



DEFORESTATION: A THREAT TO RURAL DEVELOPMENT IN MICHIKA LOCAL GOVERNMENT AREA OF ADAMAWA STATE, NIGERIA



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Abstract: The study was conducted to evaluate the effect of deforestation on rural development of Michika people of Adamawa State, Nigeria. The use of interview schedule was adopted and questionnaires were administered. A total of one hundred and fourteen (114) respondents (category I and II) were selected using purposive and random sampling techniques within the eight Districts of Michika and the forestry sector as well. The data collected include socio-economic status of respondents, causes of deforestation, agricultural cultivation, effects of deforestation etc. data generated were analyzed using descriptive statistics and Index Number. The result on the causes of deforestation were human activities, which include agricultural expansion with (26%), logging account for 17%, urbanization (15%) and fuelwood harvesting (12%). 88% of the respondents are aware of what causes deforestation. The effect of deforestation on livelihoods indicated that there is imbalance in climate and this may be due to loss of vegetation (deforestation). The study also revealed effects of deforestation such as increase in wind and soil erosion (29%) and (16%) inadequate energy and building materials (13%) and the least is flood (2%). The result obtained on percentage income and dependence on forest indicated that majority of the respondents depend on forest for their livelihood. 18% of the respondents earn ₦ 4750- ₦ 8500 monthly from the forest while 10% earns ₦ 4500- ₦ 8000 monthly. As a result of deforestation some indigenous tree species (*Termarindus indica*, *Daniella olivarii*, *Parkia biglobosa*, etc.) which were commonly found in the area are now threatened. These tree species may go extinct if conservation strategies will not adopted with immediate effect. Majority of the respondents are farmers indicating high level of dependency on forest products. In this case since agriculture is highly practiced, Agroforestry system should be adopted as well as vigorous tree planting in the area. This will not only protect environment but also build a favorable ecosystem for wildlife and increase output and income of the farmers. This will finally reduce pressure on natural forest and enhancing rural development.

Keywords: Deforestation, effects, livelihood, socioeconomics, rural development

Introduction

The socioeconomic effects of deforestation cannot be over emphasized. The transformation of forested lands by human actions represents one of the great forces in global environmental change and one of the great drivers of biodiversity loss that affect rural development. Forests are cleared, degraded and fragmented by timber harvest, conversion to agriculture, road-construction, human-caused fire, and in myriad other ways. The effort to use and subdue the forest has been a constant theme in the transformation of the earth, in many societies, in many lands, and at most times within the international, national, states and Local Government/communities circles (Nzeh, 2012).

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. Therefore its removal in an area can cause adverse effect on the peoples living conditions as many authors and scholars such as Kricher (1997), Laurance (1999), Parks (1992), Rajbhandari (2010), Geist and Lambin (2002), Ndu and Somoye (2010), among others have written much about deforestation.

Laurence (1999) mentioned the areas with highest deforestation. According to him deforestation is a high problem that the world faces in the near future. He views the three areas of highest concern 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.

According to FAO (1999) 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 (FAO, 1999).

A livelihood comprises the capabilities, assets (financial, natural, social, and physical, human) and activities required to provide a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation.

Over the years, sustainable management of forest resources has been of primary concern due to its potential impact on biological diversity and importance in maintaining global ecological functions (Areola, 1987). In spite of its importance, the natural tropical high forest has continued to diminish rapidly in the African continent, thus dwindling sustainable forest management. Nigeria could face the possibility of timber and fuel wood scarcity towards the end of the century. 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). It is crucial to clearly understand the concept of deforestation so as to save the nature from destruction so as to sustain our rural development efforts.

Materials and Methods

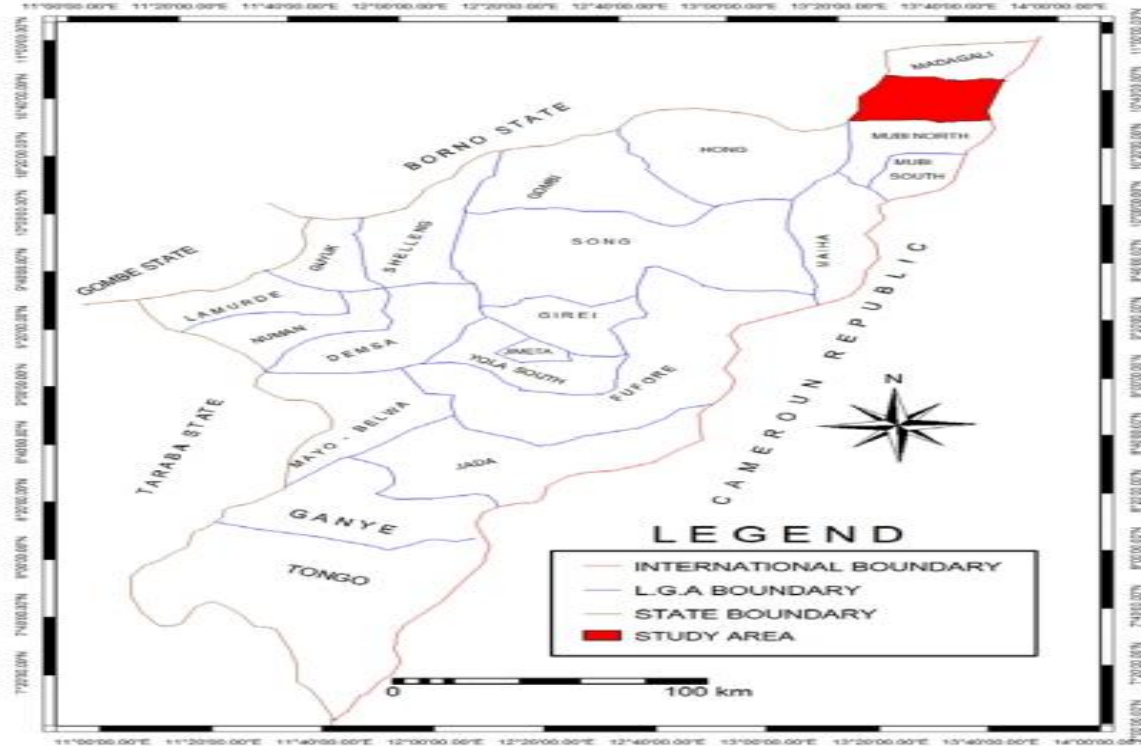
The study area is in Michika, Michika Local Government Area of Adamawa State is situated in the North Eastern corner of Adamawa State between latitude 10°36' N-10° 40'N and longitude 13° 21'E - 13° 35'E (Google Map Data, 2011). It shares common boundaries with Madagali Local Government Area to the North, Lassa (Borno State) to the West, Republic of Cameroon to the East, and to the South, Mubi North and Mubi South Local Government Area. It has a land area of about 142,199 km². Michika is composed of many ethnic groups in high proportion with their cultural backgrounds coming into play in various aspects of human endeavor, environmental Conservation being one of them.

Michika has a total population of 155,238 (National Population Commission, 2006). They are made up of diverse ethnic

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groups principal among which are the Nkaffa, Dakwa, Tilli, Kafwe, and other major settlers such as Igbo, Fulani, Margi, Matakam/Gra, Kanuri, etc. The study area lies within the Sudan savanna vegetation zone. The vegetation is mostly dominated by savanna tree species including *Ficus species*, *Vitexdonniana*, *Vitellariaparadoxa*, *Termarendusindica*, *Acacia species*, *Parkiabiglobosa*, *Daniella oliverii*, *Adansoniadigitatata*, *Gardeniaspecies*, *Grewiamolii* *Perinaryexcelsa*, *Anageciougliocarpos* and some shrubs as *Pylostigmathonigii*, *Ziziphusmauritiana*, *Gardenia aqualla*, *Nuclealatifolia*, *Anonasenegalensis*, *Sterculiasetigera*. It has a

tropical wet and dry type of climate, which is coded as a Koppen’s classification. The dry season last for a minimum of five months (November to March), while wet season spans from April to October. Thus, the mean annual Rain fall in Michika ranges from 900-1050 mm (Adebayo, 2004). Farming is the predominately occupation of people of Michika and this is done in a small-scale. Prevalent agricultural crops are maize, rice, melon, groundnut, cowpea and horticultural crops which are mostly exotic; cashew, mango, guava among other.



Source: Adamawa in Map (1999)

Fig. 1: Map of Adamawa State showing the study area in Red

Data collection

Data for the study were obtained from both primary and secondary source using both structured questionnaires and interview schedules, which were administered to the respondents. A random sampling technique was used to select ninety six (96) respondents out of eight Districts of Michika (Category I). Twenty (20) were distributed to the forest sector under the Department of Agriculture and Natural Resources Michika local government (Category II) to source secondary data this gives the total number of one hundred and sixteen (116) questionnaires administered for the study. The data collected includes 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. However, only one hundred and fourteen (114) questionnaires was retrieved from the respondents and used for the study.

Data analysis

Descriptive statistics was used in analyzing the data. The descriptive statistics used includes frequency count and percentages. It was used to describe the socio-economic characteristics of the respondents, factors that cause deforestation, benefits derived from the forest and effects of deforestation in the study area. Also Bar and Pie chart was used to describe the frequency tables.

Index Number was used to measures changes in variables over time and to find out the ratio of the current value to a base value by dividing the value in period of interest by the value in base period.

$$\text{Index Number} = \frac{\text{Value in Period of interest}}{\text{Value in Base Year}} \times 100$$

This statistical method states that when the value exceed 100, it indicate an increase in level of activity and when the value is less than 100, it indicate a decrease in level of activity.

Formula

$$P_{01} = \frac{\sum P_1}{\sum P_0} \times 100$$

Where: P₀₁ = Index number of the current year; P₁ = Total of the current activity; P₀ = Total of the base year’s activity

Results and Discussion

Out of one hundred and sixteen (116) questionnaires distributed one hundred and fourteen (114) were retrieved and used for the study (Table 1). The result in Table 1 also shows the percentage of the questionnaires retrieved; 97% were retrieved.

Table 1 Shows distributed and retrieved questionnaire

Category	No. of Q'naire Distributed	No. of Q'naire Retrieved	%
Michika Districts	96	94	97
ANR	20	20	100
Total	116	114	97

Source: field survey

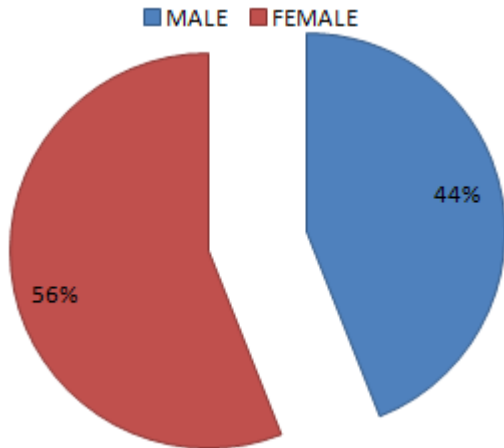
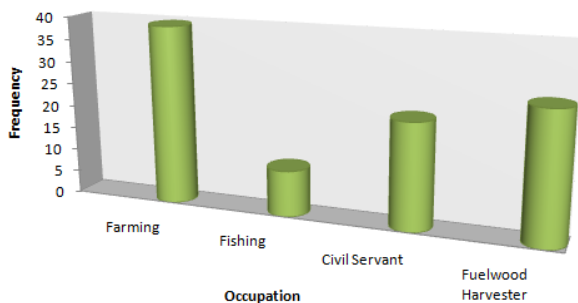


Fig. 2: Gender distributions of the respondents



Source: Field Survey

Fig. 3: Occupations of the respondents

Socioeconomic characteristics of the respondents

The results of the study indicated that 56% of the respondents were Female, while 44% Male (Fig. 2). This may be due to the level of Female involvement in fuel wood collection. A good number of the respondents (37%) are married and 16% are still 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. However, in the aspect of education higher percentage (32%) of the respondents had First School Living Certificate of (FSLC), 27% had secondary education, and 23% had non-formal education while the least (18%) had tertiary education as indicated in Fig. 3. This indicates that logging activities in the area are mostly dominated by the respondents who had formal education (primary education). The major occupation of the respondents as indicated is farming with (39%), followed by fuel wood harvesters with 28%. While 23% of the respondents were civil servants and only 10% engaged in fishing. This suggests the higher percentage indicated there is greater farming activities going on in the study area. This agrees with the work of Alexandratos (1995) that the area of agricultural land in developing countries, excluding

China, will increase in future. to meet demand for food. Family size of 8 – 10 is the most common in the study area with 29%. The highest percentage on family size indicated that increase in population in rural areas may lead to pressure on forest this also accepted the view of Food and Agriculture Organization (2010b), who pointed out that Population growth and the burgeoning demand for food, fiber and fuel have accelerated the pace of forest clearance, and the average annual net loss of forest has reached about 5.2 million hectares in the past ten years may which was followed by 23% for the family of 10 and above.

The respondents showed that deforestation is a common threat in the area. The result showed that 88% of the respondent is conversant with deforestation while only 12% were unknowledgeable about deforestation until it was explained to them. Results showed that the entire individuals in the study area had noticed deforestation. Physical observation and interaction with the rural community showed that deforestation in Michika is majorly caused by human activities. This also comes in scene with the view of Aliyu *et al.* (2014) who stress out that human activities, climate change coupled with rural poverty have led to increased deforestation in the rural areas of Nigeria. Given the low productivity of the soil in the tropics to which Nigeria belongs, the poor state of the farmers and subsistence nature of agriculture in Nigeria, green environment may be difficult to sustain (Table 2).

Table 2: People’s awareness of deforestation

Number Respondents	Aware of Deforestation	Not aware of Deforestation	% Awareness	% Not Aware
94	83	11	88	12

Source: Field survey

Causes of deforestation

Result on causes of deforestation indicated that greater percentage of deforestation is caused by agricultural expansion. This may result in conversion of more forest land to agriculture. This agreed with the work of William *et al.* (2004) who said population increases in developing countries and increasing demand for land are among the forces propelling forest conversion.

Logging activities take the second position in causing deforestation accounting for 17%. This suggests high level of dependence on trees as source of timber for roofing, furniture, energy and other wood base products as indicated by Amadi *et al.* (2006) who stated 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 a fact 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”.

Fuel wood harvesting in the study area is a major cause of deforestation (Plates 1 – 3). This may be due to low level of charcoal production in the area. Ladan (2013) expressed the same opinion in his study of energy-environment interaction in Northern Nigeria where he documented that the demand and usage of wood for cooking, heating and small-scale industrial purposes were the major causes of deforestation the area. Also Habtamu *et al.* (2016) express that the ever increasing demand of farmland, fuel wood and charcoal production coupled with population growth has accelerated the rate of forest reduction in Ethiopia.



Source: Field survey

Plate 1: *Eucalyptuscalmadulenses* plantation was degraded for urban development in Michika



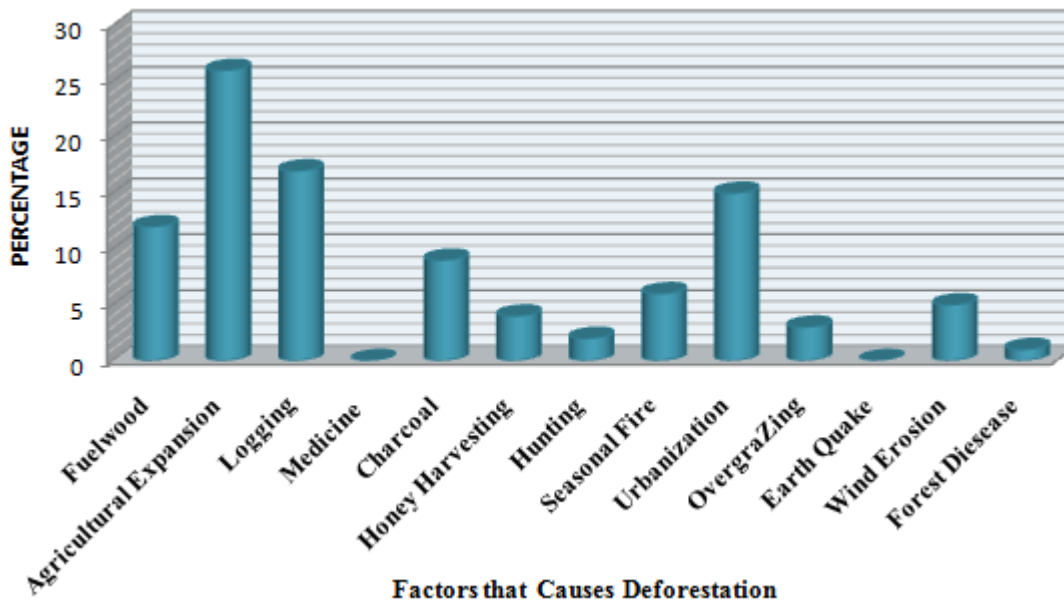
Source: Field survey

Plate 2: Fuelwood Harvester in Michika



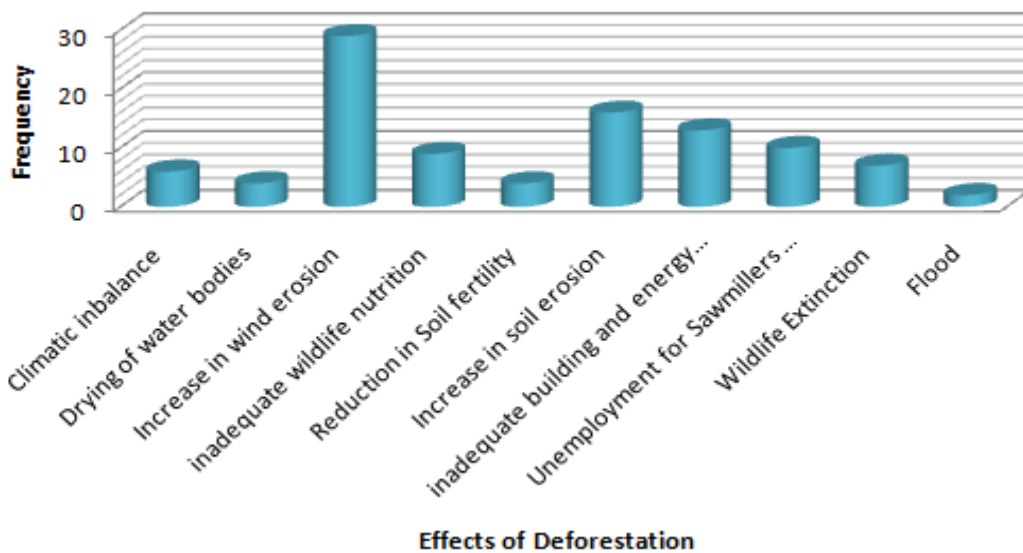
Source: Field survey (2016)

Plate 3: Forest reserve in Michika under serious agricultural cultivation



Source: Field Survey

Fig. 4: Causes of deforestation in the study area



Source Field survey

Fig. 5: Effects of deforestation in the study area

Effects of deforestation in the study area

Interaction with the respondents on effects of deforestation indicated that deforestation has effect on the livelihood of the people in the study area (Figs. 4 and 5). Deforestation results increase in wind erosion. Tsehaye and Mohammed (2013) viewed that land use cover in developing countries over the years has been experiencing environmental change due to various human activities which caused erosion in the land scope of several communities. These changes have significant implication on the hydrological cycle, micro climate and disease to both man and wildlife and also causes economic damage to the area it occurs. This also comes in alliance with the work of Amadi *et al* (2014), who reported that “all human activities are directly or indirectly hinged on the land. Food, shelter, our weights and all development efforts depends on the availability of the land. Increase in soil erosion with 16%. This indicates that absence of vegetation cover may cause soil

to lose the most important layer for plant growth. This agreed with the work of Hartemink (2006) that “Soil erosion therefore has an impaction agricultural production negatively by depleting nutrients needed for plant growth. Inadequate building and energy materials accounting for 13%, followed by Unemployment for saw millers and timber dealers with 10%. This indicated that few timber trees left may not be enough to reach the demand for the growing population for housing constructing and domestic energy in the study area. This was followed by inadequate livestock nutrition with 9%. 7% accounted for wildlife extinction; this may be due to deforestation in the study area, Climate imbalance (6%). Others include drying of water bodies and Reduction in soil fertility accounting for 4% each. 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.

Suggested strategies to combat deforestation

Table 3 shows the various strategies suggested by foresters to combat deforestation in the study area. Majority of the respondent (30%) suggested that Government should provide alternative means such as kerosene, natural gas, etc. to reduce pressure on forest. This agreed with the work of (Paul, 2008) that use of fuelwood has been on the increase due to increase in cost and scarcity of alternative sources, particularly Kerosene. Followed by individual who said government policies should be geared toward conservation accounting for

25%, which was followed by Foresters should organize awareness program (15%). Other strategies include Government should employ more forest guards and organize Joint Tax Force (JTF) team, Farmers should practice Agroforestry system and government should approve land for plantation with 10% each. It could be observed that higher proportion of individual suggested for supply of cheap commercial fuel in order to reduce pressure on the forest. This shows that deforestation can greatly be reduced by provision of alternative energy source.

Table 3: Suggested strategies to combat deforestation

Variable	Frequency	Percentage
Full authority should be given to forest law makers	3	15
Government should employ more forest guards and organize Joint Tax Force (JTF) team	2	10
Government should provide alternative means such as kerosene, natural gas, etc. to reduce pressure on forest	6	30
Farmers should practice Agroforestry system	2	10
Government should approve land for plantation	2	10
Government policies should be geared toward conservation	5	25
Total	20	100

Source: Department of Agric. and Natural Resource Michika (2017)

Table 4: Public suggested view to combat deforestation in the study area

public Suggested view to combat Deforestation	Frequency	Percentage (%)
Employing more forest guards	6	6
Afforestation program (tree planting campaign)	17	18
Provision of substitute to fuelwood	13	14
Financing the forest department	9	10
Educating the community on effect of deforestation	27	29
Proper forest Law enforcement	7	7
Provision of more land for forest reserve/plantation	15	16
Total	94	100

Source: Field survey

Interaction with local community shows that awareness program on causes and effects of deforestation is very poor with only 12%. 87% respondent has not been fully enlightened. The result on the public view to combat deforestation is shown in (Table 4). Educating the community on effect of deforestation accounting for 29%, Afforestation program retain with 18%, which was followed by Provision of more land for forest reserve/plantation (16%); Provision of substitute to fuelwood accounting for 14%. Other strategies include financing the forest department (10%), Proper forest Law enforcement (7%) and employing more forest guards (6%). The result shows that the major strategies to combat deforestation involved public enlightenment campaign on danger of deforestation. Zaku (2012) suggested that deforestation can be controlled through legislating against deforestation, public enlightenment campaign on the menace of the deforestation and the need to avert it and developing other sources of fuel apart from fuelwood and lowering the price of Kerosene.

Conclusion and Recommendation

Conclusion

Deforestation is a problem that affects human being and their socioeconomics activities as well as overall rural development. The sustainability of environmental resources (Forests) is related to the wise use and management of available forest resources. This study revealed that respondents are aware of the trend of deforestation and the environmental condition as a result of human activities. Their

understanding of temperature variation and fast disappearing of vegetation are known.. On the whole, they perceived that the land is getting barred due to reduction in forest body, climate changes, pattern of rainfall occurrence to abnormal period, increase in temperature and land degradation through soil erosion. The study also clearly indicated that there is negative effect on rural development which has affected people’s livelihood. The rate at which the vegetation covers of the study area is converted to farm land and infrastructural development may put the community in serious danger of desertification in the nearest future if not checked.

Recommendations

Based on this study on effects of deforestation on socioeconomic livelihood of Michika people, the following recommendations are recommended.

- Government should re-introduce tree planting programs annually. This will reduce environmental hazard such as wind erosion, harmattan haze, extreme heat weather conditions.
- The call for establishment and efficient management forest reserves and plantations in various areas is the more urgent in the face of an ever-increasing population and the growing demands on forest.
- Each Local Government in the States should establish a plantation to combat deforestation; this could be done by incorporating the rural farmers in the establishment and management of forest resources..

- The authorities should provide alternative 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 plant more trees 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.
- Areas where agriculture is highly practiced should adopt Agroforestry practice; this will increase output and income of the farmers.

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