Penerbit Akademia Baru

Journal of Advanced Research in Social and Behavioural Sciences

Journal homepage: www.akademiabaru.com/arsbs.html
ISSN: 2462-1951

Effects of Deforestation In Kurmi Local Government Area, Taraba State, Nigeria

Open Access

Kanati Madaki[1,2], Alexander K. Sayok[2,*]

[1] Department of Hospitality Management and Tourism, Faculty of Agriculture and Life Sciences, Federal University Wukari, Taraba State Nigeria
[2] Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

ARTICLE INFO

Article history:
Received 31 October 2018
Received in revised form 29 January 2019
Accepted 31 January 2019
Available online 1 February 2019

ABSTRACT

In spite of the importance of forest resources to man, the later also are responsible in degrading forests resulting in multiple societal and environmental problems. This paper reports the effects of deforestation on the ecosystem of northeastern Nigeria through interviews with 300 respondents from six sampled wards (districts) in the study area. From an estimated 5,000 hectares of forests have been deforested in Kurmi Local Government Area, about 74% agreed that the rate of deforestation in the area is high. Over cultivation and fuel wood were considered the major causes of deforestation in the area with 26% and 22% of the total responses respectively. Deforestation had decreased tree species and wild animals while increased soil erosion and flooding contributing to the formation of gullies, consequently led to the decrease in agricultural productivity. Recommendations were made to increase reforestation efforts through enhancement of various initiatives by the stakeholders. It was suggested that the government to relook at the effectiveness of existing forestry laws so that any weaknesses can be amended and be more flexible to enable states and localities to modify to suit local prevailing conditions and changes with time. A longer-term study was suggested to cover various seasons of the year and wider area to enable better understanding on the adverse impacts of deforestation on the environment and socio-economic aspects and their relationships.

Keywords:
Deforestation impacts, decrease agricultural productivity, Taraba State, Northeastern Nigeria

1. Introduction

The United Nations' Food and Agricultural Organisation (FAO) defines forests as "land with a tree canopy cover of more than 10 percent covering an area of more than half hectare" which includes natural and plantation forests, but not stands of trees established primarily for agricultural plantations such as fruit tree and oil palm plantations and trees planted in agroforestry systems [1]. On the other hand, deforestation is the conversion of forested areas to non-forest land into less biodiverse ecosystems such as pasture, cropland, or plantations, urban use, logged area, or

* *Corresponding author.*
E-mail address: ksalexender@unimas.my (Alexander K. Sayok)

wasteland [2]. An estimated 18 million acres (7.3 million hectares) of forest, which is roughly the size of the country of Panama, are lost each year, according to the United Nations' Food and Agriculture Organization (FAO) [1]. Without sufficient reforestation, it results in declines in habitat and biodiversity, wood for fuel and industrial uses, and ultimately decreasing quality of life [3]. Between 2000 and 2010, deforestation resulted in a net forest loss of 5.2 million ha annually worldwide, most occur in the developing world [4,5] According to Robert [6] tropical forests are disappearing rapidly as human clear the natural landscape for farms and pastures, harvest timber for construction and fuel, and build roads as well as transforming them in urban areas. Although deforestation meets some human needs, it also has profound, sometimes devastating consequences, including social conflicts, extinction of plants and animals and climate change.

Forest depletion is among the major environmental problems that threaten and have severe consequences on our environments, decreasing both floral and faunal species apart from giving more pressures to the forest dwellers who depend on them. In its assessment of 179 countries in 1990, FAO [7] found that forests constituted slightly over 3,400 million ha or 27% of global land area with forests in developed regions represented 42% compared to 58 percent in underdeveloped regions. The loss of forest area during 1980-90 was estimated at 163 million ha, of which 154 million ha or 94.5% was in the tropics alone, causing per capita forest area fell globally from an average of nearly 1.2 ha in the 1960 to 0.6 ha in 1990 and projected it to be less than 0.2 ha by 2020.

In Africa, two-thirds of the continent's population depends on forest resources for survival, income and food supplement. About 90% use fuelwood and charcoal as sources of energy, thus deforestation here is estimated at around 3.4 million ha annually [4,9] and, in Western Africa this remains a serious problem [4].

Ibrahim and Muhammad [10] stated that deforestation for agricultural development and urban growth reduced the extent, diversity and stability of forests in Nigeria. Dekule *et al.*, [11] stated that between 1990 and 2000, she lost an average of 409,700 ha of forest annually. As of 2005, it increased to about 600,000 ha annually, making it the highest rate of deforestation in the world. Common factors leading to deforestation in the country were high demand for land by farmers and forest fires apart from indiscriminate extraction of fuelwood [10].

The adverse impacts of deforestation were more severe in northern Nigeria where desertification caused by climatic extremities resulted in droughts and floods which aggravated the situations. Similar to most rural areas in Nigeria, communities use their surrounding forests for various purposes including firewood, hunting for game and gathering of medicinal herbs and chewing sticks apart from logging.

In view of these predicaments, a study on the deforestation; its causes, impacts, and efforts toward controlling its was carried out with Kurmi Local Government Area in Taraba State, Nigeria, in the hope that information gathered will be incorporated into a document on planning forest resource management and conservation policy towards a more sustainable and integrated resource use in the area.

2. Methodology

2.1 Study Site

Kurmi Local Government Area (LGA) in Taraba State, Nigeria lies within 7° North and 10° 11′ East between 09° 00' and 12°00' East occupying an area of 4,353 km² (Figure 1), with an average elevation of 265 m above sea level, having undulating topography consisting both isolated and chains of mountain across some areas dissected by three main rivers namely River Ndaforo, Belel and Bisaula. River Ndaforo has its source at Fali mountain, flowing southwards to Ndaforo to join River Donga.

River Belel starts from Gashaka mountain and flows to southern part of Abong into River Donga while River Bissaula starts from Cameron mountain but flows into River Manyan. Rocks in the area consist of glacises, magmatites and metamorphic, exposed on the surrounding hills usually by streams. The soils are transitional ferruginous tropical varying from clay to loam (below 70 cm) and deep (generally over 100 cm) except where iron, stones, pans are exposed, but are well drained. Situated in the middle belt, Taraba is affected by tropical climatic conditions characterized by dry and wet seasons. Rainy season starts from March to early November, with maximum rain in August and September, while the dry season starts from late November to early March. Average annual rainfall ranges from 1,200 to 2,500mm with mean annual temperature of 28^{o}C [12].

Taraba State is one of eight states which account for 50% of Nigeria's tree cover [13]. In the study area, the vegetation cover is mainly of savannah dominated by *Daniellia*, providing limited amount of shade. The accompanying shrubs and grasses are the *Hymenocardia* and *Andropogon* communities respectively. The economic trees commonly found include Locust Bean (*Parkia biglobosa*), Shea-butter (*Vitellaria paradoxa*), Mahogany (*Khaya spp*), Sapele (*Entandrophragma cylindricum*), Iroko (*Milicia excelsa*), and Afra (*Nectophryne afra*). Some cultivated plants include Cashewnut (*Anacardium occidentale*), Date palm (*Phoenix dactylifera*), Mango (*Mangifera indica*), Paw paw (*Asimina tribola*), Orange (*Citrus* spp), and Guava (*Psidium guajava*). The grasses are used for grazing while trees and shrubs for firewood, timber, woodcarving, palm products, fruit gathering and various construction purposes. Sawmills are fast increasing, while village and gallery forests are reducing in number and size [14]. Rainfall distribution and topography are the most important factors influencing the pattern of vegetation in Kurmi LGA, with vigorous vegetation during wet seasons but their foliage wilt in dry seasons.

Kurmi LGA has a total population of 91,282 [15] predominantly farming, fishing, lumbering, hunting and carving. Most of the people living within the area are farmers while some cutting trees for sale in towns as firewood, and had cut 5,000ha of forests in the State.

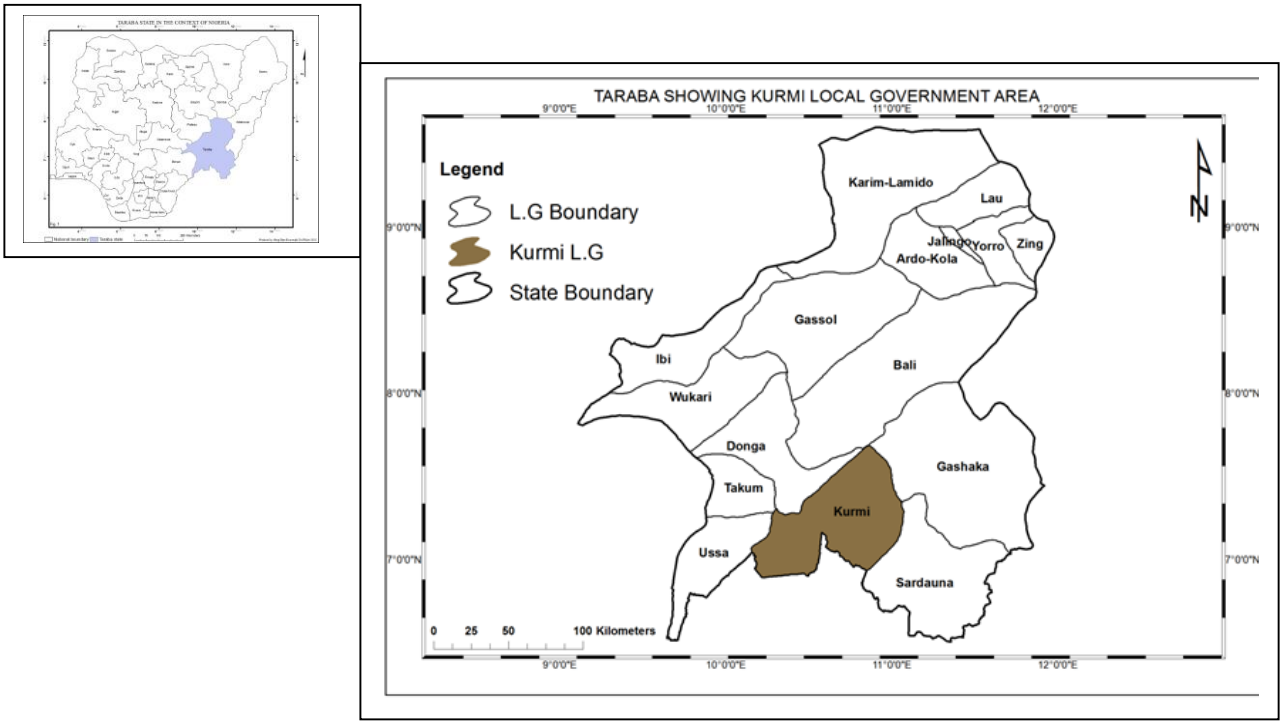

Fig. 1. Map of Taraba State, Nigeria with Kurmi Local Government Area (LGA) shaded in grey

2.2 Data Collection and Processing

Secondary data on various information especially related to the forest use and deforestation as well as socio-economic on the study area, Taraba State and Nigeria were collected from existing documents such as books, journals, reports, and others sources from relevant authorities, agencies and organizations. Primary data were collected using structured interview with respondents, in addition to, personal observations of the general environment and socio-economic situation of the study area. The respondents were chosen from six out of 10 wards in Kurmi LGA from three zones as Northern, Central and Southern with two wards randomly selected from each zone. The proportional allocation method adopted from Kothari [16] was used to select the household heads as respondents interviewed in the sampled wards. Based on this method and 17,780 households in Kurmi LGA [15] with an estimated total of 11,250 households in the six wards, 300 household heads/respondents were interviewed (Table 1). The data collected during the interview include information on the demographic and socio-economic aspects of the respondents, their opinions on the use of the nearby forests, causes of deforestation in the area, effects of deforestation on the socio-economic development of the people, and roles of various groups and institutions on initiatives or efforts toward controlling deforestation and enhancing forests in the study area.

Table 1
Household sampled for each ward within the respective zones

Zone	Wards/Villages	Available Households	Household sampled	
			Number	Percent
Northern	Didan	1,370	37	2.70
	Guanda	1,450	39	2.69
Southern	Boko Bissaula Nyido	1,780	47	2.64
	Mubi Tosso/ Sabon Gida	1,630	43	2.63
Central	Bente	1,070	29	2.71
	Baissa	3,945	105	2.66
	Total	11,250	300	2.67

3. Results

3.1. Demographic Characteristics

Majority (52%) of the respondents were 18-29 years old with 23% and 18% respectively within the 30-39 and 40-49 years while rest 7% from those older. The first three groups (18-49 years) comprising 93% are considered active working ages and thus in a better position to respond to the core subject matter of the study. In terms of gender, 60% of the respondents were males and 40% females. The highest portion of the respondents (49%) were married while 30% were single with the remainder 21% comprised of widows, widowers and divorcees. Most (76%) were living beyond 1 km from the nearest forest while 14% and 10% within the 1km and 0.5km away respectively. Majority (51%) were farmers while public servants constituted 11% and traders 10%. The remaining 28% were in other occupations such as drivers, tailoring, lumbering and fishing. The peasant farmers also consisted majority of those considered poor and were directly involved in activities leading to deforestation with man being more involved because of the higher energy required while women mainly collecting fuel wood for cooking.

3.2 Factors Leading to Deforestation

Communities in the study area use the forest for various needs especially socio-economic throughout the year (Fig. 2) and thus affects the forests [17]. Hunting wild animals for meat was the most common (51%) followed by other uses (30%) which include gathering of food plants in the form of either edible shoots, roots, cabbages, nuts, fruits and seeds, medicinal herbs and chewing sticks. These two categories of uses, however, both will not cause deforestation. Even if they do, their contribution to deforestation will be negligible. Though only 19% of the respondents mentioned that they used the forest forest land for farming and lumbering, these activities were actually among the main ones that led to deforestation as shown in Table 2.

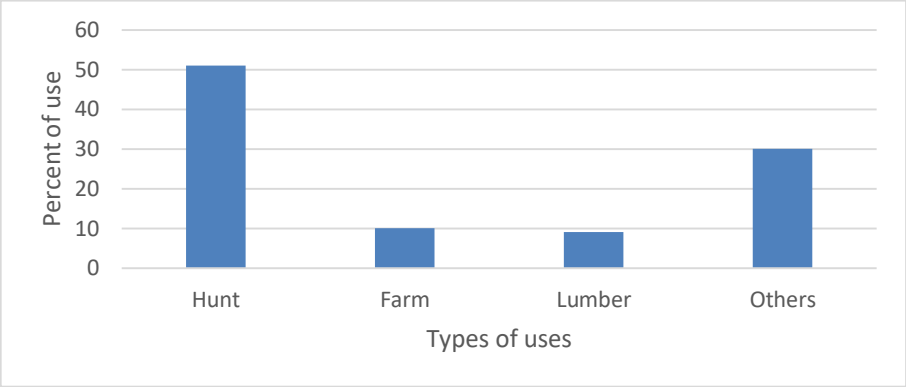

Fig. 2. Local use of the forest and their respective responses

Among the six factors/activities causing deforestation shown in Table 2, the man-related ones contributed 83% of the causes with cultivation topping the list. This could be so as farmers tend to encroach into the forest area apart from cultivating their fallows. They also can trigger wild fire when the fire used in burning their cleared fields spread into the nearby forest.

Table 2
List of factors causing deforestation based on responses

Factors/Activities causing deforestation		Number of respondents	Percentage
Broad classification	Description		
Man-related	Cultivation	78	26
(Anthropogenic)	Fuel wood collection	65	22
	Over grazing	45	15
	Lumbering	42	14
	Population growth / urbanisation	20	7
Natural	Bush fire	50	17
Total		300	100

Source: Field Survey, 2012

Though fuelwood collection contributed as the second main cause at 22%, this activity were usually undertaken in the forest, which can result in a clear-cut situation when repeated wood collections are undertaken on the same site beyond what the forest are able to replenish/recover. It was even more alarming when 74% of the respondents stated that wood was major source of energy as most cannot afford other sources which were more expensive. This rate (74%) is even higher than what had been reported by Ogunwale [18] which was 65% for Nigeria. The heavy dependent on fuel wood indicates that the demand for this resources will be higher in the future with increased in

population entailing cutting down more trees, though the latter (population increase) cause contributed the least at 7%.

Most bushfire were said to be triggered naturally such as through lightning strikes contributed 17% of the causes of deforestation. However, it can also be caused by human when fires used in the farms spread into the forest or when hunters burn the bush for hunting wild animals such as rats and other mammals. Incendiary fires also sometimes caused by careless human behaviour such as through indiscriminate burning of household rubbish or discarding cigarette butts into the forest resulting in uncontrolled forest fire. Thus deforestation can be totally caused by man in Kurmi LGA.

The main causes of deforestation are similar to those in other parts of Nigeria and in many countries especially in rural and semi-rural areas [19]. Deforestation from 1968-78 in 39 countries in Africa, Latin America, and Asia is significantly related to the rate of population growth and to fuelwood production and wood exports in 1968; it is indirectly related to agricultural expansion and not related to the growth of per capita GNP. Results indicate that in the short term, deforestation is due to population growth and agricultural expansion, aggravated over the long term by wood harvesting for fuel and export [20].

3.3. Effects of Deforestation

As stated above, many of the local communities depend on the forests for fulfilling various needs for survival and to sustain their lives. These activities especially those that were undertaken more intensely and beyond what the forest can replenished, had not only degraded the forests themselves but the surrounding environment and caused various adverse impacts to the communities that depend on the resources and services that the forests provide. Various aspects were investigated to understand how deforestation affect the environment and socio-economic cum well-being of the local communities in the area that depend on the surrounding forests. The results of this investigation based mainly on what the respondents had noticed through various tangible evidences indicating the adverse impacts of deforestations in the area are shown in Table 3.

Table 3
Adverse Impacts of Deforestation on Socio-economic and Environmental Aspects

Impacts of Deforestation	Percentage of respondents with respective response		
	Agree	Disagree	Not Sure
Socio-economic aspects			
Increased Household expenditures (to buy forest products)	86	7	7
Increased misery of people (due to decreased availability of forest product).	83	7	10
Decreased productivity in farm produce	73	27	0
Reduced Household income	67	27	6
Decreased social cohesion (increased quarrelling/conflict among villagers)	53	33	14
Environmental aspects			
Increased gullies/soil erosion	97	0	3
Increased natural disaster (landslides/flood)	100	0	0
Decreased plants and wild animals	93	0	7
Increased in the atmospheric temperature	70	0	30

Source: Field Survey, 2012

3.3.1 Socio-economic aspects

As stated earlier, most communities in the study area use forest in various purposes. The products and services obtained from these activities contributed directly to communities' well-being. On the other hand, the adverse impacts of deforestation were manifested in various socio-economic parameters with five of the common ones shown in Table 3. These impacts are inter-related to each other. Increased in household expenditures or cost of living top the list as the community had to buy those forest resources they need; about 86% of the respondent had to buy their daily requirements of fuel wood, fodder and small timber from somewhere and costlier as they are becoming more scarce. Reduced productivity of crops were felt by growers due to loss of important growth and production nutrients with increased sedimentation by deforestation thus reduced household income. All these socio-economic adverse impacts consequently increased hardships/ misery to them and lead to decreased social cohesion among them.

Although only 7% of the respondents recorded population increase as being the least among the five causes of deforestation (Fig. 2), the impacts could be substantial. Initially, all villages were located inside the government-owned forest, but deforestation over the years through increased population and thus demand for arable land, made most (76%) of the respondents were living beyond 1 km from the nearest forest while 14% and 10% within the 1km and 0.5km away. Most (76%) who were living beyond 1 km from the nearest forest stated that their homes were initially nearby the forests, and then complained that encroachment and deforestation through the years with increased population had caused their settlements to be "moved" further away from the forest with time. Those 24% who were living within the 1km from the edge of the forest also lamented that the distance from their homes to the forest will also face the same fate. Increasing distance of their homes from the forest means increasing time to travel to the forest which consequently give them more hardships in collecting forest resources. The hardships may make then buy forest resources as they will be more reluctant to collect the resources themselves. The price of the resources also will be increased with distant from the forest and their scarcity as the forest are reduced.

Those that hunt for wild meat (51% as shown in Fig. 2) were the single most adversely affected by deforestation as it decreased the size and suitable habitats for the fauna apart from scaring them away animals to further away area making hunting a more difficult venture. Many among them said that the commonly hunted animals could not even be seen as a result of deforestation. About 10% of the respondents were of the opinion that deforestation have affected farming in the area as the soil were not as productive due to reasons mentioned above and the animals from the forest eat their crops such as the herbivores eating their vegetables and other leaves while rats and squirrels ate their cassava roots and corns.

3.3.2 Environmental aspects

Deforestation can cause various impacts on the environment depending on the existing environmental condition of the area in question. As one travels within Kurmi LGA, he/she will not fail to notice the various adverse environmental impacts of deforestation in the area apart from the unbearable ambient high temperature coupled with high humidity in the general area as gullies were found in various cleared areas with sediments downhill. Survey obtained from the respondents regarding their opinions on the impacts of deforestation were later grouped into four (Table 3). All respondents agreed that natural disasters such as floods, landslides and debris flow were enhanced by deforestation with 97% witnessed that it contributed to erosion and the formation of gullies. This is so when the vegetation was removed, more rain will fall directly onto the soil triggering erosion.

The magnitude of impacts increased as the soil cover getting less with time and when tree roots die and decay, not only leading to soil erosion but formation of gullies in the landscape. In lowlying areas, flooding is a common event yearly caused by sediments from the gullies and debris flow brought about by heavy downpour.

Increased in ambient temperature was the least impacts registered as they were more aware of the conditions like those above which they can witnessed through their eyes. Increased in temperature can be relative and can be a condition that one's body can condition and adapt to with frequent and prolonged exposure so that they were not aware of the difference especially along the period. Nonetheless, the percentage of respondents who mentioned that there is an increased air temperature were still high at 70%.

3.3.2.1 Wildlife (flora and fauna)

According the respondents, in the past, the forest around Kurmi LGA provides habitat for a range of wildlife animals, and that deforestation had affected their presence and numbers. Indeed, as shown in Table 4 below, a majority of the respondents (93%) were of the opinion that deforestation reduced the availability of the forest products derived from plants and wild life animals. This is so as deforestation decreases the size of the forest, many plants/trees will be cut and collected along with their resources making them to become rarer with time. Meanwhile, suitable habitats of the fauna/animals were getting less so that animals will move to other habitats to continue their survival.

Table 4
Effects of Deforestation on Flora and Fauna

Species affected	Respondents	
	Number	Percent
Flora (Trees) species		
Mahogany (*Khaya* spp)	70	23
Iroko(*Milicia excelsa*)	69	23
Sapele (*Entandrophragma cylindricum*)	60	20
Afra (*Nectophryne afra*)	40	13
Locust bean (*Parkia baglodosa*)	31	10
Neem tree (*Azadirachta indica*)	20	7
Date palm (*Phoenix dactylifera*)	10	3
Fauna (Animal) species		
Lion (*Panthera leo* spp)	92	31
Tiger (*Panthera tigris*)	68	23
Elephant (*Loxodonta africana*)	43	14
Antelope (*Antilocapra americana*)	40	13
Hippopotamus (*Hippopotamus amphibius*)	37	12
Buffalo (*Bubalus bubalis*)	20	7

Source: Field Survey, 2012

As mentioned earlier, locals cut various types of vegetation as long as they can be used as fuel for fire and other purposes such as support. Among the more commonly species cut in Kurmi LG are shown in Table 4 which were coincidently consisting major timber/wood in Taraba state as a whole. Mahogany which consisted 23.3% was the most, followed closely by Iroko (23%) and Sapele wood (20%). The least were Date palms with 3% only; probably on the account that they are grown mainly to produce valuable fruits and that their dead fronds can also be used for firewood [20]. Thus, only the diseased and the overmatured ones were cut for this purpose.

Among the six animals commonly affected, lion top the list with 31% respondents, followed by tiger and elephant respectively as distant second and third (Table 4). This table shows that the first five animals affected by deforestation were wild which require large forest habitats. This result agrees with those obtained in the preceding section which shows that some animals that were used to be encountered or caught before in the forest area no longer seen in the study area which deforestation may be blamed as being the main factor adversely affecting their population and distribution [21].

Based on the above information, if nothing is done in the near future to control the effects of deforestation in the environment, it will be most likely that existing adverse impacts on the environment will be worsen and too costly to repair and rehabilitate while some of the above floral and faunal species will go extinct [21,22].

3.3.3 Opinions on rate of deforestation

When asked on deforestation situation using number of trees cut annually from the forest as indicators, about 91% stated that it was expanding at moderate to high rate (Fig. 3). This indicated that they were not only aware of the deforestation in the area but were also concerned, which somehow supported the claim that 36% who stated that these two factors were among the main causes of deforestation. Unfortunately, as individuals most of them felt hopeless not knowing what to do to effectively control it.

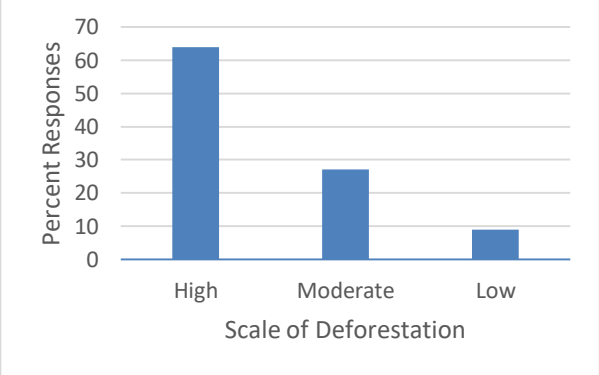

Fig. 3. Opinions on the scale of deforestation
Notes: High (More than 200 trees being cut annually)
Moderate (About 100 trees being cut annually)
Low (Less than 100 trees being cut annually)

3.3.5 Efforts towards controlling deforestation

As mentioned above almost all causes of deforestation were man-related, and thus responsible for the adverse impacts of their actions. The respondents individually stated that they were at a loss in controlling it to a level where the forest can recover in a year or two although they were aware of the deforestation and concerned on its adverse impacts. In fact, Odebiyi *et al*., [23] reported 79.3% of the respondents interviewed had a positive attitude towards conservation on Gashaka Gumti National Park. In the present study, responses on the role played by different stakeholders toward controlling deforestation and facilitating reforestation as well as enhancing the degraded forests were varied (Table 5).

Agbogidi *et al*., [24] stated earlier that Local communities have mutual relationship with forests and Odebiyi *et al*., [23] stated that they could be partners in various forest development efforts. In

this study, settlers individually had undertaken some activities either indirectly or directly towards this noble deeds with 44% of the respondents stated that they planted food crops like guava, palm trees, mangoes, plantain, banana and orange in their backyard, and that 42% try to avoid indiscriminate cutting down trees in the forests. Also substantial number of the community participated in awareness campaign (45%), establishment of plantations (34%) and practicing agro-forestry in their lands (19%), which can be considered commendable as these are positive signs toward reducing deforestation and improving forest growth. The 11% of the respondents who stated that the community also played in forestry law enforcement, however, did not really indicate the details of their involvement in this aspect.

The NGOs were said to be instrumental (54%) in providing free seeds/seedlings of fruit trees to the settlers to be planted in their backyards and patches of land. They were also said to have played a substantial role in campaigns (41%) towards solving issues related to deforestation with 24% of the respondents stated that the NGOs gave encouragement to settlers to mix trees with other crops especially food crops (practice agroforestry) in their farms while 11% helped on reforestation-related training.

The respondents noticed that the major role of Kurmi LGA as enforcement of forestry law (56%) including controlling deforestation followed by training on various aspects of reforestation and agroforestry as well as providing better livelihood through employing qualified individuals (42%). They were also seen in awareness campaigns (31%) and provision of free seedlings (27%).

Table 5
Responses on the activities/role of the different stakeholders on efforts/ initiatives towards forest conservation, controlling deforestation, and enhancement of existing forests

Efforts/ initiatives towards forest conservation, controlling deforestation, and enhancement of existing forests	Percentage of respondents with respective response by each type of stakeholders														
	Individual			Community			Non-Governmental Organization			Local Government Authority			State/Federal Government (SFG)		
	Yes	No	Not sure	Yes	No	Not sure	Yes	No	Not sure	Yes	No	Not sure	Yes	No	Not sure
Most houses plant trees in their yard	44	56	0	-	-	-	-	-	-	-	-	-	-	-	-
Most people are now trying to avoid indiscriminate cutting down of trees	42	58	0	-	-	-	-	-	-	-	-	-	-	-	-
Provision of free seedling	-	-	-	4	96	0	**54**	23	23	27	43	30	34	30	36
Practice of agro-forest conservation	-	-	-	19	81	0	24	55	21	24	50	26	**51**	25	24
Establishment of plantations	-	-	-	**34**	66	0	0	100	0	0	100	0	9	91	0
Campaigns	-	-	-	**45**	55	0	41	35	24	31	66	3	35	54	11
Enforcement of forest laws (task force)	-	-	-	11	36	53	0	100	0	**56**	44	0	40	60	0
Employment/training	-	-	-	-	-	-	11	66	23	**42**	31	27	33	24	43

Source: Field survey 2012

The State/Federal Government (SFG) were said to be similar to the LGA in their involvement/role with leading role in agroforestry while supporting LGA in enforcement of the forestry law and employment/ training. It also assisted the NGOs in supply of seedlings and community in establishment of plantations.

With serious implementation of the forestry laws on resources harvesting including lumbering, and continuation of the practices of the above each groups, as well as prudent implementation of the public administration [18,25,26] not only will deforestation in Kurmi LGA be controlled to a manageable level to where the forest can replenish itself but collection of the forest resources will be more sustainable, reforestation in clearcut areas and degraded forests will bring the forests into their natural state again.

4. Conclusions and Recommendations

Deforestation in Kurmi Local Government Area (LGA), Taraba State is higher than the national average. This is so as majority of the settlers were poor farmers and living off the surrounding forests for subsistence living and/ or cutting down trees to sale for lumber and fuelwood apart from farming. While the forests had provided them with basic needs to survive and income for some, they stated that deforestation caused had also resulted in some socio-economic hardships through increased costs of forest resources for basic daily needs as they are lesser and increased in time for gathering them. Consequently, the increased in their household expenditures had decreased in the household income for a majority (67%) of them. They also stated that deforestation also had caused inconveniences through more frequent and higher magnitude of floods during wet seasons and warmer ambient temperatures during dry seasons. Their hardships also had been manifested in the lower crop production because of more prevalent soil erosion which decreased soil fertility. The losses of forests which are habitats for animals through deforestation had decreased in number and species of animals and plants. Consequently, causing scarcity in wild meat and plant resources

The respondents were aware of the deforestation in the area and concerned on its adverse impacts, but they were at a loss in controlling it. Various efforts/ initiatives were being made in the area towards controlling deforestation and facilitating reforestation as well as enhancing the degraded forests by the different stakeholders but still could not slowdown the deforestation.

To further enhance the efforts by the different stakeholders towards solving deforestation, the following suggestions were made:

- Nigeria's forestry laws and policy instruments especially those related to deforestation-reforestation and sustainable forest management, their effectiveness for the states such as Taraba State to comply and implement need to be relook. Any weaknesses should be amended for effective implementation and enforcement. They should also be flexible to enable states and localities to modify to suit local prevailing conditions and changes with time, as well as be easily implemented by Kurmi LGA, while not forgetting its commitments to international conventions such as Convention on biodiversity conservation (CBD),
- If resources such as funds, facilities and man-power are the constraints, every effort should be made that they are available and adequate for the authorities to undertake their tasks,
- Programs and activities undertaken by any stakeholders in enhancing socio-economic wellbeing and reforestation should be encouraged. Facilities and resources should also be made available to support these noble deeds.

Because the study was only undertaken in a short period and covered a small percentage of the settlers in the area as well as too few environmental parameters, a longer-term study should be undertaken on socio-economic parameters such as household income and changes in population along with rate/ extent of deforestation with time, information on environment such as history (occurrence and magnitude) of flood, soil erosion, formation of gullies, and trend of atmospheric temperature to give a clearer picture on their relationships and to cover various seasons of the year will enable better data on the adverse impacts of deforestation on the environment.

Acknowledgement
Funding for the study was supported by The Department of Hospitality Management and Tourism, Faculty of Agriculture and Life Sciences, Federal University Wukari, Taraba State Nigeria. Various data on the forestry, demographic and socio-economic of Taraba State and Kurmi LGA were provided by Ministry of Environment (Forestry), Nigeria.

References

[1] Food and Agricultural Organisation (FAO). (2006). "Global Forests Resources Assessment: Progress towards Sustainable Forests Management." Rome: FAO.
[2] Kricher, J. (1997). A Neotropical Companion. (Princeton: Princeton University Press).
[3] A. Bradford. (2018). Deforestation: Facts, Causes & Effects. https://www.livescience.com/27692-deforestation.html. Accessed on 24 January, 2019.
[4] Nilsson, Sten. "Do we have enough forests?." In *IUFRO*, vol. 5. IUFRO, 1996.
[5] Food and Agriculture Organization (FAO) (2010). Global Forest Resources Assessment (2010). Food and Agriculture Organization of the United Nations, Rome, 2010.
[6] Robert, S. (2007). *Tropical Deforestation*. http//earthobservatory.nasa. gov/library/deforestation. Accessed 15 January 2019.
[7] Food and Agricultural Organisation (FAO). (1995*). Forest Resources Assessment 1990: Global Synthesis*. FAO Forestry Paper 12. (Rome: FAO)
[8] Center for International Forestry Research. 2005. Contributing to Africa's Development Through Forests: Strategy for Engagement in sub-Saharan Africa. Bogor Barat 16680, Indonesia
[9] FAO. 2007. *State of the World's Forest 2007*. Rome, Food and Agriculture Organisation.
[10] Ibrahim, Kamal Mohammed, and Sulaiman Inuwa Muhammad. "A review of afforestation efforts in Nigeria." *International Journal of Advanced Research in Engineering and Applied Sciences* 4, no. 12 (2015): 24-37.
[11]Adekunle, V. A. J., A. O. Olagoke, and L. F. Ogundare. "Timber exploitation rate in tropical rainforest ecosystem of southwest nigeria and its implications on sustainable forest management." *Applied Ecology and Environmental Research*11, no. 1 (2013): 123-136.
[12] Taraba State Bureau for Land and Survey. (2012). Land-use and maps of Kurmi and Taraba State, Nigeria.
[13] Okeke, C. 2018. Nigeria:Is Nigeria Losing War Against Deforestation? 27 August 2018. https://allafrica.com/stories/201808270252.html. Accessed on 25 January, 2019.
[14] Taraba State Ministry of Agriculture. (2008). Information on Agricultural Activities in Taraba State. Annual Report.
[15] National Population Commission. (2006). Population and Housing Census: Class Size of Household. Abuja, Nigeria.
[16] Kothari, Chakravanti Rajagopalachari. *Research methodology: Methods and techniques*. New Age International, 2004.
[17] Buba, U., C. Akosim, W. B. Barau, D. L. David, E. P. Danba, B. T. Kwaga, E. A. Shitta, and P. P. Vanaruwa. "An investigation of threat types to the conservation of Pan troglodytes ellioti at Kwano forest of Gashaka-Gumti national park, Nigeria." *Journal of Research in Forestry, Wildlife and Environment* 8, no. 3 (2016): 62-72.
[18] Ogunwale, A. O. "Deforestation and greening the Nigerian environment." (2015): 212-219.
[19] Allen, Julia C., and Douglas F. Barnes. "The causes of deforestation in developing countries." *Annals of the association of American Geographers* 75, no. 2 (1985): 163-184.
[20] Sulaiman, S. A., H. S. Bamufleh, S. N. A. Tamili, M. Inayat, and M. Yasin Naz. "Characterization of date palm fronds as a fuel for energy production." *Bulletin of the Chemical Society of Ethiopia* 30, no. 3 (2016): 465-472.
[21] Mfon, P., O. A. Akintoye, G. Mfon, T. Olorundami, S. U. Ukata, and T. A. Akintoye. "Challenges of Deforestation in Nigeria and the Millenium Development Goals." *International Journal of Environment and Bioenergy* 9, no. 2 (2014): 76-94.

[22] Ocholi, I. U., O. Idoko, and A. Ogidiolu. "Human Induced Change Characteristics of Selected Vegetation Variables in Parts of Kogi East, Nigeria."
[23] Odebiyi, B. R., S. M. Ayeni, M. O. Umunna, and J. J. Johnson. "Communitiesattitudes towards conservation in Gashakagumti National Park Nigeria." *Journal of Research in Forestry, Wildlife and Environment* 7, no. 2 (2015): 67-80.
[24] Agbogidi, O. M., A. U. Ofuoku, and D. E. Dolor. "Role of community Forestry in sustainable forest Management and Development: a Review." *ASSET: An International Journal (Series A)}* 7, no. 1 (2010): 44-54.
[25] Mutisya, Josphat Safari. "Administrative Impact Of Restructured Provincial Administration On Selected Aspects Of Maintenance Of Law And Order In Kenya In 2010-2014: A Case Study Of Bomet County." PhD diss., 2017.
[26] Ogeundele, O. T., Oladipo, M. O. and Adebisi, O. M. (2016). Deforestation in Nigeria: The Need for Urgent Mitigating Measures. IIARD International Journal of Geography and Environmental Management. 2(1):15-26.