices adopted by farmers in the study area were not sustainable while simple environmentally friendly farmland degradation measures were neglected. PLCC results showed significant relationship between land degradation and unsustainable farming practices (0.988 Pearson Correlation at 0.01level (2-tailed) and 0.650 Pearson Correlation at 0.01level (2-tailed). This resulted in further destruction of farmlands As a result, poverty precipitates among many of the farming communities to the extent that some farmers fail to cultivate their lands because could not afford the farm inputs and made them incapacitated in adopting farmland protection measures. Based on the findings of the study some recommendations were proffered. Some of these include: Government should understand that sustainable agricultural practices are effective in combatting land degradation in northern hence, the promotion of the adoption of sustainable agricultural practices through extension services and farmer training programmes should core agricultural policies; Awareness raising campaigns for farmers on the need for sustainable agricultural production is paramount. Extension services should be expanded to include workshops and trainings for rural farmers on basic sustainable farming practices and farmland degradation combatting measures. The idea of Climate Smart Agricultural should be incorporated in such workshops in order to intimate farmers on its advantages amidst growing adverse impacts of climate change.

Introduction

This study is aimed at examining the measures of combating land degradation for ensuring sustainable agriculture adopted by government and crop farmers in the study area with the aim of suggesting strategic environmental friendly techniques with a view of achieving soil nutrient efficiency and fertility as well as increased crop production. Land degradation is a global environmental problem that affects every part of the world which has been described to be more serious in sub-Saharan African region. Desertification which is the major form of land degradation in the dry lands is as well the major form of land degradation in Yobe State which is further exacerbated by severe drought. Much overlooked but of great concern is the anthropogenic role in land degradation process especially poor land use changes such as unsustainable farming practices. Although many authors have studied the problem of land degradation in north-eastern part of Nigeria as well as in Yobe State, little attention was given to the issue of human-induced agricultural land degradation and what efforts are made to avert it.

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

Fune LGA was created in 1976 and is the oldest LGA that has never been divided since creation. It happens to be the biggest LGA in Yobe state having a landmass of 4948 Sq km located at latitude 11'40'39'N and longitude 11'20'04'E. It has a population of 383, 390 (Yerima, 2013). Five villages from different parts of the LGA will be selected for the study namely, Gudugurka (extreme north), Ngelzarma (extreme east), Masio (extreme west), Daura (extreme south) and Jajere at the center. It is assumed that data obtained from these villages can be a representative of the whole LGA. Similarly, the selection of Fune LGA for the study is also based on its landmass.

Literature Review

Conceptual Background

Tsegaye B. (2019) defined land degradation as the temporary or permanent decline in the productive capacity of the land, and the diminution of the productive potential, including its major land uses (e.g. rain-fed arable, irrigation, forests) its farming systems (e.g. smallholder subsistence), and its value as an economic resource. Foods and Agriculture Organisation FAO (1999) defined it as a change in soil's health status resulting to decline in capacity of the ecosystem to continue to offer the goods and services. Besides, the United Nations UN defined it "as the reduction or loss of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pastures, forests or woodlands resulting from natural processes, land uses or other human activities and habitation patterns such as land contamination, soil erosion and the destruction of vegetation cover". Although soil degradation is being used interchangeably with land degradation, the term land has a wider meaning than just soil. Land thus covers water resources, landform, soils and vegetation, including both grassland resources and forests (Ambrose, *et al.,* 2018). By implication, degradation of land most of the time affects the soil which may include changes in the soil's physical, chemical and biological properties such as decline in soil nutrient content, reduced water holding capacity, lowering of soil organic matter content, changes in soil reactivity, changes in topsoil depth, increased salinity as well as reduction in biomass (Scherr,1999). Depending on the degree of its intensity, land degradation can be classified as extreme which is when the degradation occurs on soil and restoration is impossible; severe degradation involving severe nutrient depletion and extensive restoration is required; moderate degradation which involves loss of top soil leading to potential loss of productivity that requires restoration to reverse declines in productivity as well as light degradation which occurs on good soils showing signs of degradation (Oldeman, (1992) in Maiangwa, *et al.,* (2007).

The causes of land degradation can be grouped into two; proximate (biophysical) and underlying (socioeconomic) causes (Mulinge *et al.,.,,* 2015). In this context, proximate or biophysical causes refer to those factors that relate to unsustainable land use practices that usually lead to the degradation process while underlying or socioeconomic factors

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

refer to social, economic and institutional factors leading to the proximate factors (unsustainable land management practices). The underlying factors are also referred to as the drivers of land degradation.

Historical Background

Historically, land degradation is a global ecological problem that poses serious threat to global food security especially through reduced ecological value. Although data on land degradation of global scale is scarce, recent estimates indicate that currently, overall degraded lands worldwide are about 18.1 million km^2 where 92% was attributed to mismanagement (poor land use) and 38% to overgrazing (Hamdy, A. & Adel, A., 2014). Across the world, over 20% of cultivated areas, 30% of forests and 10% of grasslands are suffering from degradation, affecting about 1.5 billion people. This degradation may be the results of numerous factors or combination of thereof including anthropogenic activities such as unsustainable land management practices and climate variations (Bait, Z.G., Dent, D.L., Olsson, L., & Schaepman, M.E. 2008 in Hamdy, A. & Adel, A., 2014). Scherr, S.J., (1999) suggests that, 5-6 million hectares of arable land worldwide are irreversibly lost each year as a result of soil erosion, salinization and other degradation processes and if the degradation occurs in rough proportion to total arable land, then roughly half (about 2-3 million hectares per year) could be assumed to occur in developing regions. According to FAO, (2017), deforestation, agricultural mismanagement and overgrazing are the two major factors of human induced physical soil land degradation. Despite their economic and technological might, even developed nations are being faced by one form of land degradation or the other leading to losses in productivity as well as restoration expenses. For instance, it was reported that soil erosion affects more than 12 ha of land in Europe and about 7.2% of Europe's total cropland has been impacted resulting in losses of about 1.25 billion Euros annually in agricultural productivity and 155 million in GDP according to the European Commission Joint Research Center (Unah, L., 2020).

According to the Food and Agricultural Organisation (FAO, 2017), land degradation in Africa is not a new phenomenon and did not begin with recent increase in drought because archeological records show that arid zones in Africa began getting progressively drier since about 5000 years ago so if there is anything new about the phenomenon is the recent coincidence of climate change-induced increase in drought coupled with the increasing pressure being put on already fragile arid and semi-arid areas largely due to population pressures. According to the FAO (2017), significant quantity of soils in most African countries have been lost to various forms of land degradation to the extent that some countries lose over 50 tons of soil per ha annually which is the equivalence of losing about 20 billion tons of Nitrogen as well as 2 billion tons of Phosphorus and another 41 billion tons of potassium every year. Recent estimates put it that about 4 million ha of these resources are being deforested or degraded every year in West Africa (Joseph, O., Gbenga, A.O., Langyit, & D. G., 2018). Most important to note is that, if the current trend

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

of land degradation in Africa continues to escalate at same rate, the number of countries that will be seriously food insecure will rise to 35 by the year 2025 (FAO 2017).

With regards to the trend and severity of land degradation in Africa's different agro-ecological zones, Lamourdia & Ignacio, (2015) reported that the severity decreases from the deserts and arid zones to the humid and sub humid areas whereas only 3-30.6% of lands remain non-degraded in the arid, semi-arid and dry sub-humid areas. The situation seems relatively better in the sub-humid and humid zones where the non-degraded lands stand at around 38.1-47.2% while in the highlands; around 84% of the lands are not degraded. The increasing rate of trend and severity of land degradation from humid areas to arid and semi-arid zones signify the relationship and cumulative impacts of erosions. These statistics imply that in countries falling within the arid and semi-arid zones including northern part of Nigeria, nearly 70% of lands are degraded. This In Nigeria, land degradation in the form of desertification and erosion are major environmental challenges posing serious threat to agricultural productivity especially in the northern region where it has been estimated that as at 2015, about 35% of the total landmass has been affected by desertification (Unah, L., 2020). The 11 desert frontline states in the north are agricultural mainstay of the country with over 80% of the population engaged in agriculture related activities.

Statement of the Problem

Despite the numerous policies and programmes put in place by the Federal Government of Nigeria to combat land degradation and boost agricultural productivity since early 70s up to now, the situation still remains a matter of serious concern as most of these policies and programmes did not record meaningful success. It has been estimated that desertification which is the major form of land degradation in northern Nigeria still moves at the rate of 5.5km per annum (Lamprey 1975 in Ambrose, *et al.,.,,* 2018) and it expands at the rate of 6km per annum with 70% of dry land affected (UNEP 1992 in Ambrose, *et al.,.,,* 2018). Consequently, Nigeria loses 351,000 hectares of land in its northern part annually due to desertification and southward movement of sand which moves at the rate of 0.6 km per year (Nwokocha, 2017). Out of Nigeria's 909,890 km2 of land area, more than 580,841 km2 representing 63.83% of total land area of the country is affected by desertification (Olagunju, 2015). Jaiyeoba, (2003) is of the opinion that about one-fifth of the total land area in northern Nigeria is being threatened by desert encroachment.

Consequently, 11 of the northern most states have their total landmass degraded by more than 50% as a result of which they are described as severely degraded (Macaulay, 2014) Besides, it has been documented by experts that an estimated 35 percent of land that could be cultivated in the 11 northern States described as prone to desertification 50 years ago is now degraded by desertification (www.thenewhumanitarian.org).In addition, land degradation in Yobe State is being exacerbated by constant drought being experienced in the region. Drought in the north-east region plays significant role in increased desertification in the area (Musa & Shuaib, 2010; Olagunju, 2015; Terhile, 2017 in Abdullahi, 2018). The annual mean annual rainfall in the north stands at 600 millimeter against 3,500 millimeters in the south (Unah, 2020). Consequently, many of the states' natural

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

ecosystems are being lost at rates of great concern leading to the loss of its soil productivity by 67.2% between 2015-2019 (Unah, 2020). Thus, Yobe State leads the 7 northern states severely hit by desertification after Borno State.

Meanwhile, in their bid to boost soil fertility, crop farmers in Fune L.G.A. engage in more environmentally devastating practices such as excessive tillage, overuse of inorganic chemicals, mono-cropping, and farming of marginal lands etc. which lead to further degradation of agricultural lands with significant fall in productivity. As a result, poverty precipitates among many of the farming communities to the extent that some farmers fail to cultivate their lands because could not afford the farm inputs. Moreover, the north-eastern region where Yobe State is located has the highest poverty rate of 76.3% compared to the mean national 69.2% relative rate (NPC, 2006 in Abdullahi, 2018). Thus, these problems in Yobe State as well as the similar problems in other states coupled with the failure of the various land degradation and agricultural development initiatives, Nigeria can be described as a food dependent country that still relies on food importation. Therefore, it is against this background that this study is intended to examine the roles played by both the government and crop farmers in combating land degradation in Fune L.G.A. with a view of achieving sustainable agriculture.

Purpose of the Study

The purpose of this study is to identify the farming practices as well as measures of combating agricultural land degradation being adopted by local crop farmers for ensuring sustainable agriculture and suggest strategic environmental friendly techniques with a view of achieving soil nutrient efficiency and fertility as well as increased crop production in Fune L.G.A. of Yobe State, Nigeria.

Objectives of the Study

1. To identify farming practices adopted by crop farmers in Fune L.G.A. of Yobe State, Nigeria.
2. To identify agricultural land degradation combating measures adopted by crop farmers for ensuring sustainable agriculture in Fune L.G.A. of Yobe State, Nigeria.
3. To determine the relationship between land degradation and unsustainable farming practices in Fune L.G.A. of Yobe State, Nigeria.
4. To suggest suitable strategic environmental friendly techniques of combatting agricultural land degradation with a view of achieving sustainable agriculture in Fune L.G.A. of Yobe State, Nigeria.

Materials and Methods

The research adopted the Descriptive Survey design involving mixed methods (Quantitative and Qualitative) targeting a sample size of 353 respondents. Convenient, Snowball and Purposive sampling were used as sampling methods. Data collecting

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

instruments used include Self-Administered Questionnaire, Observation Checklist as well as Focus Group Discussion Guide. Five villages (wards) were purposively selected from the Local Government Area to serve as the study areas which in Mashio, Jajere, Ngelzarma, Daura and Gudugurka. In terms of its time scope, the study lasted for a period of 3 months starting from April-June 2024. This is because, at this time, preparations are in full gear for the 2024 farming season and will give the researcher the opportunity to vividly observe farming practices being adopted by farmers as well as their efforts in addressing agricultural land degradation with a view of improving soil fertility for higher productivity.

Self-Administered Questionnaire

Closed Ended Questionnaires was administered on the crop farmers which comprised of 20 questions deriving responses for the first 2 objectives of study. The questions were based on the Liker's Scale of Strongly Agreed (SA), Agreed (A), Disagreed (D), Strongly Disagreed (SD) and Undecided (UD). Data obtained from administration of the questionnaire was analysed using Descriptive Statistics using the SPSS.

Farmland Observation Checklist

In each of the 5 villages selected to serve as the study areas, 10 farmlands were selected for observation, making a total of 50 farmlands. The observation checklist was rated on the scale of Very Good, Good, Fair and Poor. Thus, at the end of the observation exercise, Descriptive Statistics was used to interpret data obtained therein.

Focus Group Discussion

It was deemed important to also generate some qualitative data in achieving the objectives of the study; hence, Focus Group Discussion was also employed. In order to achieve this, a total of 10 crop farmers were randomly selected in each of the 5 villages to participate in the discussion. Content analysis method was adopted to analyse data obtained.

Results

Questionnaire

The questionnaire consisted of two parts each deriving answers to the first two objectives of the study. The first objective sought respondents' views on the types of farming practices they adopted.

Table 1: Farming practices engaged by farmers

S/N	MEASURES	% RESPONSE RATE
01	Farmers practice mixed cropping to enhance soil fertility	55
02	Farmers avoid excessive tillage to protect the soil	28

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

03	Farmers practice shifting cultivation to allow farmlands to replenish	31
04	Farmers avoid excessive application of inorganic fertilizer and other chemicals on their farms	34
05	Farmers implement water conservation, harvesting and management practices	15
06	Farmers practice mixed farming (livestock integration) to improve soil nutrients	20
07	Farmers adopt Climate-Smart Agriculture to help adapt to and mitigate impacts of climate change	10
08	Farmers adopt crop diversification and the use of improved seed varieties for increased crop yield	25
09	Farmers use organic manures (animal dung)to boost soil fertility	78
10	Poverty is a contributory factor in farmers' inability to engage in sustainable farming practices	86

With regards to the types of farming practices being adopted by the crop farmers, data obtained revealed that majority of the basic sustainable and environmentally friendly practices are neglected. Out of the 10 sustainable farming practices put to the farmers as shown in Table 1 above, only adoption of mixed cropping received a 55% acceptance rate while crop diversification got 40%. However, the use of organic manure in the form of cow dung received the highest acceptance rate of 78%. This indicated that farmers in the study areas adopt the use of cow dung to boost soil fertility. Similarly, 86% of the respondents did agree that poverty prevents them from engaging in sustainable farming practices.

Table 2: farmland degradation combatting measures by farmers

S/N	MEASURES	% RESPONSE RATE
01	Farmers grow windbreakers around their farmlands to arrest soil erosion and desertification	21
02	Grazing is managed to protect vegetation cover	35
04	Farmers construct terraces on sloppy farmlands to arrest soil erosion	33
05	Cover crops are planted to protect soil erosion	12
06	Farmers adopt mulching to protect soil fertility and protect soil erosion	15
07	Agroforestry is practiced by farmers to maintain soil erosion and enhance soil fertility	28
07	Corn stalks are left on farmlands after harvesting to protect soil and enhance soil fertility	32
08	Farmers do not engage in deforestation to arrest desertification	20

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

09	Farmers avoid slash and burn in their farms in order to protect soil health and protect soil structure	52
10	Poverty is a contributory factor in farmers' inability to adopt basic farmland degradation combatting measures	91

The second part sought respondents' views on the majors adopted by crop farmers in combatting farmland degradation. Out of the 10 questions put forward in the questionnaire to derive the farmers' views on measures being adopted to combat farmland degradation as shown in Table 2 above, with the exception of avoidance of slash and burn, none received a 50% acceptance rate meaning most of these basic farmland degradation combatting measures were neglected. This clearly indicated that crop farmers in the study do not engage in the basic agricultural land degradation combatting practices capable of ensuring sustainable agriculture. Just as in the case of engaging in sustainable farming practices, 91% of the respondents agreed that poverty is a contributory factor in their inability to adopt basic farmland degradation combatting measures.

Focus Group Discussions

Results obtained from the Focus Group Discussions which was analysed using Content Analysis did not differ much from data obtained from the questionnaire administration. Although almost all of the participants were aware of the concept of agricultural land degradation, majority of them agreed to not doing enough to address the situation admitting that many of the farming practices they engage in are unsustainable and further exacerbate the menace. This doesn't mean that they are unaware of the basic farming practices that can be adopted to combat the menace of agricultural land degradation such as crop rotation, mixed cropping, shifting cultivation, use of local manure, agroforestry etc. However, they attribute their failure to adopt friendly farming practices to poverty, rising cost of farming, luck warm attitude of the government as well as drought and unrelenting desertification. According to the participants, poverty is the main reason why they are unable to engage in sustainable farming practices as well in adopting basic land degradation combatting measures. However, all of the participants vividly indicated that they do not know anything about Climate-Smart Agriculture talk less of adopting it.

Farmland Observation Checklist

A total of 45 farmlands were visited in the five wards selected for the study. The visitation was made in June when crop farmers were busy working on their farms in anticipation of the first rains. This provided the opportunity to clearly observe and assess farmers' efforts and moves in combatting farmland degradation to boost production and also offered an opportunity to ascertain the farms' status in terms of degradation. Unfortunately, none

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

of all the farms visited fulfilled even 40% of all the farmland degradation combatting measures considered for observation. Simple measures that could help a lot in protecting the farmlands such as agroforestry, cover crops planted, mulching, and water conservation/management were not seen. Besides, almost all the farms vividly showed signs of soil degradation and reduced soil fertility. However, heaps of local manure in form of animal dung were seen in almost all the farm visited. Verily, this practice helps in maintaining soil structure and increasing fertility thereby boosting agricultural yield.

Discussions

Results obtained from the questionnaire administration, Focus Group Discussions and Farmland Observation Checklist indicated that crop farmers in all the study areas engage in unsustainable farming practices and neglect basic sustainable farming practices capable of combatting agricultural land degradation and boosting soil fertility. The importance of adopting sustainable farming practice to combat agricultural land degradation cannot be over emphasized. These findings agree with that of Jonas, N. Chianu *et al.,* (2006) who revealed that in Africa, many people who live rural areas largely depend on agriculture for their livelihoods and due to rapid population growth, the resource base upon which agriculture depends is put under pressure often leading to agricultural practices that further destroy the environment. The study further revealed that decreased agricultural productivity contributes to increased rural poverty as a result of which farmers are compelled to engage in various food production practices and natural resource extraction that further degrade the environment. Definitely, soil fertility loss can be prevented by adopting appropriate crop management especially cover cropping and multiple cropping as cover crops have the ability to influence physical soil properties such as infiltration rate, moisture content, organic matter content as well influencing levels of Nitrogen especially when Nitrate fixing legumes are used as the cover crops.

Inevitably, perennial neglect of these basic practice resulted to increased soil fertility loss leading to decreased crop yield as well as increase in diseases and pests manifestations. Consequently, in their bid to boost soil fertility, the farmers engage in more environmentally devastating practices such as excessive tillage, overuse of inorganic chemicals, mono-cropping, continuous cropping and so on which lead to further degradation of agricultural lands with significant fall in productivity. PLCC results showed significant relationship between land degradation and unsustainable farming practices (0.988 Pearson Correlation at 0.01level (2-tailed) and 0.650 Pearson Correlation at 0.01level (2-tailed). As a result, poverty precipitates among many of the farming communities. According to Bizi, A. B., & Sidi, Y.D. (2023) some of the most effective ways of preventing soil erosions in northern Nigeria include the use of cover crops, multiple cropping, agroforestry and conservation tillage. Although it is widely agreed that the use of cover crops can guarantee protection from soil erosion and resultant soil fertility loss,

their use in Yobe state and of course in many other northern state seems to be very difficult or totally impossible. This is because cover crops need long term moisture to grow, survive and offer the protection required whereas the long term drought being experienced in this region makes it very difficult to protect agricultural land degradation by growing cover crops depending largely on rain water for its growth and development. Moreso, farmers do not practice water conservation measures that could enable the maintenance and development of cover crops. According to A.G. Hassan *et al.,* (2019), drought is a major impediment to the development of agriculture in Yobe state. Due to the severity of drought in the state, farmers engage in more environmentally devastating farming practices in their quest to increase crop yield.

Consequently, the significant decrease in productivity induced by the long term agricultural land degradation which was further exacerbated by drought and the farmers failure to engage in sustainable farming practice as well as the neglect of basic land degradation combatting measures resulted in increased poverty among many farming communities. This presents a serious threat to farming in the area. Since majority of the communities in these areas are farmers and will never stop farming, the unsustainable farming practices will continue and the deterioration of farmlands will continue along with it resulting in further decrease in crop yield and further degradation. This also poses a great threat to the agricultural productivity of Yobe state at large.

Hence, to end this, the consequences of poverty among farming communities have to be seriously addressed. In a study by Dia, Oaya and Joshua (2023), poverty was found to a critical impediment to subsistence farming in Nigeria and more especially in rural area where majority of the farmers are. The study further revealed that 42% of farming households in Adamawa state of Nigeria were poor. Similarly, Okuneye, P. A. *et al.,* (2004) opined that, In Nigeria, poverty is concentrated in rural areas where resource-poor farmers mainly characterized by preponderance of small farm units, fragile soils, rain-dependent, minimum inputs as well as poor yield dominate the agricultural sector. More worrisome is that, with increased poverty, rural crop farmers will further engage in environmentally devastating practices in their bid to boost productivity thereby leading to more degradation, decrease crop yield and resultant increase in poverty

Recommendations

Results from this study clearly indicated that crop farmers are accomplices in the deterioration of agricultural land degradation in Fune LGA by engaging in unsustainable farming practices and neglecting simple and basic farmland degradation combatting measures. However, based on data obtained from the study, this could be attributed to poverty and lukewarm attitudes of government in that regard. Since the last objective of the study was to proffer solutions to the menace of agricultural degradation in the LGA, the following recommendations are proffered:

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

1. Government should understand that sustainable agricultural practices are effective in combatting land degradation in northern hence, the promotion of the adoption of sustainable agricultural practices through extension services and farmer training programmes should core agricultural policies.
2. In order to address the menace of agricultural land degradation in the state, government should provide farmers with incentives to implement these practices..
3. Government should work out modalities on how to complement farmers efforts in maintain cover crops in agricultural lands by erecting water conservation projects accessible to farmers. This is because cover crops are effective means of protection the soil and boosting soil health and fertility. Otherwise, with the persistent drought raging the state, cover crops are just mirages to many crop farmers.
4. Awareness raising campaigns for farmers on the need for sustainable agricultural production is paramount. Extension services should be expanded to include workshops and trainings for rural farmers on basic sustainable farming practices and farmland degradation combatting measures. The idea of Climate Smart Agricultural should be incorporated in such workshops in order to intimate farmers on its advantages amidst growing adverse impacts of climate change.
5. Cattle ranches should be reintroduced and strengthened in order to stop grazing on farmlands so as not be leave farmlands bare exposing them to soil erosion and further desertification.
6. Financial incentives in the form of subsidised agricultural loans should be made accessible to rural farmers in order to boost their economic status so that they will be able to adopt sustainable farming practices as well as basic land degradation combatting measures.
7. Workshops should be organised for rural farmers in order to make them understand the importance of sustainable agricultural practices such as agroforestry, shifting cultivation, mixed cropping, mixed farming, cover cropping, and water conservation and so on.
8. Government should provide rural farmers with basic agricultural inputs such as improved seeds and farm implements in order to boost their productivity.
9. Government and the organised private sector should devise a means of saving rural farmers from predators who take advantage of the rising poverty rate among rural farmers and strip them off of their farm produce at very low costs there by plunging them in more poverty.
10. Ecological funds meant for the mitigation of environmental crises should be judiciously utilised especially in the area of addressing land degradation.
11. Finally, international efforts in combatting land degradation especially in the Sahel such as the Great Green Wall etc. should be strengthen with the aim of addressing widespread land degradation.

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

References

Abdullahi, H.G. (2018). *Drought and drought mitigation in Yobe State, Nigeria*. (PhD Thesis); University of Wolverhamton. Retrieved 20/08/2020 from www.wlv.openrepository.com

Adamu Abubakar Yerima (2013) Fune Local Government Area, Yobe State, Nigeria. *Coverage Assessment Semi-Quantitative Evaluation of Access and Coverage.* Retrieved from www.coverage-monitoring.org 9/02/2024.

Ambrose, A.Z., Yarima, U., Nankap, L.B. (2018). Climatic information as evidence of desertification processes in northern Yobe State, Nigeria: Implications for agriculture and ecosystem. *Global journal of pure & applied sciences.* Vol. 24. 117-124.

Bizi, A. B., Sidi, Y. D. (2023) Soil erosion in northern Nigeria: potential impact and possible soluition; a review. *Journal of Scientific Research and Reports*, 29 (7), 17-26.

B. M. Macaulay (2014). Land Degradation in Northern Nigeria: The Impacts and Implications of Human-Related and Climatic Factors. *African Journal of Environmental Science and Technology.* Vol. 8(5) Pp 267-273.

FAO. (1999). *Land Degradation defined.* Retrieved 13/08/2020 from www.fao.org.

FAO. (2017). *The state of the world's land and water resources for food and agriculture*. Retrieved 29/07/2019 from www.fao.org.

Hamdy, A. & Adel, A. (2014). Land degradation, agriculture productivity and food security. Review Paper; *Fifth International Scientific Agricultural symposium, Agrosym* 2014. Retrieved 06/07/2020 from www.researchgate.net

Jaiyeobo, I.A. (2003). Changes in soil properties due to continuous cultivation in Nigerian semiarid savannah. *Soil and Tillage Research.* 70. 91-98. doi.10.1016/S0167- 1987(02)00138-1

Joseph Oloukoi, Gbeng Adagbasa Efosa, Langyit Dasat Gloria (2018). Desertification Risk Analysis and Assessment in Northern Nigeria. *Remote Sensing Applications: Society and Environment.* Vol. 11, Pp 70-82

Jonah N. Chianu, Hiroshi Tsujii & Joseph Amange (2006). Environmental Impact of Agricultural Production Practices in the Savannas of Northern Nigeria. *Journal of Food, Agriculture & Environment* Vol. 4 (2): 255-260.

Lamourdia Thiombioni & Ignacio Tourino-Soto (2007). *Status and trends in land degradation in Africa*. Retrieved 10/06/2020 from www.researchgate.net

Maiangwa, M. G., Ogunjibe, A.O., Olukosi, J.O. & Atala, T.K. (2007). Land degradation: Theory and evidence from the north-west zone of Nigeria. *Journal of applied sciences* Vol. 7 (6): 785-795.

Mulinge, W., Patrick, G., Festus, M., Peter, M., Evelyne, K., &Alisher, M. (2015). *Economics of land degradation and improvement in Kenya.* Springer Link. Pp 471-498.

Nwokocha, C.O. (2017). The challenges facing the effective implementation of drought and desertification policies in north-east Nigeria. *Arts Social Science Jour.* Vol 8: 289. doi: 10.4172/2151/6200.1000289

Olagunju, T.E. (2015). Drought, desertification and the Nigerian environment: A review. *Jour. of Ecology and the Natural Environment.* Vol. 7 (7).196-209.

P.A. Okuneye, E. Fabusoro, K. Adebayo & I. A. Ayinde (2004). The Nigerian Agriculture and Poverty Incidence: The Need for Private Sector Empowerment. *Paper presented at the Farm Management Association of Nigeria Conference, Abuja, Nigeria.* Oct 19-21, 2004.

Scherr, S. J. (1999). *Soil Degradation: A threat to developing country food security by 2020.* 2020 vision discussions paper 27; International Food Policy Research Institute, (IFPRI). Retrieved 12/07/2020 from www.ideas.reprec.org

Tsegaye B. (2019). Effects of Land Use and Land Cover Changes in Soil Erosion in Ethiopia. *International Journal Agric. Science Food Technology* 5 (: 026-034.1)

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]

Unah, L. (2020). *Erosion crisis swallows homes and livelihoods in Nigeria*. African Reporting Programme: Future Climate for Africa. Retrieved 06/09/2020 from www.climatechangenews.com

EDITOR-IN-CHIEF
Prof. H. U. Nwanjo [Nigeria]