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EXPLORING ENVIRONMENTAL DEGRADATION IN YOLA SOUTH LOCAL GOVERNMENT AREA, ADAMAWA STATE

[1]***Ibrahim M. Adamu and*** [2]***Fatima N. Abubakar***

[1]Department of Agricultural Technology, Adamawa State Polytechnic, Yola Adamawa State Nigeria
[2]Department of Urban & Regional Planning, Adamawa State Polytechnic, Yola Adamawa State Nigeria.

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Abstract: This paper aimed to overview environmental degradation in Yola South Local Government Area, Adamawa State. The present paper summarizes pertinent information on environmental degradation in the area through investigating limited available and pertinent studies conducted in the area coupled with field observations and interviews which form the basis of the secondary data for the research. It was identified that drought, flood, soil degradation/erosion and deforestation were the major types of environmental degradation. Similarly, it was also revealed human factor is the most inducing of creating such menace than the natural factor. Loss of properties, lives, destruction of farmlands and buildings, paralysis of socio-economic activities and ecosystems deterioration were among the generated effects caused by the processes of environmental degradation in the area. It is therefore, suggested that government should ensure effective monitoring of the environmental resources and protecting them through formulating and adoption of polices and strategies that will not only safeguard the resources but will also improve and sustain them for future growth and development in the study area.

Keywords: Environment, Degradation, Overview, Yola

Introduction

It is apparent to know and understand that earth's environment is receiving enormous challenges and threats resulting to the losses of its inherent resources. These resources are directly linked to human sustainability and well-being of his livelihood. Globally, environment is considered as the embryo where all kind of development, management and sustainability are carried out for both living and non-living things. However, deterioration of these environmental resources could lead to what is known as environmental degradation. Environmental degradation received various conceptual definitions which includes that of Maurya *et al.*, (2020) who defined environmental degradation as the deterioration of the environment through depletion of resources which includes all the biotic and abiotic elements that form our surrounding, that is, air water, soil, pant animals, and all other living and non-living element of the planet of earth. Furthermore, environmental degradation is the deterioration of the environment through depletion of resources such as quality of air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of

wildlife; and pollution (FAO, 2022). It is also defined as any change or disturbance to the environment perceived to be deleterious or undesirable (Johnson, et al., 1997). Environmental degradation is a very serious problem worldwide which covers a variety of issues including pollution, biodiversity loss, and animal extinction, deforestation and desertification, global warming, and a lot more. Environmental degradation is of two broad types: when natural habitats are destroyed or rendered unusable through pollution or contamination; or natural resources are misused, over-used, and made scarce and eventually depleted. Either of the two situations can result in deprivation of the populace of such critical essentials like food, water, quality air and basic survival resources. Environmental degradation comes in many types. When natural habitats are destroyed or natural resources are depleted, the environment is degraded. Efforts to counteract this problem include environmental protection and environmental resources management. Mismanagement that leads to degradation can also lead to environmental conflict where communities organize in opposition to the forces that mismanaged the environment (FAO, 2022

Environment keeps changing over time naturally and it is also amenable to changes by human beings in Yola South LGA, Adamawa State. This is because most of its population depends directly on it for their livelihoods or activities based on natural resources for farming, grazing, fuel, industries, buildings etc. Their economic well-being is inextricably tied to the productivity of natural resources and quality of environment. These natural resources that are utilized by the people in the area includes;

- water resources
- soil and land resources
- forest and pasture resources
- Air resources

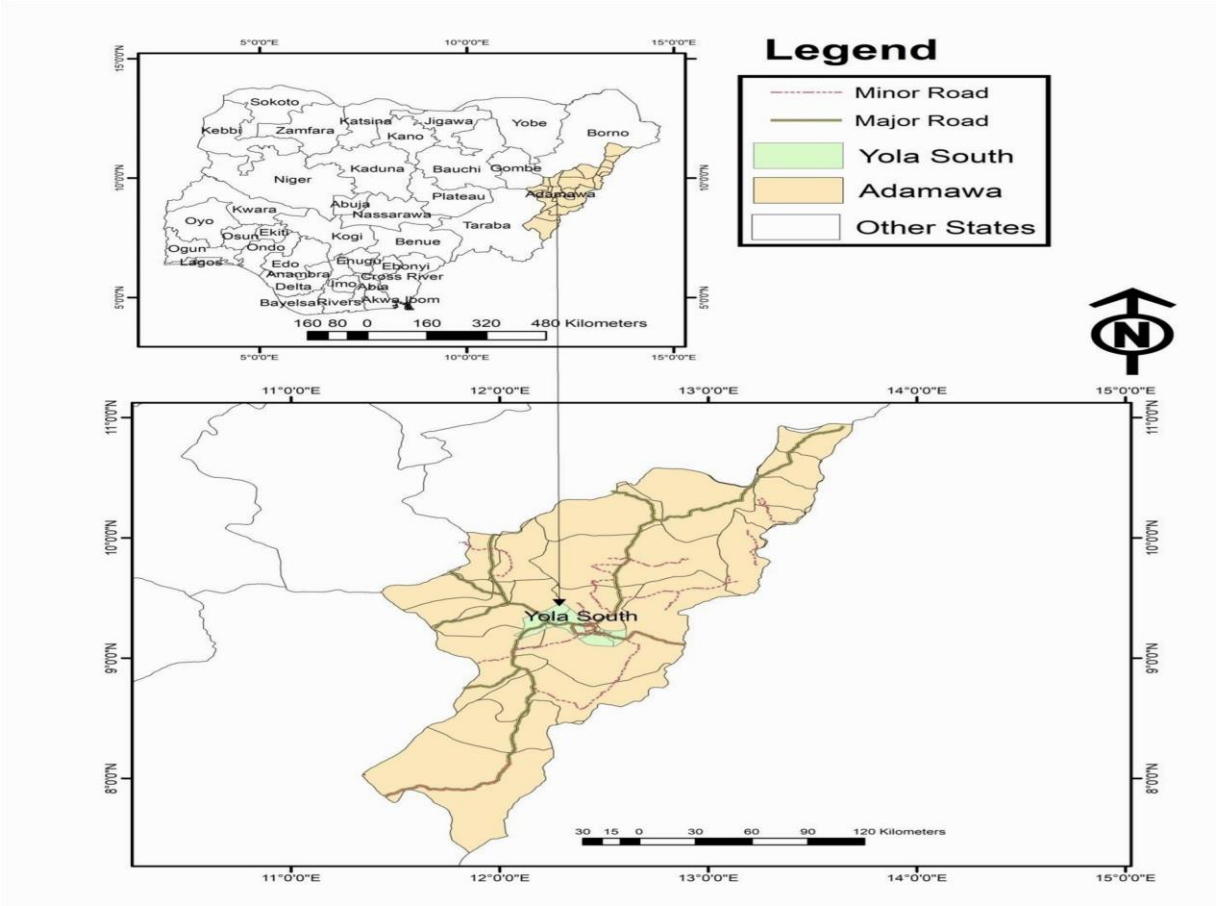
Unfortunately, most of these natural resources in Yola South are in a serious state of degradation. For example, water resources such as surface water (rivers, streams, dams, lakes) faced with high rate of flooding, scarcity, drought and lost due to evaporation rate, siltation effects, loss of aquatic organism pollutions from agrochemicals. Meanwhile, the groundwater aquifers are overexploited in many arid and semi-arid areas, surface water sources are highly polluted and consequently water for drinking and irrigation is increasingly getting scarce and polluted which in consequence incidence of waterborne diseases has increased significantly in recent years

In Yola South Local Government Area soil and land resources were degraded due to erosion, over-urbanization, sediment deposition, salinity, water-logging, decline of inherent fertility and low productivity (Sadiq *et al.,* 2019). Forest and pasture resources are suffered from overgrazing, bush burning, deforestation etc Increasing levels of air pollutions due to increase number of automobiles and industries pose a serious threat to human health and longevity. It is based on this backdrop this paper aimed to overview the aspect of environmental degradation in Yola South Local Government Area.

METHODOLOGY

Study Area

The study is conducted in Yola-South Local Government Area of Adamawa State, Nigeria. The study area lies between Latitude 9˚ 15'-10˚.2' -North of the Equator and Longitude 12˚ 26' -10˚.2' East of the Greenwich Meridian, having an average elevation of about 192 m (Adebayo 1999). The area has a land mass of 2,310.05 km^2 .The area is bounded by Yola North (Jimeta) to the North, Fufore to the East, Demsa to the West and in the south by Mayo-Belwa and Fufore LGAs of Adamawa State.The map of the study area was depicted on figure 1.



Fgure 1. Shows Map of the study Area

Sources of Data

To achieve the specific objectives of the study, the authors comprehensively studied the limited available and pertinent past and previous studies conducted in the area which form the basis of the secondary data for the research. In addition, filed observations, in-depth interview sessions, and focus-group discussions were undertaken for the background and qualitative data respectively

What are the Types of Environmental Degradation in the Study Area

In Yola South LGA, of Adamawa State most of the environment natural resources are in a serious state of degradation. These types of resources are degraded by several factors which are apparent in the study area as are presented on Figure 2 classified as natural and anthropogenic factors. The authors identified five (5) major types of environmental degradation which appeared **DROUGHT SCENARIOS.** When precipitation in a region of a given period of time is less than average precipitation in that region in the same period, the drought is occurred in that region because the

creatures (plants, animals, humans) have been compatible with average precipitation received in that region and in more case of precipitation shortfall, their lives will be exposed to threat (Beersman and Buishnd, 2007; Saeid, *et al.*, 2017).

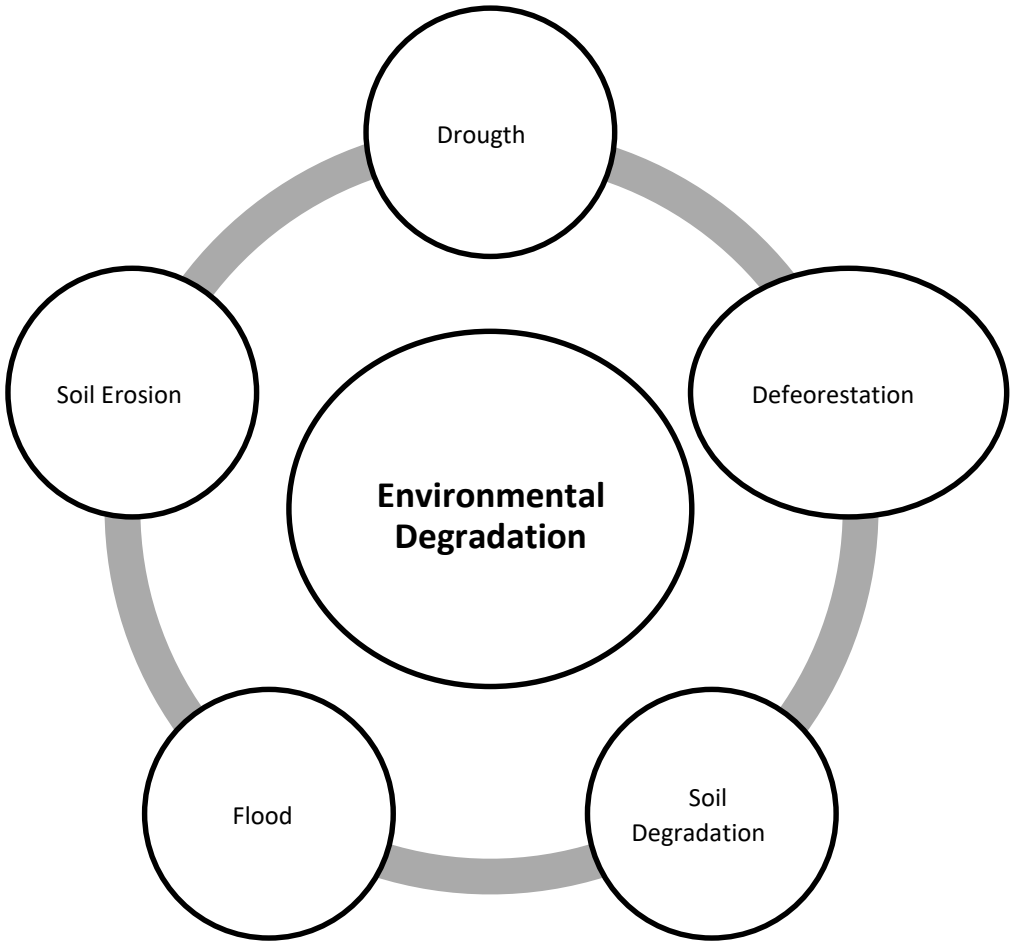


Figure 2. Shows the identified environmental Degradation in the study area

Yola South LGA is among the area with considerable arable lands for agricultural production in the state which produces a large proportion of grains and staple diet of the growing population. Yet the area is frequently under drought attack and this negatively affects food production in the area and is continuously reoccurring most especially in the recent decades. Thus, there is need for comprehensive analysis of drought severity characterization in both temporal and spatial variability in the area with the aim of providing essential and valuable information for the farmers, decision makers and other related agro-climatic agencies for strategic planning and decision making processes respectively. Considerably, in the study area it was reported by researchers and observed that meteorological, hydrological and agricultural droughts were evident affecting agricultural and other socioeconomic activities in the area. Conditions have been assessed through various research using different methods and indices of drought quantification and its risk imposed on environment and agricultural production. Among these research work conducted for drought analysis and

its characterization using different indices includes rainfall seasonality index (RSI) by Sadiq (2020a) Rainfall Anomaly Index (RAI) by Sadiq *et al.,* (2020a) Rainfall Decile Index (RDI) by Sadiq (2020b RDI) and Percent of Normal precipitation (PNP) by Sadiq *et al.,* (2020b) and hydrologic drought using Stream-flow drought index (SDI) and Standardized Waterlevel Index (SWI) by Sadiq, (2020c) respectively.

The variability of drought scenarios in both spatial and temporal scales of different methods in the area were overviewed and presented on tables 1 and 2 respectively. For the use of PNP method of drought analysis from 1978-2017, moderately dry condition was occurred in two years only (5%) in the year 1987 and 2002 having the percent normal values of 72.61 % and 70.23 % as depicted in table 1 reported by Sadiq *et al.,* (2020b) While the use of RDI for the lowest rainfall amount not exceeded 10-20% of the precipitation occurrences rated as much below normal and characterized as exceptional drought (D4) were found in the year 2002, 1987, 1973, 1974, 2006, 1971, 2003, 2005, 1979 and 2004 as presented on table 2 (Sadiq, 2020b)

Table 1. Variability of Drought intensity using Percent of Normal Precipitation of Yola South LGA from 1978-2017 (40 Years) period

S/n	Pn Classification	Years of Occurrences	Frequency	Percentage (%)
1	Moderately Dry	1987 and 2002	2	5
2	Very Dry	Nill	0	0
3	Extremely Dry	Nill	0	0

Source: Sadiq *et al.,* (2020b)

Table 2. Variability of Drought Intensity using Rainfall Deciles Index of Yola South LGA from 1969-2018 (50 Years) period

Rainfall ratings (mm)	Decile Percentage	Years	Frequencies	Drought Category	Drought Description
Much below normal (800-656.7)	Lowest 20%	2002, 1987, 1973, 1974, 2006, 1971, 2003, 2005,1979, 2004	10	D4	Exceptional Drought
below normal – (903.4-808.9)	Next lowest 20%	2008, 2001, 1990, 2013 1970, 1991, 1972,1983, 1986, 2007	10	D3	Extreme Drought
Near normal (915.8-936.3)	Middle 20%	2001, 2017, 1994, 1981, 1977	5	D2	Severe Drought

Source: (Sadiq, 2020b)

Moreover, there are quite apparent development of hydrologic drought in the study area evidently from gradual decline of water levels, discharge rate, drying of lakes (Plate 1), dams and other water bodies which are essentially used for irrigation farming, animal consumption, commercial, industrial and other domestic activities as was reported by sadiq, 2020c. Figure below.

Plate1. Shows the hydrologic drought scenarios at different locations of the study area

Similarly, drought effects had also manifested in the area in terms of vegetation loss subjecting the area into desertification process thereby forcing an indiscriminate movement of cattle by the herdsmen to Cameroon border threatens permanent soil degradation, cracking and drying of soils and disrupts crop growth (Sadiq, *et al.*, 2019a; Sadiq, and Hen 2018; Sadiq , 2020a). Plate 2 depicted some implications of water scarcity on agricultural production in the study area. Thus, drought disrupts crop growth, reduces grazing land, and threatens permanent soil degradation (Sadiq, *et al.*, 2020a).

Plate 2 . Shows the effect of dry -spells of 7 -8 days (22 -29 July, 2021) on rice crop experienced in the study area (Sadiq and Vahyala, 2023).

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FLOOD SCENARIOS

Bwala, *et al.*, (2015) had explained that flood is simply seen as an environmental hazard that occurs when there is an overflow of water that submerges land which is usually dry. The increasing need for human development through rapid urbanization has led to a wide spread horizontal development especially in the developing countries (Adewumi, 2013). Similarly, in Adamawa state, there are areas that are highly prone to flood for the past decades with a peculiar high extent of a particular year which might be associated with an indiscriminate human/ anthropogenic activities and their proximity to the River Benue Plains coupled with some natural climatic phenomenon such as high rainfall or precipitation, High Evaporation Rate, Low atmospheric temperature, High Relative Humidity, River flow, Run-off, gauge height, etc. (Sadiq and Hena, 2018). Thus, Yola South LGA is not exceptional in the state. However, in Adamawa state, Yola South LGA, is among the probable flood prone area for all most a decade with a peculiar high extent of a particular year which might be associated to human induced factors such as poor or absence of drainage, illegal building structures on/across drainage channels, blockages of canals/drains, dumping of waste in gutters and culverts, illegal channelization of channels, poor waste management and poor physical planning. Plate 3 below show the evident of flood in Yola South LGA.

Plate 3. Showing the Improper dumping of waste in gutters/culverts along Abuja Road in

The study area captured on June, 2022.

The repeated occurrence of catastrophic flood episodes in Adamawa state, particularly in Yola South LGA the impacts of flooding have increasingly assumed from significant to threatening proportions, resulting in losses sustained by the urban dwellers and flood victims, have been sustained by the citizen of the study area due to what has become perennial anthropogenic disaster. Among the devastating effects of flood in the area includes, loss of properties, destruction of farmlands and buildings, loss of lives and paralysis of socioeconomic activities as was reported by Sadiq *et al.*, (2019b) as shown on Plate 4.

Plate 4 Shows devastating effect of flood scenarios in the study area.(Sadiq *et al.*, 2019 b)

SOIL DEGRADATION

Soil degradation, refers to a broad spectrum of changes in soil characteristics because of natural or anthropogenic factors that alter their structure and quality, including deforestation and the removal of natural vegetation, agricultural activities, overgrazing, overexploitation of vegetation for domestic use, and industrial activities (Lal, 1997; FAO, 2015; Karlen and Rice ,2015 and Lal, 2015). Soil degradation is causing a decline in crop productivity and huge economic loss, putting the food security and livelihood of farmers at risk (Bhattacharyya, *et al.*, 2015).

Sadiq, *et al.*, (2019a) classified causes of soil/land degradation in Yola South LGA, Adamawa State in to anthropogenic, cultural, physical and climatic factors. Anthropogenic causes of soil degradation process entails direct and indirect human activities associated with soil nutrients depletion. It was revealed that land use and or urbanization was the utmost factor that caused devastating soil degradation in the study area with 23 % of the respondents (Sadiq *et al.*, 2019a). This might be largely due to increase in population density which prompted inhabitants in the area to occupy the fertile agricultural land under cropping to building of houses and industries (Plate 5). Montagomery, (2007) explained that people have been building and expanding their cities on the most fertile soils, thereby squandering such a valuable.

Plate 5. Shows the rapid urbanization on fertile agricultural land at Tashan-Sani in the study area during year 2019.

Similarly, Sadiq *et al.,* (2020a) reported that removal of crop residues on the farmland caused soil degradation; likely crop residues are removed in the study area as animal forage rather than incorporating them in to the soil to improve the soil nutrients. In the study area about 21% of the respondents assessed deforestation as the main factor of soil degradation in the area, where trees (leaves, litters which decomposed in purification process of organic matter in nitrogen cycle are indiscriminately cut down as fuel wood for cooking and economic purposes subsequently subjecting the area in to desert encroachment zone .Thus, In Nigeria desertification is fast becoming a threat in the northern parts especially the states in the Sahel and Sudan savanna areas (Uchegbu, 2002).Overgrazing by the animals was perceived by 19 % of the respondents to had caused soil degradation in the study area. Perhaps might be due to their traction effects on the soil physical properties such as structures, texture, porosity and compaction. Overgrazing affects soil structure, compaction rates, porosity, and top soil depletion which have led to soil erosion and reduced soil fertility (Sadiq, *et al.,* 2019a).

SOIL EROSION

Soil erosion continues to be a major threat in many regions of the world despite decades of focused scientific research and societal concern. Soil erosion is a significant environmental issue of common concern in the world today, serious water and soil loss resulting from what has become one of the main factors restraining local economic development (Chu, 1956, *Poesen et., al.,* 2003 and Tang, 2004). Farmers in Yola and environs are seriously facing reduction in farm output annually due to the accelerated loss of topsoil through erosion from agricultural land which recognized as an important threat to their profitable farming (Sadiq et al., 2019a). Thus, plates 6

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below described the glaring effects of soil erosion on different farm locations of the study area.

Plates 6 . Shows the devastating effect of soil erosion on arable lands at Bole (I) in the year 2019

It was revealed that overgrazing by the animals. Overgrazing implies excessive grazing or removal of grasses by animals, thereby exposing soils to degradation. Looking at the extensive nature of the production system in the area pastoralist and herdsmen moved their animals in and out of the area in accordance with seasonal changes as a consequence predisposing the soil to loss of organic matter, texture, structure and compaction which are premises of nutrients availability. In addition, as a result of massive redeployment of most people into farming most especially in this current government where agriculture received holistic and ardent attention coupled with the migration of internally displaced persons from the northern part of the state that depend on farming as their primary functions led to invading of limited marginal land for farming purposes. This however, leads to overutilization of the marginal lands which subject them to degradation through erosional processes as was reported by Sadiq and Ardo, (2020). Furthermore, deforestation is among the main factor of soil degradation in the area, subsequently subjecting the area in to desert encroachment zone (Sadiq *et al.*, 2019a) .Thus, In Nigeria desertification is fast becoming a threat in the northern parts especially the states in the Sahel and Sudan Savannna areas (Uchegbu, 2002). Hence, deforestation may lead to soil erosion, loss of soil nutrients, and decrease in transpiration and evaporation losses, which may consequently lead to desert encroachment respectively. This is because the roots of trees and other plants hold the top soil in situ. Therefore, by clearing an area for either agricultural, industrialization or other purposes is exposing the soil more easily to washed away by water or wind leading to soil erosion subsequently to desertification. Heavy rainfall was revealed to be the major cause of soil erosion in Yol South (Sadiq and Ardo, 2020).

The apparent resultant effects of water erosion in the area might be attributed to fluctuating increase in the annual rainfall amount in the study area for the recent decade as it was reported recently by Sadiq *et al.,* (2019a) that high amount of rainfall experienced in the area.

Soil erosion in the study area has been reported to have caused adverse effects on the environmental resources which are identified. Farm buildings and facilities such as fences, ware houses in areas where erosion occurred are observed to be destroyed in areas such as Mbamba, Bole, Yolde-Kohi of the study area. In addition during the erosional process materials (sands, Silt, pebbles, debris) are transported from upper slope to lower slope which might be deposited to streams, dams, rivers, lakes and other water bodies. Dam along Jimeta-Yola road has silted due erosional depositions of sands, pebbles, stones etc. In addition, the major lake known as Njuwa lake recognized as an Oxbo-lake where fishing festival were conducted for the past decades have been silted through erosional depositions from river Chochi which inconsequence leads to absolute drying up of the lake as was reported by Sadiq and Abdullahi (2020).

DEFORESTATION

According to Ogundele, *et al.,* (2016) the conversion of forest to another permanent nonforested land use such as agriculture, grazing, or urban development is termed deforestation. He further noted that deforestation over time has been associated with distortion of forestry issues. The rate of deforestation currently exceeds the rate of forest renewal. Human activities thus significantly have adverse effects on the forest environments; forest is one of the resources that rural populace depend on for livelihood (Amadi, *et al.,* 2021). Forests provide a wide variety of highly valuable ecological, economic and social benefits such as, carbon storage, soil and water conservation, provision of employment, enrichment of systems, and improvement of urban and rural living condition. Visibly, these services differ broadly in nature and therefore tend to be valued in different manners by different societies and different social groups. There are several factors that drive most people to actively participate in deforestation activities in Yola South LGA, of Adamawa State which are related to either agronomic, social, cultural or economic issues. An attempt was made by the author towards surveying the fundamental causes of deforestation in the area and identifies the magnitude of these factors.

The major cause of deforestation in Yola South LGA is extensification of farming activities. This findings concur with finding of Amadi, *et al.,* (2021) stated that greater percentage of deforestation is caused by agricultural expansion. This may result in conversion of more forest land to agriculture. Similarly, the marginal arable lands are no longer fertile due to continuous cropping and poor management which also prompted most farmers to move in to the bush scavenging for virgin land which should be deforested. In the study area four (4) wards were identified to have received high level of deforestation due farming activities they are Yolde Kohi, Mbamba, Namtari and Yolde Pate-Bole. Fuelwood extraction is the second fundamental cause of deforestation in the study area with about 18 % perceived by the respondents. This is because about 55 % of its population fully depended on the wood as their sole source of energy for cooking including light industries such Bakery, Parboiled rice processing and Soya centers. Charcoal is considered as the second major source of fuel use in cooking in the area after fuelwood. In fact it is recognized as an alternative to fuelwood. It is cheaper than the fuelwood, available and affordable in any quantity. These charcoals are derived from deforested trunks of timber and tress including those that are suitable as fuelwood can be converted to charcoal as energy source respectively.

A. Before B. After deforestation

Plates 7. Evidences of deforested land for building purposes at Kasuwan Katako, Yola South LGA, Adamawa State in the area (Captured on 5th April, 2023)

These challenges are mostly felt after a long period of continuous deforestation. These challenges can take different forms. The author empirically surveyed that 57 % of the respondents conceived that deforestation effects is highly severe in the area, 23 % perceived it to be severe while moderately severe was agreed by 15 % and 5 % as not severe in the area as was presented on figure 18. The effects caused by deforestation were depicted on figure 19 and discussed as follows;

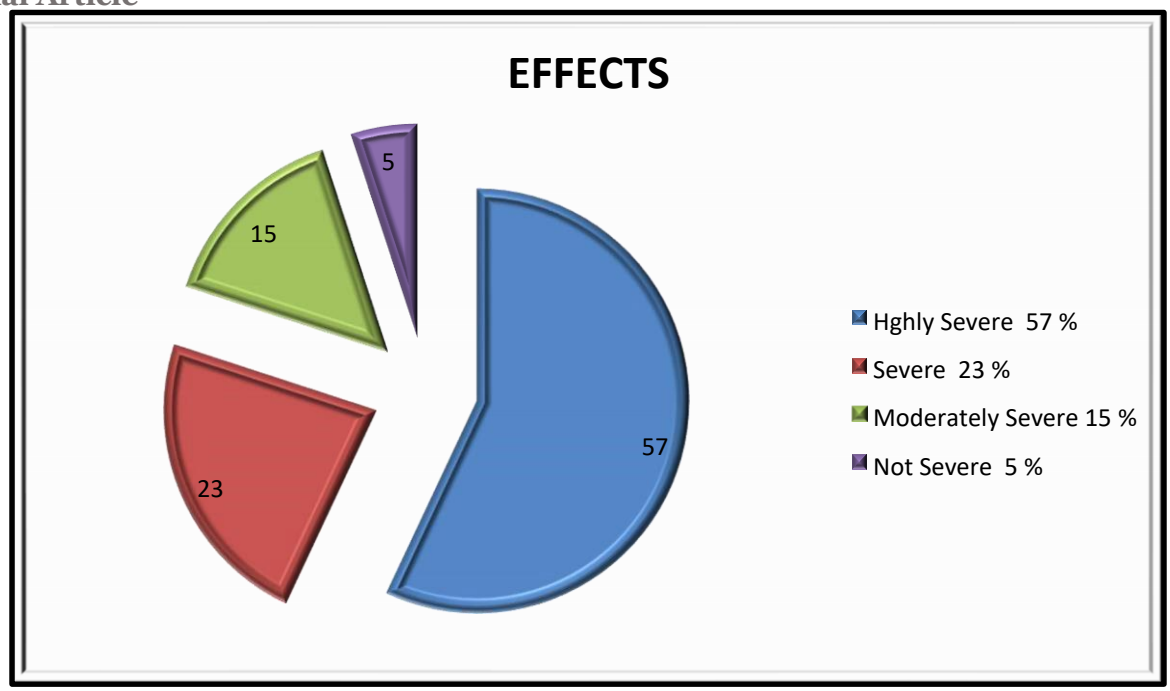

Figure 3. The level of Severity of deforestation in Yola South LGA, Adamawa State

The major glaring and devastating effects of deforestation felt by most of the respondents (20 %) in the area was climatic changes. Yola area was reported to have drastic increased in the atmospheric temperature and reduction in the rainfall amount with seasonal reoccurrences of drought and dry-spells in the recent decade which might be associated with reduction in vegetation cover due to deforestation effects. The second apparent effects perceived by the 15 % of the respondents in the area to have caused by deforestation is low soil fertility. As the trees are cut down it exposed the soil to direct effects of solar radiation which fasten the rate of organic matter decomposition in the soil and exposing the soil to erosional processes. There are quite large numbers of fauna (animal) and flora (plant) species that are no longer visible in the study area. This is because their habitats are been over utilized and destroyed by anthropogenic activities of which the most common and devastating is the deforestation as was conceived by 15 % of the respondents in the area. This finding was agreed with outcome of Amadi *et al.,* (2021) who found that deforestation (7%) accounted for wildlife extinction.

CONCLUDING REMARKS

Environmental resources can only be utilized and sustain for the future occurrence if they are secured from the threat of degradation either was caused by natural or anthropogenic factors. Like other environment, Yola South LGA, has abundant environmental resources that are utilize by people for their livelihood. However, these resources are getting out of hand as a result of indiscriminate human utilization causing different forms of degradation. Thus, this present paper aimed to overviewed and identified major existing environmental degradation in the area drought, flood, soil erosion and deforestation. These factors seriously continue to cause exacerbated effects on human, animal and the ecosystem entirely hampering growth and development in the area. The causes and effects of environmental degradation were highlighted respectively. It is therefore suggested that government at all levels should put more effort

and strengthen the adoption of environmental policies that will not only safeguard and protect the environment but will improve and sustain the resources for growth and development.

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