



World Scientific News

An International Scientific Journal

WSN 112 (2018) 107-117

EISSN 2392-2192

Devastating Effect of Forest Degradation in Southern Guinea Savanna of Nigeria

A. Buochuama^{1,*}, O. A. Akande¹ and M. O. Buochuama²

¹Federal College of Wildlife Management, Forestry Research Institute of Nigeria,
PMB 268, New Bussa, Nigeria

²Department of Statistics, School of Physical Sciences, Federal University of Technology,
P.M.B. 1526, Owerri, Nigeria

*E-mail address: alexanderbuochuama@yahoo.com

ABSTRACT

Forest degradation poses serious ecological consequences to the environment. Therefore, this research deals with the devastating effect of forest degradation in southern guineas savannah of Nigeria. In this study, about one hundred and twenty questionnaires (120) were used to collect data from a number of villages in Wawa community. Descriptive statistics was used in the data analysis. Construction, poverty, population increase, and farming were some of the sources of forest degradation in the study area. The consequences of forest degradation in the study area were erosion, desertification, wildlife habitat destruction and global warming/ climate change. The study noted that the solutions for curbing forest degradations include the following; agroforestry, creation of more forest reserves afforestation/ reforestation, implementation of forest laws and policies and public enlightenment on the consequences of forest degradation.

Keywords: devastating, ecological, forest degradation, guinea savanna, Nigeria

1. INTRODUCTION

More than 1.6 billion people around the world depend on varying degrees on forests for their livelihoods – not just for food but also for fuel, for livestock grazing areas and for medicine. At least 350 million people live inside or close to dense forests, largely dependent on these areas for subsistence and income, while about 60 million indigenous people are almost wholly dependent on forests (World Bank, 2006). FAO (2002) defines forest degradation as: The reduction of the capacity of a forest to provide goods and services. Perceptions of forest degradation are many and varied.

In a recent survey, Lund (2009) found more than 50 definitions of forest degradation, formulated for various purposes. FAO (2009) shows that many such definitions are either very general or their focus is on the reduction of productivity, biomass or biological diversity. Definitions that refer to multiple-use forests or multiple forest benefits may consider forest values comprehensively but are more difficult to apply universally in a consistent and transparent way. Nonetheless, the common definition of forest degradation given above provides a satisfactory definition at the international level and a common framework for developing more specific definitions for particular purposes. It is also compatible with an ecosystem-services approach.

Forest degradation involves a process that negatively affects the characteristics of a forest such that the value and production of its goods and services decline. This change of process is caused by disturbance (although not all disturbance causes degradation), which may vary in extent, severity, quality, origin and frequency. Disturbance may be natural (e.g. that caused by fire, storm or drought), human-induced (e.g. through harvesting, road construction, shifting cultivation, hunting or grazing) or a combination of the two. Human-induced disturbance may be intentional (direct), such as that caused by logging or grazing, or it may be unintentional (indirect), such as that caused by the spread of an invasive alien species (FAO, 2009).

Forest degradation is a serious environmental, social and economic problem. Quantifying the scale of the problem is difficult, because forest degradation has many causes, occurs in different forms and with varying intensity, and is perceived differently by different stakeholders. The International Tropical Timber Organization (ITTO, 2002) estimated that up to 850 million hectares of tropical forest and forest lands could be degraded.

Environmental degradation and poverty have become important global issues since the 1970s, when the world countries and international community became aware of the negative consequences of over-exploitation of the human environment.

This had led to the calling of several international summits such as the United Nations Conference on Environment and Development at Stockholm, which was held in 1972, and the Conference on Environment and Sustainable development at Rio de Janeiro, which was organized by the United Nations in 1992. During the World Summit on Environment and Sustainable Development in Rio de Janeiro, the world leaders agreed that equitable use of the natural resources and ecosystem ensures sustainable development and poverty reduction in the world, which is critical to human survival. In this regard, this present study aims to ascertain the sources of forest degradation, assess the consequences and recommend solutions for curbing forest degradation in the study area.

2. MATERIALS AND METHODS

2. 1. Study Location

The study was carried out in selected villages of Wawa community in Borgu Local Government Area of Niger state, Nigeria. It is located on latitude 9°53'N and longitude 4°31'E, covering a land mass of about 16,200 km² Ojo *et al.* (2018).

2. 2. Data Collection and analysis

Data used for this study were collected using a set of structured questionnaire from one hundred and twenty (120) respondents in the study area. All data used for this study were analysed using descriptive statistics.

3. RESULTS

Table I shows the selected villages of the respondents. Table 2 below reveals the socio-demographic characteristics of the respondents. Figure 1 shows the source of livelihood of the respondents in the study area. Figure 2 displays the academic qualification of respondents in the study area. Figure 3 clearly reveals the sources of forest degradation in the study area. Figure 4 showcases the consequences of forest degradation in the study area. Figure 5 displays the solutions for curbing forest degradation. Figure shows land that has been cleared for farming in Wawa, Borgu Local Government Area of Niger State, Nigeria.

Table 1. Selected villages of the respondents

Villages	Rate (n = 120)	Proportion (%)
Babarasa	24	20.0
Wooko	24	20.0
Leshigbe	24	20.0
Garafini	24	20.0
Malele	24	20.0

Table 2. Socio-demographic characteristics of the respondents

Socio-demographic factors	Rate	Proportion (%)
Sex		
Male	57	47.5
Female	63	52.5

Age Group		
15-20	15	12.5
21-25	44	36.7
26-30	19	15.8
31-35	16	13.3
36-40	11	9.2
≥41	15	12.5
Marital Status		
Single	66	55.0
Married	53	44.2
Divorced	1	0.8
Religion		
Christianity	41	34.2
Islam	79	65.8

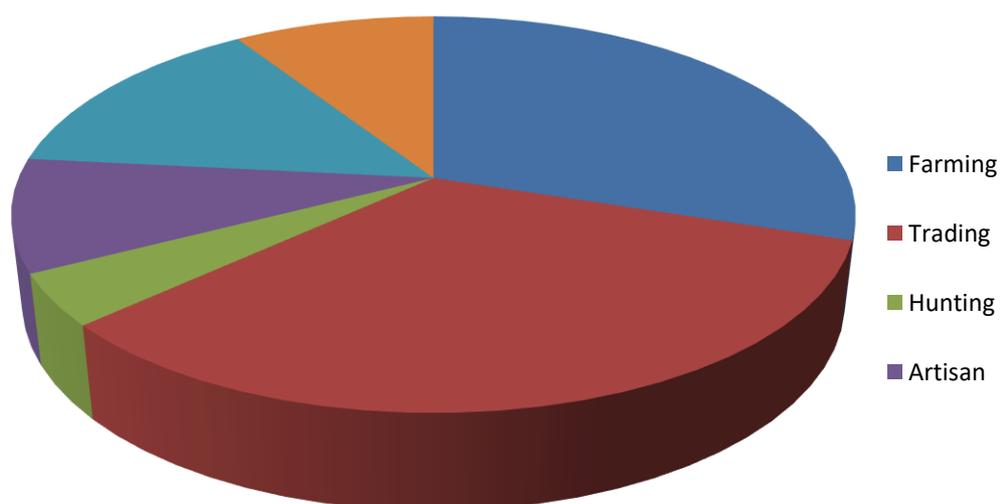


Figure 1. Source of livelihood of the respondents in the study area

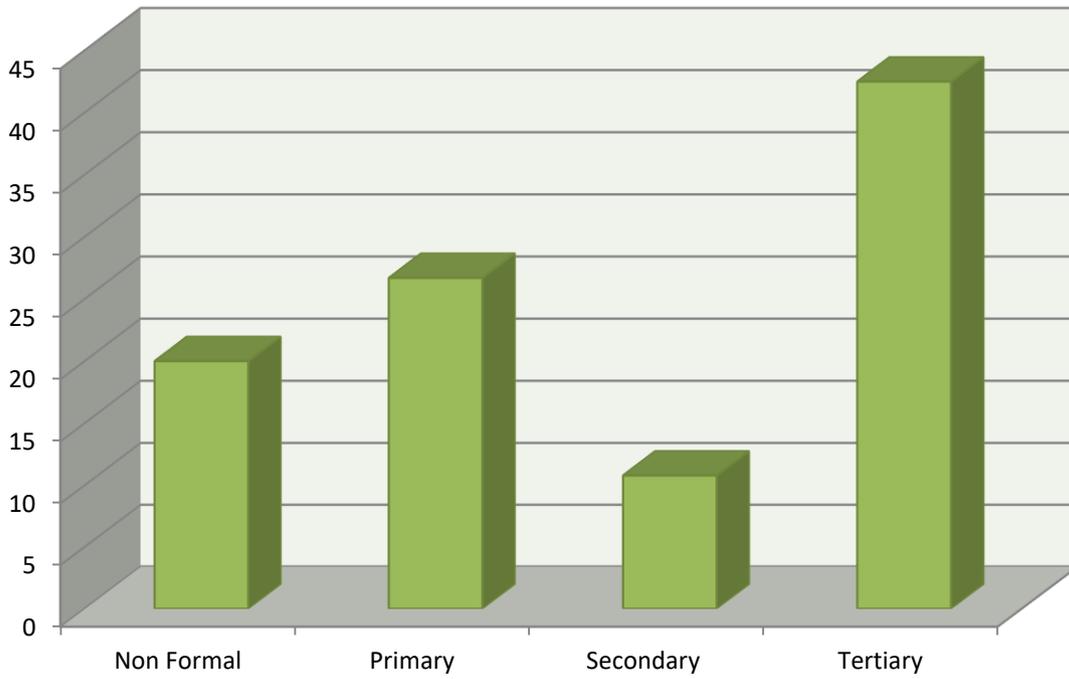


Figure 2. Academic qualification of respondents in the study area

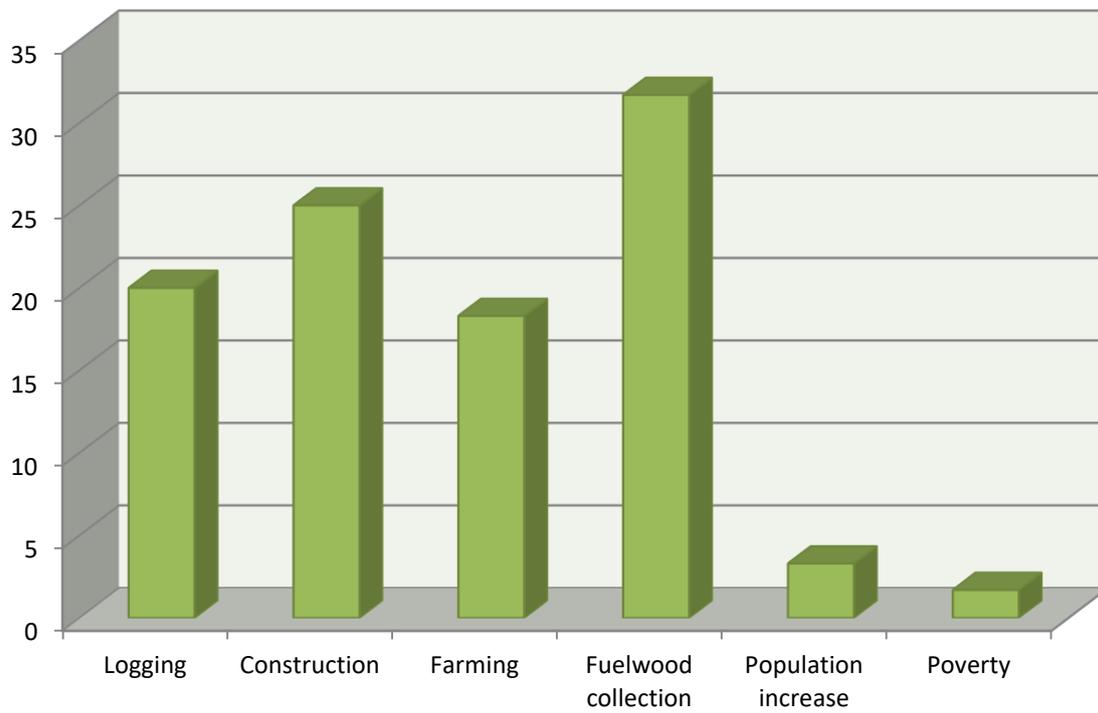


Figure 3. Sources of forest degradation

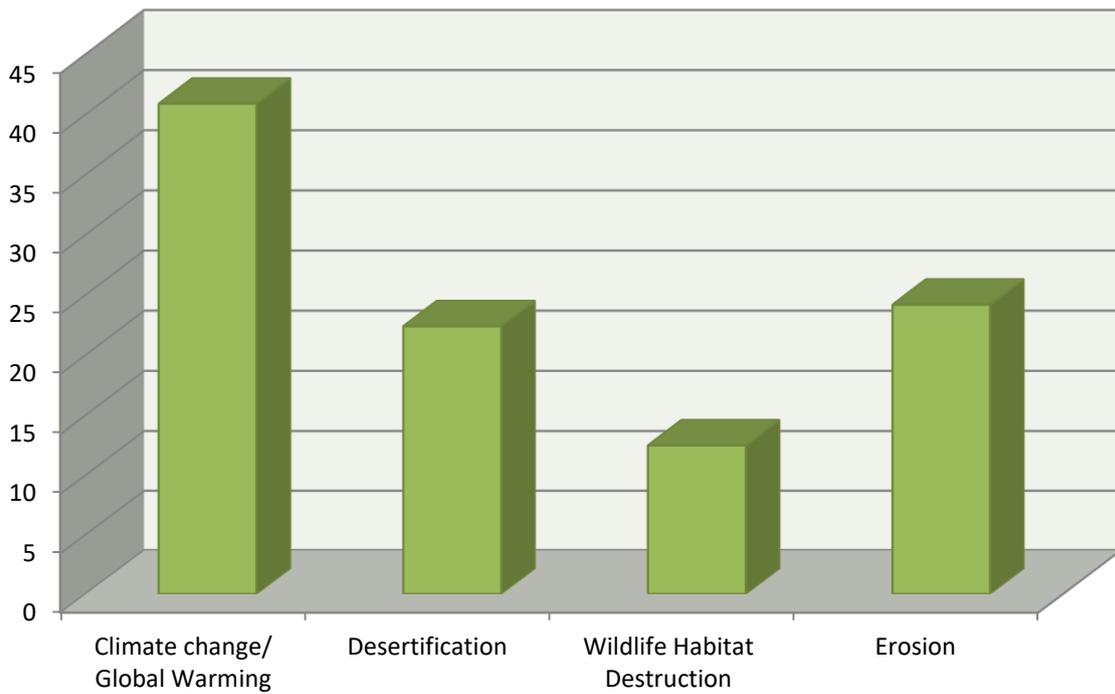


Figure 4. Consequences of forest degradation

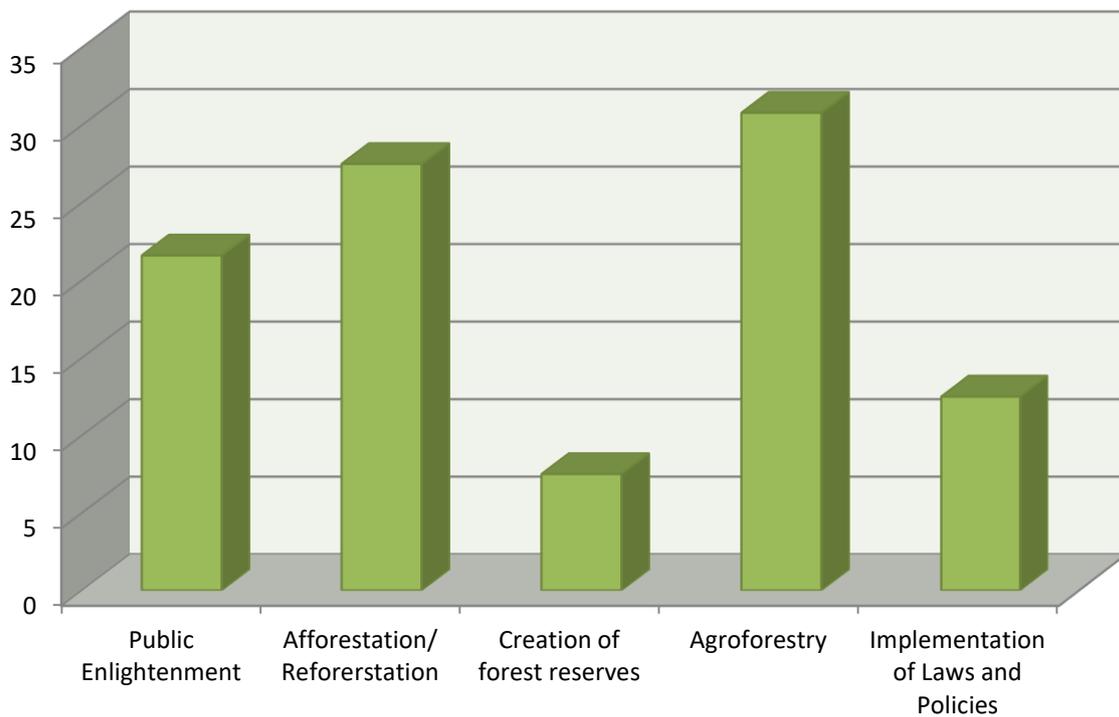


Figure 5. Solutions for curbing forest degradation



Figure 6. Forested land that has been cleared for farming in Wawa, Borgu Local Government Area of Niger State, Nigeria

4. DISCUSSION

The socio-demographic characteristics (Table 2) of the respondents reveal the number of females (52.5%) is higher than that of the males (47.5%). This is because in the study area, more female folks are involve in farming, gathering of firewood and trading in Non-Timber Forest Products (NTFP). A greater proportion (65.8%) of the respondents chose Islam as their religion. This can be due to the fact that, the northern part of Nigeria is dominated by Islam. The table also shows that ages 21-25 years were the highest age group, followed by ages 26-30 years. The source of livelihood (Figure 1) depicts that trading and farming are the major sources of livelihood of the respondents. This is so because, the study area is a typical rural community and as such they mainly depend on farming and trading in agricultural/forest products for sustenance. A similar finding was observed by Ojo *et al.* (2018); they observed trading and farming to be the major occupation of respondents in their study. The academic qualification (Figure 2) reveals that a greater proportion (42.5%) of the respondents has obtained tertiary education. This might be due to the encouragement given to the members of the community by their leaders to embrace tertiary education and the presence of specialized degree-awarding institutions in the Local Government Area. Most of these higher degree holders serve as civil servants in the public sector. Only about 20% of the respondents indicated that they possess no formal education.

The sources of forest degradation (Figure 3) depicts that fuelwood collection is the major (31.7%) source of forest degradation in the study area. Most of the community members depend on the forest for their heat supply, because they view wood energy as an easily available and accessible source of energy. Woods obtained from the forest are cut to size using machete or axe and are stacked properly to allow them dry well. They can be used when fully dried. Activities like this, lead to depletion of forest resources at an alarming rate.

Construction work is another major (25.0%) source of forest degradation found in this study. During building constructions in most rural communities in Nigeria, the forest is exploited of suitable wood resources ideal for construction. In the study area, wood is mainly used as a structural material for the roof, windows and doors. Timber species are usually sighted in the forest and immediately marked for processing by small sawmills in the area, without observing any precaution against forest degradation. Many valuable tree species has been lost due to this incessant cutting of trees for construction. Forest degradation in most regions in Africa has increased over the years and both anthropological activities and natural disasters have added to this problem. Logging (20%) is a common factor of forest degradation, especially in the tropics. Annually, large volumes of logs are removed from the forest without any feasible mechanism to replace them. Uncontrolled logging comes with many associated environmental problems.

The forest is depleted, the soil surface of the forest land is altered, biodiversity are loss, etc. In the study area, where little or no government presence exists in regards to regulation of logging activities, logging is carried out by any sawmill that has the ability to log with very little or no restrictions. It can also be observed in figure 3 that farming is another activity leading to forest degradation. Farming (18.3%) is a major contributor of forest degradation. When forest lands are encroached for agricultural activities, that portion of land will be cleared and made suitable for the cultivation of crops. Maloney and Weller (2011) noted that agricultural land use increases nutrient inputs into streams relative to native vegetation, with consequent negative effects on macro invertebrate and fish assemblages, potentially resulting in toxic algal blooms (Cloern, 2001).

Communal lands with abundant forest resources are cleared for either small or large-scale agricultural activities. 3.3% of the respondents indicated that population increase can also lead to a degraded forest. An increasing population, without any increase in the size of the forest or regulation on the sustainable use of the forest, leads to a mounting stress on the available forest resources. In the study area, where no birth control strategy are put in place to check overpopulation, households are relatively large and thus, this brings more pressure on the available forest resources in the study area. Poverty (1.7%) is another source of forest degradation in the study area. Many of the rural poor depend on forest resources for their survival. Ojo *et al.* (2018) noted that because wealth is unequally distributed in our society, the less privilege looks for an alternative source of income. The forest is usually seen as the first alternative that comes to mind for exploitation. The collective issue of environmental degradation and poverty was addressed in the report presented by the World Commission on Environment and Development 1987 which was termed “Our Common Future”. In this report, the commission clearly stated that poverty is the bane of environmental degradation in most countries of the third world, especially in the rural areas, and that before any effective policy on environmental management and sustainable development can be achieved, policy makers and government should first address the issues of poverty.

The consequences of forest degradation (Figure 4) show that climate change/ global warming is the major outcome (40.9%) of forest degradation in the study area. Erosion is the second leading factor (24.2%) leading to forest degradation. This is similar to the findings of Ojo *et al.* (2018). When forest lands are cleared without replacement, this leaves a vast portion of land prone to agents of erosion. Desertification (22.4%) and wildlife habitat destruction (12.5%) are other consequences of forest degradation in the study area. The characteristics of guinea savanna show that it is prone to desertification, when forest resources

are depleted, the risk increases. Many areas in guinea savanna where desertification has not really been experienced in the past are now seriously combating desertification. This is similar to the findings of Omar *et al.* (2013) who noted that desertification threatens the drylands of Sub-Saharan Africa more than any other region in the world. Once the vegetation cover is removed, the fragile soils are exposed to winds and battering rains. Erosion is inevitable. Wildlife suffers the most when forests are degraded. Their habitats are destroyed, their food sources are lost and their existence is threatened. They are at high risk to poachers when searching for new habitats.

The solutions for curbing forest degradation (Figure 5) reveal that agroforestry (30.8%) is the main solution for a degraded forest, followed by afforestation/ reforestation (27.5%). Agroforestry serves as an avenue to increase food producing and at the same time conserving the environment. Reforestation has the potential to reduce the amount of agricultural pollutants (fertilizer and pesticides) applied to the land, and to filter out sediment and excess nutrients before entering streams (Lowrance *et al.*, 1997; Newbold *et al.*, 2010). Other studies on the role of afforestation/ reforestation in curbing forest degradation have also been reported (Berthrong *et al.*, 2009; Farley *et al.*, 2005; Jobbagy and Jackson, 2004). When trees and arable crops/ animals are simultaneously and sustainably managed on the same piece of land, the yield from such lands increases and the soil is protected from erosion. Afforestation/ reforestation help to restore a degraded forest, increases biodiversity and assist in the mitigation of climate change/ global warming. Other solutions for curbing forest degradation are public enlightenment (21.6%), implementation of forest laws and policies (12.5%) and creation of forest reserves (7.5%).

5. CONCLUSION

Forest degradation is occurring in many rural societies at an alarming rate. This paper has shown the sources, consequence and solutions for curbing forest degradation. It was revealed that anthropogenic activities are the sources of forest degradation in the study area. The ecological consequences of forest degradation are devastating and agroforestry and reforestation/ afforestation are to major ways to curb deforestation in the study area.

References

- [1] Berthrong, S.T., Jobbagy, E.G., Jackson, R.B.,. A global meta-analysis of soil exchangeable cations, pH, carbon, and nitrogen with afforestation. *Ecol. Appl.* 19 (2009) 2228–2241.
- [2] Cloern, J.E. Our evolving conceptual model of the coastal eutrophication problem. *Mar. Ecol. Prog. Ser.* 210 (2001) 223–253.
- [3] FAO. Sustainable Management of Forests and REDD+: Negotiations Need Clear Terminology, Information, (2009).
- [4] Farley, K.A., Jobbagy, E.G., Jackson, R.B. Effects of afforestation on wateryield: a global synthesis with implications for policy. *Glob. Chang. Biol.* 11 (2005) 1565–1576.

- [5] ITTO. ITTO guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests. ITTO Policy Development Series No. 13. (2002) Yokohama, Japan.
- [6] Jobbagy, E.G., Jackson, R.B. Groundwater use and salinization with grassland afforestation. *Glob. Chang. Biol.* 10 (2004) 1299–1312.
- [7] Maloney, K.O., Weller, D.E. Anthropogenic disturbance and streams: land use and land-use change affect stream ecosystems via multiple pathways. *Freshw. Biol.* 56, (2011) 611–626.
- [8] Lowrance, R., Altier, L.S., Newbold, J.D., Schnabel, R.R., Groffman, P.M., Denver, J.M., Correll, D.L., Gilliam, J.W., Robinson, J.L., Brinsfield, R.B., Staver, K.W., Lucas, W., Todd, A.H. Water quality functions of riparian forest buffers in Chesapeake Bay watersheds. *Environ. Manag.* 21 (1997) 687–712.
- [9] Lund HG. What is a degraded forest? Forest Information Services, Gainesville, USA. (2009).
- [10] Newbold, J.D., Herbert, S., Sweeney, B.W., Kiry, P., Alberts, S.J. Water quality functions of a 15-year-old riparian forest buffer system. *J. Am. Water Resour. Assoc.* 46 (2010) 299–310.
- [11] Ojo B.S., Alaye, S.A. Buochuama A. and Martins.A. Influence of Deforestation in Borgu Local Government Area of Niger State, Nigeria, *World News of Natural Sciences* 18(2) (2018) 62-71.
- [12] Omar A. Abdi, Edinam K. Glover, Olavi Luukkanen Causes and Impacts of Land Degradation and Desertification: Case Study of the Sudan. *International Journal of Agriculture and Forestry* 3(2) (2013) 40-51.
- [13] Tuteja, N.K., Beale, G., Dawesc, W., Vaze, J., Murphy, B., Barnett, P., Rancic, A., Evans,R., Geeves, G., Rassam, D.W., Miller, M. Predicting the effects of landusechange on water and salt balance – a case study of a catchment affected bydryland salinity in NSW, Australia. *J. Hydrol.* 283, (2003) 67–90.
- [14] World Bank. India: Unlocking Opportunities for Forest Dependent People in India. Report - IN, World Bank: South Asia Region 85 (2006) 34481.
- [15] N.A. Amusa, J. B. Ojo, The effect of controlling *Mononychellus tanajoa* (Acari: Tetranychidae) the cassava green spider mite using *Typhlodromalus aripo* (Acari: phytoseiidae) on the severity of cassava diseases in Transition forest, Nigeria. *Crop Protection* Volume 21, Issue 7, August 2002, Pages 523-527.
- [16] Filip Colson et al., The influence of forest definition on landscape fragmentation assessment in Rondônia, Brazil. *Ecological Indicators* Volume 9, Issue 6, November 2009, Pages 1163-1168
- [17] C.T. Ingold. Aquatic spora of Omo Forest, Nigeria. *Transactions of the British Mycological Society* Volume 42, Issue 4, December 1959, Pages 479-485
- [18] Brian Hopkins. Vegetation of the Olokemeji Forest Reserve, Nigeria: IV. The Litter and Soil with Special Reference to Their Seasonal Changes. *Journal of Ecology* Vol. 54, No. 3 (Nov., 1966), pp. 687-703

- [19] E. W. Jones. Ecological Studies on the Rain Forest of Southern Nigeria: IV. The Plateau Forest of the Okomu Forest Reserve. *Journal of Ecology* Vol. 43, No. 2 (Jul., 1955), pp. 564-594
- [20] M. D. Swaine, T. C. Whitmore. On the definition of ecological species groups in tropical rain forests. *Plant Ecology Vegetatio* May 1988, Volume 75, Issue 1–2, pp 81–86
- [21] Budowski G. 1955. Distribution of tropical American rain forest species in the light of successional processes. *Turrialba* 15: 40–42.
- [22] Coley P. D. 1983. Herbivory and defensive characteristics of tree species in a lowland tropical forest. *Ecol. Monogr.* 53: 209–233.