The Environmental Studies

Causes and Effects of Deforestation on the Socio-Economic Livelihood of Michika People, Adamawa State, Nigeria

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Abstract
The transformation of forest lands by human activities represents one of the greatest forces of global environmental change and biodiversity loss. The impact of people on the forest has been and continues to increase with its devastating effects. This study evaluated the effect of deforestation on the socioeconomic livelihood of Michika people of Adamawa State, Nigeria. The use of interview schedule and questionnaires were adopted. A total of one hundred and fourteen (116) respondents were selected using purposive and random sampling techniques within the eight Districts of Michika and the forestry sector as well. Data collected include the socioeconomic characteristics of respondents, reasons for harvesting of forest trees, effects of deforestation and observed environmental effect. Data generated were analyzed using descriptive statistics and Index Number. The result show that human activities were the main causes of deforestation, which included agricultural expansion with (26%), logging account for 17%, urbanization (15%) and fuelwood harvesting (12%). Majority (88%) of the respondents are aware of what causes deforestation. The effect of deforestation on livelihoods indicated that there is imbalance in climate due to deforestation, loss of water bodies, increase in ambient temperature and bare grounds, increase in wind and soil erosion and inadequate energy and building materials. The results also indicated that majority of the respondents depend on the forest for their livelihood. 18% of the respondents earn ₦ 4750- ₦ 8500 monthly from the forest. This has increased forest product exploitation hence the increased deforestation of some indigenous tree species such as *Termarindus indica, Daniella olivarrii, Parkia biglobosa,* e.t.c. their population are now threatened. These tree species may go extinct if conservation and reforestation strategies are not adopted. Majority of the respondents are farmers indicating high level of dependency on forest land, therefore, agroforestry system should be adopted; this will not only protect the tree environment but also build a favorable ecosystem for forest and wildlife population increase. This will enhance agricultural output and income of the farmers and finally reduce pressure on natural forest.
Keywords: *Deforestation, Causes, Effects, Livelihood, Socioeconomics, Michika People.*

Introduction

Deforestation refers to indiscriminate cutting down of trees or over-harvesting of trees in an area. The transformation of forest lands by human activities represents one of the great forces in global environmental change and biodiversity loss. The impact of people on the forest has been and continues to increase. Forests are cleared for agriculture, timber, road-construction, human-caused fire, and in myriad of other ways. In Nigeria, the rate of deforestation currently exceeds the rate of forest regeneration. Human activities thus significantly have adverse effects on the forest and the environments. Forest is one of the factors that regulate the temperature of a particular area. Therefore its removal can cause a rise in environmental temperature and affect the people's living conditions. Many authors and scholars such as Kricher (1997), Laurance (1999), Rajbhandari (2010), Geist and Lambin (2013), Ndu, and Somoye (2010) have written much about deforestation and its effects which among others include increase in the average temperature of earth's atmosphere, oceans, and landmasses. Laurence (1999) identified areas with highest deforestation in the world today to include Asia, Africa and the Americas where the tropics experience the highest pace of conversion at 10 million ha/year. However it has been reported that Nigeria has the highest rate of deforestation in the world (FAO, 2000). It has been predicted that within the next fifty years, unless adequate measures are taken, most humid tropical forest land area in Africa could be transformed into unproductive land and the deterioration of the savannah into desert will be accelerated (Hunter *et al,* 2005).

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 conditions hence, where there is no forest, these benefit are greatly missed. Deforestation leads to global warming and climate change (Mastrandea and Schneider, 2008). It is on this note that this work set out to investigate the effects of deforestation on the socio economic livelihood of Michika people of Adamawa State Nigeria. Therefore the study sought to examine the causes and effects of deforestation and how it affects or influences the socioeconomic livelihood of the people of Michika, Adamawa state, Nigeria.

Methodology

The Study Area

Michika, Michika Local Government Area of Adamawa State is situated in the North Eastern corner of Adamawa State between latitude $10^{0}36^{1}$ N-10^{0} 40^{1}N and longitude 13^{0} 21^{1}E - 13^{0} 35^{1}E (Figs 1).It shares common boundaries with Madagali Local Government Area to the North, Lassa (Borno State) to the West, Republic of Cameroun to the East, and to the South, Mubi North and Mubi South Local Government Area. It has a land area of about 142,199 km^2. Michika Local Government Area has a total population of 155, 238 (National Population Commission 2006) and made up of diverse ethnic groups principal among which are the Nkaffa, Dakwa, Tilli, Kafwe, and other major settlers such as Igbo, Fulani, Margi, Matakam/Gra, Kanuri e.t.c.

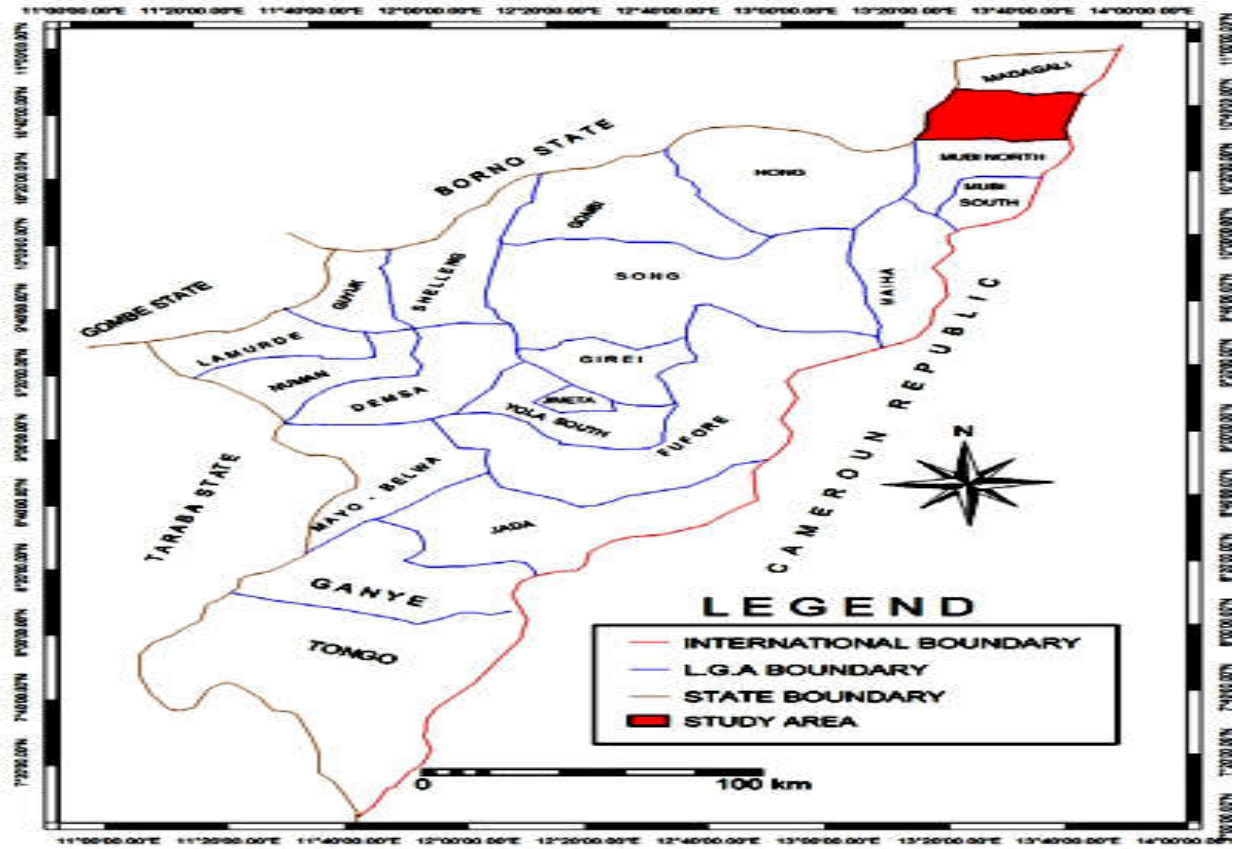

Figure 1 Map of Adamawa State showing the study area in Red

The study area lies within the sudan savanna vegetation zone dominated by tree species such as Ficus *species, Vitex donniana,Vitellaria paradoxa,Termarendus indica, Acacia species, Parkia biglobosa, Daniella oliverii, Adansonnia digitatata,Gardenia species,Grewia molii Perinary excelsa, Anagecious liocarpos* and some shrubs as *Phylostigma thonigii, Ziziphus mauritiana, Gardenia aqualla, Nuclea latifolia, Anona senegalensis, Sterculia setigera*. It has a tropical wet and dry type of climate. The dry season last for a minimum of five months (November to March), while wet season spans from April to October with the mean annual Rain fall in Michika ranges from 900-1050 mm (Adebayo, 2004). Farming is the predominant occupation of the people of Michika and agricultural crops grown among others include maize, rice, melon, groundnut and cowpea.

Random sampling technique was used to select ninety six (96) respondents from the eight Districts of Michika on one hand while twenty (20) copies of the questionnaire were distributed to the forest sector under the Department of Agriculture and Natural Resources Michika Local Government on the other. This gives a total of one hundred and sixteen (116) copies of questionnaire that were administered for the study. Interview schedule was also used to source information on the causes and effects of deforestation on the socioeconomic livelihood of the people living in the deforested area, the possible solution, and effect on climatic conditions.

Data collected include causes of deforestation, effects of deforestation on the livelihood of the people, monthly income of the people and strategies to combat the effects of deforestation. Secondary data were obtained from existing information in journals, textbooks, conference proceedings, papers, and newsletters. Descriptive statistics such as simple percentage, bar charts, frequency tables were employed for data analysis.

Results and Discussion

Socio-demographic Characteristics of the Respondents

Table 1 Distributed and Retrieved Questionnaires

'N	Category	Number of Questionnaire Distributed	Number of Questior Retrieved	Percentage
1	Michika Districts	96	94	97
	ANR	20	20	100
	TOTAL	116	114	97%

Source: field survey (2017).

Out of 116 copies of questionnaire distributed, 114 (97%) were retrieved and used for the study (Table 1). The results of the study indicated that 56% of the respondents were Females, while 44 % were Male. This is due to the level of Female involvement in fuel wood collection. 34% of the respondents are within the age range of 40-50 years, representing the active part of the population engaged in logging activities. A good number of the respondents (84%) are married and 16% are single .This suggests that logging activities in the study area is mostly associated with the married individuals and it is also likely that they engaged their family members in logging activities. The major occupation of the respondents is farming, followed by fuel wood harvesting. This higher percentage of farmers indicated greater farming activities resulting in deforestation of the area. This agreed with Alexandratos (1995) that the area of agricultural land in developing countries, excluding China, will have to increase from 760 million ha to 850 million ha by 2010 to meet demand for food. Family size of 8-10 is the most

common in the study area, hence increase in population in rural areas leads to pressure on forest. This is also the view of Food and Agriculture Organization, (2001), who posited that Population growth and the demand for food, fiber and fuel have accelerated the pace of forest clearance.

Causes of Deforestation

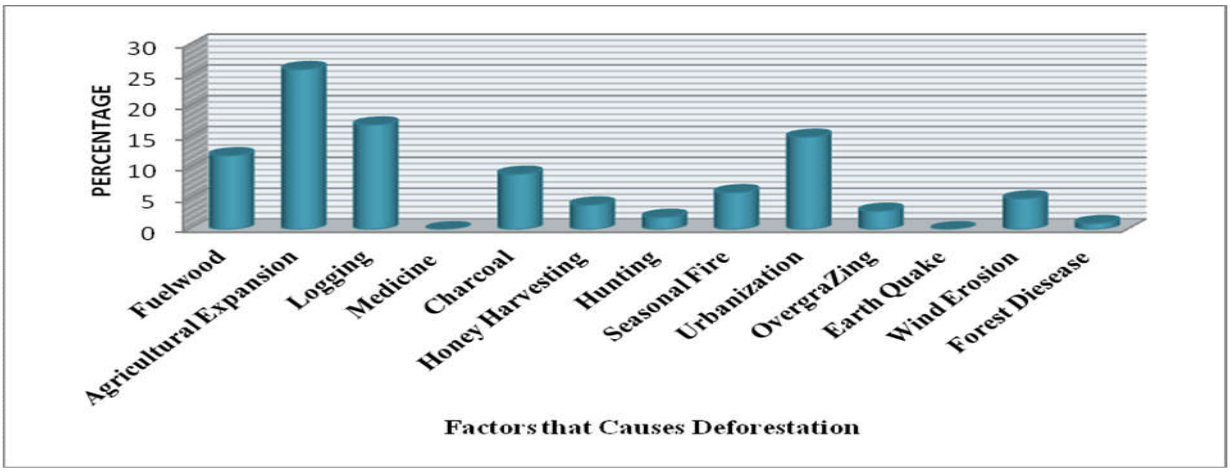

Figure 2: Causes of deforestation in the study area

The bar chart above shows causes of deofrestation as depicted from the data collected from the field. Based on the data analyzed using simple percentage as shonw on the bar chart on figure 2 on the causes of deforestation in Michika, the result revealed that 13 respondents representing 11% ticked that the causes of deforestation is fuelwood collection, 30 respondents representing 26% said agricultural expansion is the major causes of deforestation. 19 respondents (17%) ticked for logging of wood as the cause of deforestation in the area, 1 person (0.5%) ticked for collecion for medicine as a cause of deforestation, 11 respondents (10%) ticked the cause of deofrestation is charcoal production. In a similar vain, 3 respondents (3%) choose honey harvesting as a cause of deforestation, 2 respondents (1.5%)said hunting of games especially rodents account for deforestation in the study area. Six respondents (5.5%) ticked for seasonal wild fire as a cause of deforestation, 19 respondents representing 17% said urbanization is the major cause of deforestation, 2 respondents (2%) said overgrazing, 1 respondent (0.5%) ticked for earthquake, 6 respondents (5%) said wind erosion is a major cause of deforestation, while 2 respondents (2%) tickedforforest disaster as the cause of deofrestation in the study area. from this analysis, one can observed that fuel wood collection, agricultural expansions, logging, charcoal production as a source of energy used virtually in every home, seasonal fire, urbanization and wind erosion are the major drivers of deofrestation in the study area, these factors combined (88%) account majorly for the deforestation occuring within the study area, while factors like medicine collection, honey harvesting, hunting, overgrazing, earth quake and forest disaster account for less than 12% of the causes of deforestation in the study area.

Results showed that greater percentage of deforestation is caused by agricultural expansion (Figure 2 and 3). This agreed with the work of William *et al.* (2004) who said that population increase in developing countries and increasing demand for land are among the forces propelling forest conversion.

The high level of dependence on trees as source of timber for roofing, furniture, energy and other wood base products is on the increase with no corresponding forest regeneration. People in the study area agreed that deforestation is majorly caused by human activities. This also in line with the view of Aliyu, *et al*., (2014) who stressed that human activities, climate change coupled with rural poverty have led to increased deforestation in the rural areas of Nigeria. Accordingly, Amadi *et al* (2006) reported that "very few private forest plantations and woodlots across Adamawa State reveals unexplored and poor public participation in forest regeneration and management in the state. It is disturbing that forest regeneration pace by government agency had tremendously declined over the years against the high rate of exploitation of trees for fuel, poles and construction materials. In the same vein, urbanization due to land development through construction of roads, buildings, dams and other infrastructural developments also have it toll on forest land. Accordingly, Amadi *et al (2014)* and Imeht and Adebola (2001) reported that the destruction of natural habitats result in depletion in biodiversity and also clarified that every year a considerable part of the nation's forest resources is destroyed through industrialization, urbanization, road constructions, commercial agriculture and other activities thereby disturbing the ecological balance that nature maintains within the ecosystem.

There is high dependence on wood and charcoal production as a major source of fuel for cooking in the study area. Ladan (2013) expressed the same opinion that the demand and usage of wood for cooking, heating and small-scale industrial purposes were the major causes of deforestation. Also Habtamu *et al.* (2016) stressed that the ever increasing demand of fuel wood and charcoal production coupled with population growth has accelerated the rate of forest reduction in Ethiopia. Traditional method of honey collection and hunting during which tress and their branches are destroyed for honey collection also caused deforestation in the study area. A better alternative is for bee hives to be placed in the top of trees instead of cutting down trees and their branches for honey harvesting as Ja'afar Furo (2014) advised that rural communities should establish other means of enhancing rural income by engaging in honey farming in their farms. Individual with low monthly income depends highly on the forest for a living and this is the category of individuals who put more pressure on the forest resources (Table 2).

Effects of Deforestation

The bar chart on figure 3, the analysis of data using simple percentage revealed that the effects of deforestation as observed in the area are numerous; this is seen from the responses given on the questionnaire. From the result of the simple percentage analysis, 8 respondents representing 7% ticked that one of the effects of deforestation is climate imbalance, 6 respondents (5%) ticked for drying up of water bodies, 32 respondents, representing (28%) ticked that deforestation causes increase in wind erosion, 9 respondents (8%) said deforestation leads to inadequate wildlife nutrition, 5 respondents, (4%) ticked for reduction in soil fertility. Nineteen respondents (17%) ticked for increased soil erosion, while 17 respondents representing 15% ticked for inadequate building materials including good lands. Nine respondents (8%) responded that deforestation leads to unemployment for saw millers and others who harvest non timber forest products (NTFPs), 8 respondents ticked that deforestation leads to wildlife extinction, while 1 respondent (1%) ticked that deforestation leads to flooding. It is also deduced from the result of the analysis that increase in wind erosion, increase in soil erosion, inadequate building materials, unemployment, wildlife extinction and climate imbalance account for about 89% of the effects of deforestation, while minor effects according to the result include drying up of water bodies, reduction in soil fertility, and flood. These effects though not encompassing, are caused as a result of deforestation in the study area.

Deforestation has some negative effects on the socio-economic livelihood of the people in the study area such as increase in wind erosion, increase in temperature of the micro climate and disease to both man and wildlife with consequent economic damage. The absence of vegetation cover may cause soil to lose the most important layer for plant growth. In the same vein, Hartemink (2006) stated that "Soil erosion has negative impact on agricultural production by depleting nutrients needed for plant growth. Other negative effects of deforestation include Inadequate building and energy materials, unemployment for saw millers and timber dealers, inadequate livestock nutrition, wildlife extinction, increase in atmospheric temperature, drying of water bodies and reduction in soil fertility (Fig. 3).

Hartemink (2006) also reported that in tropical regions where many soils have inherent low fertility that is concentrated in the top soil, loss of top soil by soil erosion results in a serious reduction in soil chemical fertility. As a result of deforestation some tree species are now threatened. These include African iron wood *(Prosopis africana)*, African Copaiba Balsam tree *(Daniella oliverii),* Chinese date (*Zizipus Mauritania),* African locust bean (*Parkia biglobosa*) and African birch *(Anogeissus leiocarpa)*. Others are Shear butter tree *(Vitellaria paradoxa)*, Sweet black current tree *(Vitex doniana)* and *Tamarindus indica* known as Tamarind tree (Table 2).

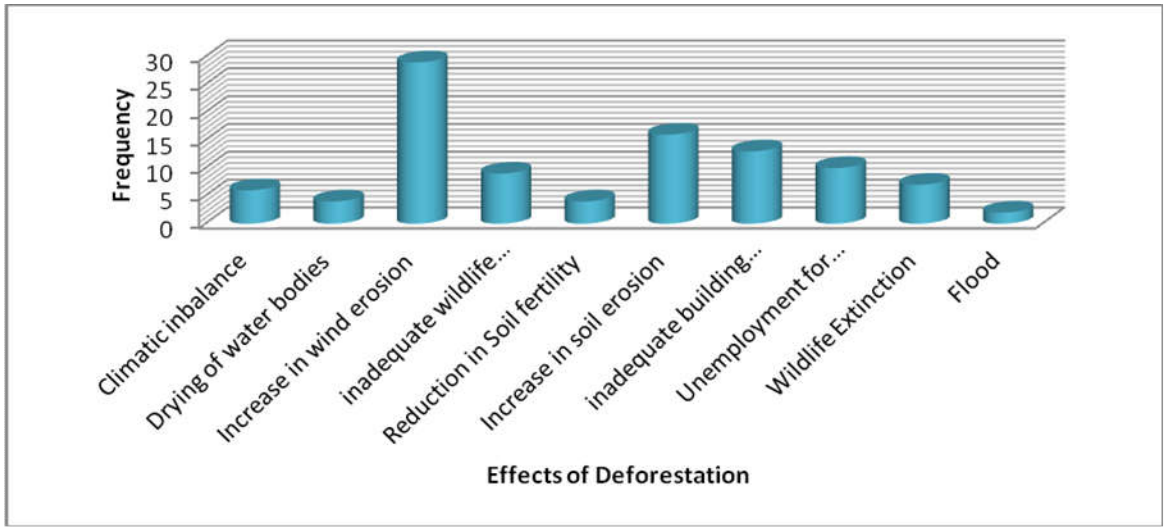

Figure 3: Some effects of Deforestation in the Study Area

In a regrettable submission of the Adamawa State Economic Empowerment and Development Strategy ADSEED, (2004) noted that the State used to be like a "Garden of Eden, with trees and forests everywhere'' but with an increase in human population and more people now there is serious exploitation of natural resources, including cutting down trees for crop cultivation, shelter, cooking and exploitation of animals and fish. No one would ever have thought that these resources were exhaustible. Due to government failure to support forest conservation, insufficient founding, negative response from the people, and poor management of available forest resources, the problem of forest regeneration and conservation practices in the study area may take a longer time to be achieved.

Table 2 Threatened Tree Species due to deforestation in the Study Area

Observed Tree Species	Scientific Name	Native name	Respondent	Percentage (%)
Tamarind tree	(*Tamarindus indica*)	Mbula	3	3
African locust bean	(*Parkia biglobosa*)	Lughuni	10	11
Shear butter tree	*(Vitellaria paradoxa)*	Fuma	7	7
Chinese date	(*Zizipus Mauritania)*	Dyivi	10	11
African iron wood	*(Prosopis africana)*	Mishimi	30	32
Sweet current tree	*(Vitex doniana)*	Shikai	7	7
African Copaiba	*(Daniella oliverii)*	Lellekai	17	18
African birch	*(Anogeissus leiocarpa)*	Dyaka	10	11
Total			94	100

Source: field survey (2017).

The level of agroforestry system practiced in this area is very low. The implication is that less number of trees are deliberately protected on farm lands and this may expose the area to so many environmental consequences. According to (Amadi *et al*. (2013) agroforestry is beneficial especially in drought prone areas not only in terms of improving agricultural yield, but offers a wide range wood and wood products such as wood for fuel, construction, tools, fiber formats, baskets, ropes, medicines, dyes, tannin, cosmetics and glue.

Trees in Agroforestry farms also help to check erosion replenish the soil and act as wind breaks, hence stabilizing the environment for rural development.

Fig. 4: Forest Reserve in Michika under Serious Agricultural Cultivation

Socioeconomic livelihoods of the people

Table 2. Percentage Income of the Respondent and dependence on Forest Products

S/N	Monthly Income Range	Monthly Income Range from Forest Product	Freq	Percentage of Total Respondent	Average Monthly Income	Average Monthly Income From Forest Product	Percentage Income From Forest Products
1	5,000-10,000	4750-8,500	17	18.09	7,500	7,096.88	11.6
2	10,100-15,000	4500-8000	10	10.64	12,516.67	6,250	10.2
3	15,100-20,000	4250-7500	6	6.38	17,516.67	6,125	10
4	20,100-25,000	4000-7000	3	3.19	22,516.67	5,500	9
5	25,100-30,000	3,750-6500	13	13.83	27,516.67	5,125	8
6	30,100-35,000	3500-6000	9	9.57	27,716.67	4750	7.8
7	35,100-40,000	3250-5500	5	5.32	31,516.67	4,375	7.2
8	40,100-45,000	3000-5000	2	2.13	42,516.67	4,000	6.6
9	45,100-50,000	2750-4500	8	8.51	52,516.67	3,625	5.9
10	50,100-55,000	2500-4000	3	3.19	62,516.67	3,250	5.3
11	55,100-60,000	2250-3500	5	5.32	67,516.67	2,875	4.7
12	60,100-65,000	2000-3000	4	4.26	72,516.67	2500	4.0
13	65,100-70,000	1750-2500	3	3.19	77,516.67	2,125	3.5
14	70,100-75,000	1500-2000	2	2.13	82,516.67	1,750	2.9
15	75,100-80,000	1250-1500	3	3.19	87,516.67	1,375	2.3
16	80,100-above	1000 or Less	1	1.06	90,100	1000	1.6

Source: field survey (2017).

Conclusion

Deforestation is now recognized as a known problem that affects the people, their socioeconomics activities as well as biodiversity of Michika LGA of Adamawa State. The respondents are aware of deforestation and the environmental conditions as a result of human activities. Their understanding of environmental temperature variations and fast disappearing of vegetation are indications of their awareness of the consequences. On the whole, they perceived that the land is getting barred due to reduction in forest cover, climate changes, pattern of rainfall occurrence, and land degradation through soil erosion as some of these effects. Therefore, the rate at which the forest lands are being converted to farm land and infrastructural development may put the community in serious danger of desertification in the nearest future if reforestation and conservation practices are not put in place.

Recommendations

Based on the findings from this study, the following recommendations have been made.

- Government should re-introduce the annual tree planting campaigns. This will help to encourage people to plant more tress to reduce environmental hazard such as wind erosion, harmattan haze, extreme weather conditions and many more related environmental consequences that could result from deforestation.

- There is the need for efficient management of Forest plantations and other natural forests in various areas in the face of an ever-increasing population and the growing demands on forest resources.
- Each Local Government in the States should establish a forest plantation to combat deforestation; this could be done by incorporating the rural farmers in the establishment and management aspects.
- The authorities should provide affordable alternatives to fuelwood. This is to be done by constant supply of kerosene, domestic gas, constant supply of electricity and their equipment at a subsidized price; this will reduce pressure on forest.
- Extension Workers should be motivated by the government so that they can educate rural farmers on important strategies to reduce the danger of desertification in their localities through conservation education.
- Forest nurseries should be established in each Local Government Area to enable them raise enough seedlings for planting in the area.
- Laws against deforestation and bush burning should be strictly enforced.
- Allocation of more funds for afforestation and reforestation of marginal lands be given to the Department of Forestry in the State.
- Areas where agriculture is highly practiced should adopt Agroforestry practice; this will increase output and income of the rural farmers.

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