International Journal of Agriculture and Forestry 2020, 10(3): 63-70
DOI: 10.5923/j.ijaf.20201003.01

Impact of Deforestation on Some Selected Rural Communities in Jada, Ganye and Toungo Local Government Areas, Adamawa State Nigeria

David Cromwell Sakiyo[1,*], Adamu Musa[1], Enoch Buba Badgal[2]

[1]Department of Forestry Technology, Adamawa State College of Agriculture, Ganye, Adamawa State, Nigeria
[2]Department of Forestry Technology, Adamawa State Polytechnic, Yola, Adamawa State, Nigeria

Abstract The study was conducted in three Local Government Areas of Adamawa State Nigeria, to investigate the impact of deforestation on some selected rural communities in Jada, Ganye and Toungo Local Government Areas. Specifically, the study evaluated the main causes of deforestation in the study area. It also evaluated the effect of deforestation and its impact on the people of the area. A total of 150 questionnaires were administered to the participating households, purposive sampling techniques were used in generating primary data through questionnaire, discussion and observation and the data obtained were analyzed with descriptive statistics. 61.4% of the respondents were between the ages brackets of 31-40 years. The result of the study showed that 139 of the respondents representing 92.7% have the knowledge about deforestation. It also showed that 110 respondents representing 73.3% agreed that cutting of trees and bush burning are the major causes of deforestation. The findings of the research revealed that majority of the rural populace lacked in-depth knowledge of the consequences of deforestation. It was also found out that the main economic activities of the indigenes were farming, hunting, logging, which resulted in destroying large areas of land because they do not take any measures to conserve the forest in search of their daily bread. Among the recommendations suggested were enforcement against logging, education on effects of deforestation, re-introduction of tree planting programs annually, Forest nurseries should be established in each Local Government Areas to enable them raise seedlings for planting.

Keywords Bush burning, Logging, Questionnaires, Respondents, Jada, Ganye, Toungo

1. Introduction

Deforestation is a conventional environmental challenge substantially affecting the resilience and distribution of forests across different boundaries. Deforestation is simply defined as the loss of trees' cover usually as a result of forests being cleared for other land uses (Gorte and Sheikh, 2010). It also affects economic activity and threatens the livelihood and cultural integrity of forest dependent people by reducing the supply of forest products and causes siltation, erosion, desertification, drought and flooding (Annan, 2013). Forest is valuable assets which the world cannot do without. Not only do they provide resources such as timber, food, medicine but they also play a key role in the fight against global warming, climate change and loss of biodiversity. This shows the significant role a forest plays in human survival. Therefore, there is need for effective policy and management tools, bringing together practitioners interested in climate protection, biodiversity conservation, effective natural resources exploitation and rural livelihood to protect forest.

Agriculturally, deforestation and conversion of forest to arable land has drastic effect on soil properties. The principal effect of deforestation on chemical and nutritional properties of soil is related to a decrease in organic content. This leads to disruption of nutrient cycling mechanism as a result of the removal of deep rooted trees, which has serious effect on organic and nutrient content as such affects agricultural productivity. Studies conducted from 1971 to 2005 revealed that there was a temperature increase in Nigeria by 1.1℃, compared to the global increase in mean temperature of 0.74℃. It was also found that in the same period, the amount of rainfall in the country decreased by 81mm as against global average decrease of 52.8mm. It was noticed that these climatic changes had sharp effects on the agriculture (Udofia *et al*., 2011).

Forests regulate global climate and act as a major agents of carbon exchange in atmosphere. The rate at which forests of different types are disappearing for years now is alarming

* Corresponding author:
dsakiyo1@gmail.com (David Cromwell Sakiyo)
Published online at http://journal.sapub.org/ijaf

and the trend remains unprecedented. Globally, the high demand for timber and other forest products has resulted in the high level of forest encroachment and high rate of deforestation and forest degradation (Gandiwa *et al.*, 2011). Deforestation is a severe environmental problem owing to its negative consequences such as climate change, biodiversity loss, erosion, flooding, siltation, and soil degradation. Although this phenomenon started since the dawn of civilization and evidence in several areas have shown that it is on the increase due to incessant tree exploitation and increase in socio-economic activities and is a function of the growing human population and activities prompted mainly by such factors as poverty, demography, land tenure systems, inadequate conservation status and development policies (Gandiwa *et al.*, 2011).

Nigeria is naturally endowed with vast expanse of forest land, the swamp forests in the extreme Southern part of the country, the tropical rainforest in the South- western axis and the wooded savannah in the middle belt. Nigeria ranks among the countries of the world with abundant forest resources. Mfon *et al.*, (2014), reported that, forests in Nigeria occupied about 110, 890km^2 of the country total land mass of about 910,770km^2, in other words, forests are about 12.18% of vegetation cover of the country. Mfon *et al.*, (2014), also stated that at least 60 percent of all known species of plant and about 90 percent of all the world's non-human primates such as monkeys and about 40 percent of all the birds of prey and about 80 percent of all the insects, live in the tropical rainforests of the world. The level of community nutrition is sometimes linked to fuel wood availability and cost, others depend directly on forest for their livelihood, among them are a high number of forest and wood workers (Aliyu *et al.*, 2014). Perception of the causes of deforestation varies depending on one's perspective. While people perceived poverty, population growth, hunger and high illiteracy as the root cause of deforestation, to others, deforestation is cause by lack of alternative livelihood in forest communities where the forest serve as sole source of income generation and food. Taking lack of alternative livelihood as contributor to deforestation could be true to some extent because apart from farming, hunting, illegal wood logging and charcoal burns, most rural dwellers have no any effective income generation activities to augment pressure on forest resources. This has compelled them (rural communities) to rely on forest land for farming and other activities that could degrade the forest (Aliyu *et al.*, 2014).

According to Van Kooten and Bulte (2000), deforestation refers to the removal of trees from a forested site and the conversion of land to another use, most often agriculture. There is growing concern over shrinking areas of forests in the recent time (Barraclough and Ghimire, 2000). The livelihoods of over two hundred million forest dwellers and poor settlers depend directly on food, fibre, fodder, fuel and other resources taken from the forest or produced on recently cleared forest soils. Also, according to Nzeh and Eboh (2007) poor people have thus been able to exploit the forest for food, fuel and other marketable products which create both income and employment for the rural dwellers. Furthermore, deforestation has become an issue of global environmental concern, in particular because of the value of forests in biodiversity conservation and in limiting the greenhouse effect (Angelsen *et al.*, 1999). This has led economists to increase their efforts to model the process of deforestation and conversion of forests to other land uses.

But, in the view of Enabor (1986), deforestation is the removal or destruction of forest vegetation without any deliberate attempt at its regeneration. The term thus, includes not only felling of timber trees, but also removal of shrubs and other plants from the forest.

Deforestation is as old as man himself and as Enabor (1986) rightly reported, the early stages of civilization made it essential to destroy and remove some of the abundant forests in order to pave the way for activities such as arable farming and human settlements which advanced human development. Deforestation can therefore be regarded as primarily a result of man's efforts to meet his legitimate needs for social and economic development through expanding agriculture, Industrialization and infrastructural development.

Adebayo (2010), opined that poor living conditions and illiteracy are causes as well as consequences of environmental degradation. The high level of poverty and illiteracy in Africa directly linked to the current level of environmental pollution and degradation in the continent. The poor and the illiterate are often more interested in issues related to their daily survival than environmental management; this lack of interest and awareness often lead to more reckless environmental behavior which in turn breeds more environmental problems and leads to a vicious cycle of poverty. The growing concerns about the environmental unsustainability of economic growth patterns and increased awareness of a potential forest degradation crisis have made it clear that the environment and the economy can no longer be considered in isolation. At the same time, financial and economic crisis has provided the opportunity for policy interventions aimed at discouraging deforestation of the environment and renewed growth on more environmentally and socially sustainable grounds. Forests are valuable assets which the world cannot do without (Adebayo, 2010).

Mankind's activities on the environment in his quest for development have resulted in a continuous and serious degradation of the ecosystem, thus pose a threat to both his present and future living. Human beings use the environment in three basic ways: as a resource bank, the environment supplies them with raw materials needed to maintain their existence, and their social and technological structures; as a habitat - people require more space per individual than any other species and as sink for wastes- human beings produce more waste than other species (Tadesses *et al.*, 2006).

The cumulative pressure of human activities on the forest and the concomitant impact on the resources no doubt has reduced the livelihoods of the communities that depend on the activities. There is also the impoverishment of the local

people who rely on forest resources for their livelihood. A livelihood is said to be sustainable when it maintains or enhances the local and global assets on which livelihood depends and has no beneficial effect on other livelihoods (Bisong and Mfon, 2006). With the current conservation scenario of restricting access, while deforestation is on-going, the study is therefore geared towards assessing the impact of the deforestation on livelihood.

2. Materials and Methods

Study Area

The study was carried out in Jada, Ganye and Toungo Local Government Areas, located in the Southeastern part of Adamawa State, Nigeria. The study area is located within the Guinea Savannah zone of the Nigeria's vegetation Zones (see figure 1).

Jada Local Government Area (L.G.A.) is located between latitude 8° 43′ N to 8° 47′ N and longitude 12° 06′ E and 12° 12′ N of the Greenwich meridian, with a total land mass area of 2,890.039Km^2. It shared local boundary with Fufore L.G.A. in the North, Mayo-belwa to the West, Ganye to the South and also share international boundary with Cameroon Republic along its eastern boarder (Adamawa State Diary (ASD), 2007).

Ganye Local Government Area is bounded by Jada to the North, Mayo-Belwa and Taraba State to the West, Toungo to the South and to the East Cameroon Republic (Adebayo, 2010). It has a land mass of about 2291.42km^2 and a population of 164,087. The mean annual temperature is 26.7℃ and the mean annual rainfall ranges between 1000mm and 1600mm with a distinct dry season which begins in November, and ends in April and the wet season begins in April and ends in October or sometimes in November. The area is located within the Guinea Savannah zone of the Nigeria's vegetation Zones. The major economic activity in the area is agriculture, food crops grown in the area includes Maize, sorghum, cowpea, Cassava and Potatoes. While Cash crops such as Ground nuts, Rice, Yam and Sugarcane are produced in large quantities. The famers are also engaged in collection and processing of non-timber forest such as Shea nuts. Major livestock reared in the zones are Cattle, Sheep, and Goats (Adebayo 1999).

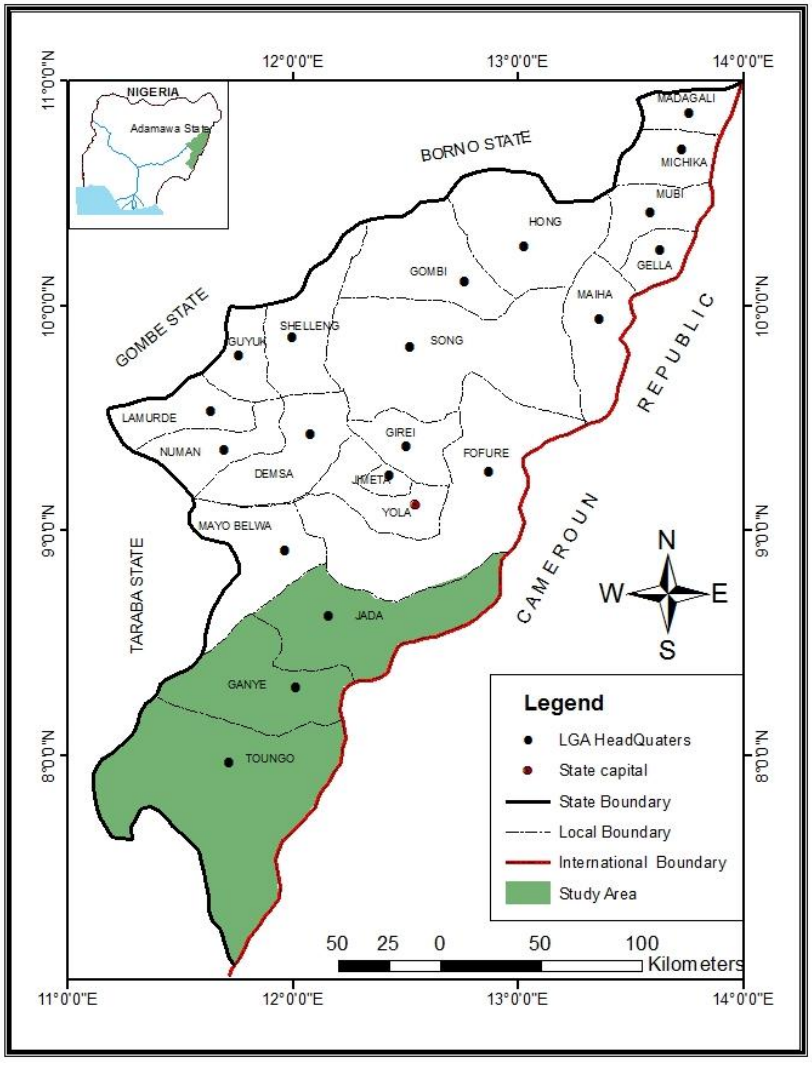

Figure 1. Adamawa State Showing Study Area (Source: GIS Laboratory Department of Geography, MAUTECH, Yola 2019)

Toungo L.G.A is located in the Southern part of Adamawa State. It is bounded by Ganye to the North, Taraba State to the West and South and also share international boundary with Cameroon Republic to the East. Toungo is located between latitude 7° 2′ 46″ to 8° 12′ 13″ N and longitude 11° 3′ 53″ to 12° 15′ 0″ E of the Greenwich meridian. Most of the activities of the people of the area are farming and livestock rearing.

Population and Sampling Techniques

The targeted populations were the total number of households in the study area. The study adopted the purposive sampling techniques. In the first stage of the sampling technique, three (3) Local Government Areas (LGAs) were purposively selected from the Southern zone of Adamawa State (Jada, Ganye and Toungo). The second stage involved selection of five (5) rural communities in each of the LGAs under study. This gave a total of fifteen (15) rural communities. The third stage involved the selection of respondents (i.e. household heads). Ten (10) household heads were selected from each of the fifteen (15) rural communities to represent the target population, making a total number of one hundred and fifty (150) household-heads.

Data Collection

Data for this study were collected from primary sources. The primary data were obtained by the use of structured questionnaire. Information sought include, among others were, age of household heads, occupation, marital status and educational qualification. Information on the causes of deforestation and its effects, local programs aimed at checking deforestation and knowledge on the consequences of deforestation was also asked. Furthermore, personal contacts, oral interviews and observations were used during visitation to obtain information on the subject matter; this aided the primary data collection techniques. The questionnaires were filled and retrieved for further statistical analysis.

Method of Statistical Analysis

A list of measures provided for the respondents were placed on a five point likert scale (LS). Each respondent was asked to tick any of the options namely: 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'. Values assigned to these options are 5, 4, 3, 2 and 1 respectively. The completed questionnaires were retrieved, coded and subjected to descriptive statistical analysis such as tables, frequencies distributions and percentages with the used of SPSS version 23.0.

3. Results

Socio-demographic characteristics of the respondents

The socio-demographic characteristics of the respondents examined include: sex, age, marital status, livelihood occupation and educational attainment, these are shown in Table 1. A total of 150 questionnaires were administered to the participating households, out of these number, 134 (89.3%) were male while 16 (10.7%) were female. The populations of the study were youth constituting 61.4% of people between the age brackets of 31-40 years. This implies that, most of the respondents were young people who were at their prime age and are capable of getting involved in different income generating activities from the forest to augment feeding and betterment of their living standard. In terms of marital status, most of the respondents were married which constitute 86.0%, followed by singles with 9.3%. Widowed respondents had 3.3% and the least were the divorced with 1.3%. In terms of occupation, Farmers had the highest with 67.3% among others.

Table 1. Demographic characteristics of Respondents

Variables	Frequency	Percentage (%)
Sex		
Male	134	89.3
Female	16	10.7
Age		
20 and below	09	6.0
21-30	27	18.0
31-40	96	61.4
41 and above	18	12.0
Marital Status		
Married	129	86.0
Single	14	9.3
Widowed	5	3.3
Divorced	2	1.3
Occupation		
Farming	101	67.3
Trading	29	9.3
Civil Servant	18	2.0
Others	2	1.3
Level of Education		
None	29	19.3
Primary	32	21.3
Secondary	74	49.3
Tertiary	15	10.0
Total	**150**	**100**

Moreover, the level of education of the respondents indicated that Secondary school certificate holders had the highest 74 (49.3%) followed by those with primary school certificate 32 (21.3%), uneducated had 29 (19.3%) and those with tertiary education had the least 15 (10.0%). This implies that the respondent's level of education could Influence their livelihood activities or potentials in the forest zone on their Socio-economic status which should be used to boost production.

Table 2 depicts the respondents' opinion on decrease in soil fertility, cutting of trees and soil erosion as perceived knowledge of the major causes of deforestation. The agreed

had the highest 110 (73.3%) followed by the strongly agreed with 26 (17.3%), the undecided had 11 (7.3%), the disagreed had 3 (2.0%) while the strongly disagreed had the least 0 (0.0%).

Table 2. Decrease in soil fertility, cutting of trees and soil erosion as causes of Deforestation

Variables	Local Government Areas			
	Jada (%)	Ganye (%)	Toungo (%)	Total (%)
Decrease in soil fertility				
SA	3(6.0)	11(22.0)	12(24.0)	26(17.3)
A	41(82.0)	35(70.0)	34(68.0)	110(73.3)
UD	5(10.0)	4(8.0)	2(4.0)	11(7.3)
SD	0(0.0)	0(0.0)	0(0.0)	0(0.0)
D	1(2.0)	0(0.0)	2(4.0)	3(2.0)
Cutting of trees				
SA	19(38.0)	28(56.0)	16(32.0)	63(42.0)
A	25(50.0)	21(42.0)	30(60.0)	76(50.7)
UD	3(6.0)	0(0.0)	1(2.0)	4(2.7)
SD	1(2.0)	0(0.0)	0(0.0)	1(0.7)
D	2(4.0)	1(2.0)	3(6.0)	6(4.0)
Soil erosion				
SA	16(32.0)	9(18.0)	18(36.0)	43(28.7)
A	32(64.0)	38(76.0)	21(42.0)	91(60.7)
U	2(4.0)	1(2.0)	7(14.0)	10(6.7)
SD	0(0.0)	1(2.0)	1(2.0)	2(1.3)
D	0(0.0)	1(2.0)	3(6.0)	4(2.7)
Total	**50(100)**	**50(100)**	**50(100)**	**150(100)**

KEYS: SA = Strongly Agree A = Agree U = Undecided SD = Strongly Disagree D = Disagree

The responds of the participants on cutting down of trees during farming activities and logging for commercial purposes as causes of deforestation realized that 76 (50.7%) agreed that wood logging is the main cause of deforestation in the area, followed by the strongly agreed with 63 (42.0%). The disagreed had 6 (4.0%), the undecided had 4 (2.7%) while the strongly disagreed had the least 1 (0.7%).

The table also showed the respondents opinion on deforestation as a major cause of soil erosion. The agreed had the highest 91 (60.7%) followed by the strongly agreed 43 (28.7%), the undecided had 10 (6.7%), the disagreed had 4 (2.7%) while the strongly disagreed had the least 2 (1.3%).

Table 3 depicts the respondents' opinion on biodiversity extinction, animal species extinction as a major effect of deforestation. Opinion on biodiversity extinction revealed that, agreed had the highest with 112 (74.7%) followed by the strongly agreed 35 (23.3%), the disagreed had 3 (2.0%) while the strongly disagreed and the undecided had the least with 0 (0.0%).

The table also showed the respondents opinion on animal species extinction as effect of deforestation. The agreed had the highest with 118 (78.7%) followed by the strongly agreed 30 (20.0%), the disagreed had 2 (1.3%) while the strongly disagreed and undecided had 0 (0.0%) each.

Table 3 further showed the respondents opinion on planting of trees and attending awareness creation programs as one of the preventive measures of deforestation. The agreed had the highest 95 (63.3%) followed by the strongly agreed with 50 (33.3%), the disagreed had 4 (2.7%), the undecided had 1 (0.7%) while the strongly disagreed had the least 0 (0.0%).

Table 3. Major effects of Deforestation

Variables	Local Government Areas			
	Jada (%)	Ganye (%)	Toungo (%)	Total (%)
Biodiversity extinction				
SA	12(24.0)	9(18.0)	14(28.0)	35(23.3)
A	37(74.0)	41(82.0)	34(68.0)	112(74.7)
UD	0(0.0)	0(0.0)	0(0.0)	0(0.0)
SD	0(0.0)	0(0.0)	0(0.0)	0(0.0)
D	1(2.0)	0(0.0)	2(4.0)	3(2.0)
Animal species extinction				
SA	10(20.0)	8(16.0)	12(24.0)	30(20.0)
A	39(78.0)	42(84.0)	37(74.0)	118(78.7)
UD	0(0.0)	0(0.0)	0(0.0)	0(0.0)
SD	0(0.0)	0(0.0)	0(0.0)	0(0.0)
D	1(2.0)	0(0.0)	1(2.0)	2(1.3)
Awareness				
SA	24(48.0)	11(22.0)	15(30.0)	50(33.3)
A	23(46.0)	38(76.0)	34(68.0)	95(63.3)
UD	0(0.0)	1(2.0)	0(0.0)	1(0.7)
SD	0(0.0)	0(0.0)	0(0.0)	0(0.0)
D	3(6.0)	0(0.0)	1(2.0)	4(2.7)
Total	**50(100)**	**50(100)**	**50(100)**	**150(100)**

KEYS: SA = Strongly Agree A = Agree U = Undecided SD = Strongly Disagree D = Disagree

4. Discussion

Result in table 1 indicated that there were more males 134 (89.3%) available and selected for the study than females 16 (10.7%). This implies that men are mostly involved in farming, hunting, wood logging and other human activities related to deforestation while the females are engaged in other household activities.

The table also revealed that most of the respondents were young people who were at their prime age and are capable of getting involved in different income generating activities from the forest to augment feeding and betterment of their living standard. The age of respondents was important in this study because it was to determine economic active group whose activities have serious repercussion on the environment. Since age goes with man power, the more active age group engage in any degradable activity the higher the exploitation, hence the greater the environmental impact.

In terms of marital status, the table showed that a good number of the respondents were married 129 (86.0%) followed by singles with 14 (9.3%), widowed respondents had 5 (3.3%) and the least were the divorced with 2 (1.3%). This suggest that agricultural practices in the study area is mostly associated with the married individuals and it is also likely that they engaged their family members in farming activities and hence making farm work relatively simple in operation.

Moreover, in terms of occupation of the respondents, farmers constitute most of the respondents with the highest percentage (67.3%) followed by traders (9.3%), then civil servants with (2.0%) and the least were found among others with (1.3%). This is common with most rural parts of Nigeria and Africa at large. It also agrees with the findings of Quaye (2009), who said that about 70% Nigerians are farmers. The result on the educational attainment of the respondents showed that Secondary school certificate holders had the highest 74 (49.3%) followed by those with primary school certificate 32 (21.3%), uneducated had 29 (19.3%) and those with tertiary education had the least 15 (10.0%). This implies that the respondent's level of education could Influence their livelihood activities or potentials in the forest zone on their Socio-economic status which should be used to boost production. This also indicates that agricultural activities in this area are mostly dominated by the respondents who had formal education. Quaye (2009), pointed out that education is one of the important human capitals which play important roles in determining status in society. Education is expected not only to contribute to people's ability to read and understand instructions but also help them to adopt new techniques. This could lead to more direct employment generation, better economic empowerment and well-being of the rural populace. Also, Adekunle (2009) pointed out that the level of education of farmers will directly affects their ability to adapt to change and to accept new ideas. Similarly, World bank (2006) cited that education is one of the potentials rural dwellers Possess in improving their socio-economic status. It is realized that most people in the rural communities of the three LGAs have attempted to acquire some formal education but the majority stopped at secondary school and this cuts across the various age category.

Table 2 depicts the respondents' opinion on decrease in soil fertility and drought as perceived knowledge of the consequences of deforestation. The findings indicate that the respondents with the highest percentage 110 (73.3%) acknowledge that decrease in soil fertility and drought are the consequences of deforestation. The assertion by Hope (2007) indicates that environmental degradation made people poorer through lack of availability of natural resources.

The responses of the participants on cutting down of trees during farming activities and wood logging for commercial purposes as causes of deforestation realized that 76 (50.7%) agreed that wood logging and cutting down of trees are the main causes of deforestation in the area. This result agrees with the findings of Asfaw (2003) who described deforestation as continued land clearing for agriculture due to an exploitive farming system, tree cutting for fuel, logging due to population growth accompanied by stagnating agricultural production. This perspective is not entire different from the argument advanced by Insaidoo *et al.* (2012), who acknowledged the bush fires, indiscriminate logging and conversion of forest to farmland as the predominant causes of deforestation. Furthermore, Ogunleye *et al.* (2004), also identified farming activities such as bush clearing and burning, shifting cultivation as causes of deforestation in Nigeria.

The respondents' opinion on deforestation as a major cause of soil erosion showed that the agreed had the highest 91 (60.7%) while the strongly disagreed had the least with 2 respondents representing 1.3%. this result is in line with findings of Annan (2013), who stated that deforestation affects economic activity and threatens the livelihood and cultural integrity of forest dependent people by reducing the supply of forest products and causes siltation, soil erosion, desertification, drought and flooding. Anyadike (2009), opined that deforestation, over grazing, bush burning, and unplanned development have impact on climate change and environmental sustainability.

Table 3 depicts the respondents' opinion on biodiversity extinction as a major effect of deforestation indicated that the agreed had the highest with 112 (74.7%) while the disagreed had 3 (2.0%). The result agrees with the findings of Yakusa and Levins, (2007), stated that forests clearance and the subsequent agricultural development has a detrimental effect on every element of local ecosystems such as microclimate, soil and aquatic conditions, and most significantly, the ecology of local plants and animals including human disease factors. Omofonmwan and Osa-Edoh (2008), opined that depletion of wildlife and biodiversity leading to loss of many non-timber forest products which sustain majority of the rural population is one of the effects of deforestation. The result is also in agreement with the findings of Sukumaran and Jeeva, (2008) who stated that loss of biodiversity of tropical forests is mainly due to degradation and destruction of habitat by anthropogenic activities.

The respondents' opinion on deforestation as a cause of animal species extinction showed that the agreed had the highest with 118 (78.7%) followed by the disagreed who had 2 (1.3%). Environmentalists argue that when trees are cut, the forest no longer supports the same wildlife or maintains clean water as effectively as it did before and this may place its inhabitants at risk (Knox and Marston, 1998). Omofonmwan and Osa-Edoh (2008), agreed that depletion of wildlife and biodiversity leading to loss of many non-timber forest products which sustain majority of the rural population is one of the effects of deforestation.

The opinion of the respondents on planting of trees and attending awareness creation programs as one of the preventive measures for deforestation indicated that the agreed had the highest 95 (63.3%) followed by the strongly agreed with 50 (33.3%), the disagreed had 4 (2.7%) while the

undecided had 1 (0.7%).

5. Conclusions

The result of this study revealed that majority of the rural populace lacked in-depth knowledge of the consequences of deforestation. Some of those engaged in wood logging, farming, hunting and other land users are aware of the trends of deforestation and status of land as a result of human activities, they perceived that environment is changing due to reduction in rainfalls, increase in temperature and land degradation through erosion. Ways of reducing deforestation therefore must go hand in hand with improving the environmental knowledge of the rural populace.

ACKNOWLEDGEMENTS

The authors wish to appreciate the support provided by the entire staff of Adamawa State Community and Social Development Agency (World Bank Assisted). Sincere thanks to all the respondents to the questionnaire for taking their time to participate in this study.

REFERENCES

[1] Adebayo, A. A., 2010. Federal University of Technology, Yola. 8th Inaugural Lecture: Climate: Resource and Resistance to Agriculture 48: 15-22.

[2] Adeboyo A., 1999. Sunshine, Temperature, evaporation and relative humidity, in: Aspatial analysis. *The Journal of Environmental and Earth Science,* 2(10), pp.173-183.

[3] Adekunle, V. A., 2009. Contributions of agroforestry practice in Ondo State, Nigeria, to environmental sustainability and sustainable agricultural production, *Journal of Agroforestry and Silviculture,* 4(3): 278-284.

[4] Aliyu, A, Modibbo, M.A, Medugu, N.I. and Ayo, O., 2014. Impacts of Deforestation on socio-Economic Development of Akwanga Nasarawa State. *International Journal of Science, Environment and Technology 3*(2): 403 – 416.

[5] Angelsen, A. Shitindi, E. F. K. and Aaarrestad, J., 1999. Why do farmers expand land into forest? Theories and evidence from Tanzania. *Environment and Development Economics,* 4: 13-31.

[6] Annan, P., 2013. Annual Deforestation Rate and Growth in Gross Domestic Product in Brazil. *International Journal of Agroforestry and Silviculture,* 3: 7-9.

[7] Anyadike, R. N. C., 2009, Climate Change: Causes and Consequences, paper presented at CEMAC, UNEC, public lecture.

[8] Asfaw, G., 2003. Breaking the current cycle of famine in Ethiopia: natural resource management and drought related famine prevention; Research Paper. Addis Ababa, Ethiopia.

[9] Barraclough, S. and Ghimire, K.B., 2000. Agricultural expansion and tropical deforestation, Earthscan.

[10] Bisong, F. E. and Mfon, P., 2006. Effect of Logging on Stand Damage in the Rainforest of South-Eastern Nigeria. *West African Journal of Applied Ecology* 10(1): 1-10.

[11] Enabor, E.E. and A.B. Oguntala., 1986. Socio-economic factors of deforestation in Nigeria. 111-125 in challenge of deforestation in Nigeria. 1st ed. Processing for FAN Conference, Minna.

[12] Gandiwa, P., Matsvayi, W., Ngwenya and Edson, G., (2011); Assessment of Wildlife and Huma Settlement Enccroachment into the Northern Gonarezhou National Park, Zimbabwe. *Journal of Sustainable Development in Africa*, 13(5): 12-15.

[13] Gorte, R.W and Sheikh, P. A., 2010. Deforestation and Climate Change, Congressional Research Service, March 24, 2010. Retrieved from http://www.fas.org/sgp/crs/misc/R41144.pdf.

[14] Hope, K.R., 2007. Poverty and Environmental Degradation in Africa. *Journal of Environment and Sustainable Development,* 6(4): 451-472.

[15] Insaidoo, T. F.G. Ros-Tonen, M. A.F. Hoogenbosch, L. and Acheampong, E., 2012. Addressing Forest Degradation and Timber Deficits in Ghana, ETFRN News.

[16] Knox, P. L. and Marston, S. A., 1998. Places and Regions in Global context: Human Geography, Prentice-Hall Inc, Upper Saddle River, New Jersey 07458, pp. 174-175.

[17] Mfon, P. Akintoye, O.A. Mfon, G, Olorundami, T., Ukata, U. and Akintoye, T. A., 2014. Challenges of Deforestation in Nigerian and the Millennium Development Goals. *International Journal of Environment and Bioenergy,* 9(2): 76 – 94.

[18] Nzeh, C.E.P. and Eboh, E.C., 2007. Analysis of income effects of forest products activities among rural households in Enugu state Nigeria, *Journal of Agriculture and Social Research,* 7(1): 23-33.

[19] Ogunleye, A.J., Adeola, A.O., Ojo, L.O.and Aduradola, A.M., 2004. Impact of farming activitie on vegetation in Olokemeji Forest Reserve, Nigeria. *International Journal of Biodiversity and Conservation,* 6(2): 131-140.

[20] Omofonmwan, S.I. and Osa-Edoh, G.I., 2008. The challenges of environmental Problems in Nigeria, Journal *of Ecology,* 23(1): 53-57.

[21] Quaye,S., 2009. Food Security situations in North Ghana, coping strategies and related constraints. *African Journal of Agricultural Research,* 3(5): 48-76.

[22] Sukumaran, S. and Jeeva, S., 2008. A floristic study on miniature sacred forests at Agastheeshwaram, southern peninsular India. Eurasian. *Journal of Biosciences,* 2: 66.

[23] Tadesse, E., Ameck, G., Christensen, C., Masiko, P., Matlhakola, M. and Shilaho, W., 2006. The People Shall Govern: A Research Report on Public Participation in Policy Process, Centre for the Study of Violence and Reconciliation (CSVR), Johannesburg, South Africa.

[24] Udofia, S.I., Jacob, D. E., Owuah, P. W. and Samuel, N. S., 2011. Steaming Environmental Degradation: The

Afforestation Approach. *Nigerian Journal of Agriculture, Food and Environment,* 7(1): 22-27.

[25] Van Kooten, G. C. and Bulte, E. H., 2000. The economics of nature: managing biological assets Blackwell. World Bank 2006, World Development Indicators 2006, Washington, http://www.worldbank.org/data/wdi2006.

[26] World Bank., 2006. Poverty and Hunger: Issues and options for Food Security in Developing countries. Washington.

[27] Yasuoka. J, and Levins. R., 2007. Impact of deforestation and agricultural development on Anopheline ecology and Malaria Epidemiology. *Journal of American Society of Tropical Medicine and Hygiene,* 76(3), pp.450-460.