

ASSESSMENT OF DEFORESTATION IN MASHEGU LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA: CAUSES, EFFECTS AND REDUCTION STRATEGIES

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ABSTRACT

The study assessed the causes, effects as well as providing strategies for reducing deforestation in Mashegu Local Government Area, Niger State, Nigeria. Simple random sampling technique was employed in the study; 5 wards out of the 10 available in the Local Government Area were randomly selected. A total of 150 copies of questionnaire were randomly administered with 30 respondents selected in each ward. Out of the 150 respondents, 16 respondents were discountenanced, leaving a total of 134 sampled respondents. Data were analyzed using descriptive statistics such as frequencies and percentages while tables and chart were used to present the results. The results revealed that majority (71%) of the respondents were males, while the rest were females. Majority of the respondents were between the productive ages of 30-49 years representing 72% while age 50 and above accounted for only 11%. In terms of education, 86% of the respondents attained both primary and secondary school education while 4% had no formal education. Farming (31%) is the major cause of deforestation in the study area while mining recorded only 1%. The major effect of deforestation in the study area is soil erosion (29%), closely followed by high temperature (19%) and other environmental hazards accounted for only 2%. The best strategy for reducing deforestation in the study area as suggested by the respondents is through afforestation and reforestation with a response of 48%. The study would enable forestry policy makers, other stakeholders and even farmers in the study area to be better informed about the implications of deforestation and seek innovative means and ways to combat its menace.

Key words: farming, soil erosion, afforestation, reforestation

INTRODUCTION

Forests play a vital role in the environment and for people, like providing the basic necessities such as habitat for a variety of wildlife species, contributing to the control and moderate climate, preventing soil erosion and flooding, providing timber and fuelwood, providing wild foods (such as wild meat, edible insects, edible plant products, mushrooms and fish) and medicine, etc. (FAO, 2010). Despite the benefits obtained from forests, deforestation has contributed to continued decline of forest resources. Deforestation is the total removal of the forest or the cutting down of trees and other forms of vegetation cover from a particular site without any form of replacement (Aina and Salau, 1992; Anijah-Obi, 2001).

There is growing concern over shrinking areas of forests in the recent times (Barracough and Ghimire, 2000). According to FAO (2000), tropical forest covers 814 million ha in Africa, 168 million ha in Asia and the Pacific, and 536 million ha in Latin America. However, only 25 million ha are exploited in a sustainable way and 11 million ha of tropical forests are conserved with an effective political protection. All the tropical humid forests in Africa suffer from a massive deforestation (Soury, 2007). Loss of biodiversity of tropical forests is mainly due to degradation and destruction

of habitat by anthropogenic activities. Currently, deforestation is a global problem (Sukumaran and Jeeva, 2008) because the annual rate of global deforestation is about 13 million hectares, most of which occurs in developing world. Forest loss in Africa is particularly troubling, however, two-thirds of the continent's population depends on forest resources for income and food and 90% of Africans use fuel wood and charcoal as sources of energy (FAO, 2010). Despite the dependence on forest resources and non-timber forest products, deforestation in Africa is estimated at about 3.4 million hectares/year (FAO, 2010).

Nigeria has one of the highest rates of deforestation of primary forests where more than 50% of such forests have been lost in the past (Mfon *et al.*, 2014; Oyetunji *et al.*, 2020). Several reasons contribute for deforestation in Nigeria and all over the world, according to Bamba *et al.* (2011). Deforestation is usually caused by agricultural practices, timber exploitation, charcoal production and firewood consumption. Ojo *et al.* (2018) and Halidu *et al.* (2020) listed farming, logging, charcoal production, firewood collection, Grazing, urbanization as the causes of deforestation in their studies. Several effects of deforestation in Nigeria have been highlighted in various studies

which include global warming, loss of biodiversity, soil erosion, desertification, watershed deterioration (Olagunju, 2015; Ojo *et al.*, 2018; Halidu *et al.*, 2020). The rate of deforestation in Nigeria needs to be reduced. Some of the strategies identified are community education, adoption of agroforestry practices, provision of alternative source of energy, afforestation and reforestation programme, etc. (Ganiyu and Mbalisi, 2015, Halidu *et al.*, 2020).

In the study area, forest has been cleared for logging, timber export, agriculture and notably the collection of wood for fuel, and this remains problematic in the area. As a result of deforestation in the study area, soil erosion and excessive heat are experienced by the community. This has a very serious economic and health implication to the people. Therefore, to assess the causes and effects of deforestation as well as providing strategies in reducing it in Mashegu Local Government area of Niger State, Nigeria, there was need to carry out this study. This would enable forestry policy makers, other stakeholders and even farmers in the study area to be better informed about the implications of deforestation and seek innovative means and ways to combat its menace.

MATERIALS AND METHODS

Study Area

The study was conducted in Mashegu Local Government Area (LGA). The study area is one of the 25 LGAs of Niger State, Nigeria. The LGA is located in the eastern part of Niger State in northern Nigeria. Mashegu is bounded by the Niger River in the west and Kaduna River in the northeast. It lies between latitude 9° 57' N and longitude 5° 13' E with Mashegu town being the headquarters of the LGA, covering 10 wards. It covers a land area of about 9,182 sq. km (Ayodeji *et al.*, 2014). The study area as well as other parts of Niger State has distinct dry and wet seasons with annual rainfall varying from 1,100 mm to 1,600 mm. The temperature varies between 21°C to 37°C while the rainy season lasts for about 150 days (Ibrahim *et al.*, 2019). The main occupation of the people in the study area is farming while the major crops grown are yam, rice, cowpea, sorghum, maize, groundnut, tomato and sweet potatoes, amongst others (Ayodeji *et al.*, 2014).

Sampling Techniques and Data Analysis

The data were generated from a structured questionnaire administered to the respondents in the study area. Simple random sampling technique was employed in the study. Five wards out of the 10 available in the LGA were randomly selected. The wards randomly selected were Mashegu, Ibbi, Manigi, Kwatachin, and Kulho wards. A total of 150 copies of questionnaire were randomly administered with 30 respondents selected in each ward. Out of the 150 respondents, 16 respondents were discountenanced, leaving a total of 134

sampled respondents. Variables which were analyzed include sex, age, educational status, marital status, causes of deforestation, effects of deforestation, etc. Data were analyzed using descriptive statistics such as frequencies and percentages while tables and chart were used to present the results.

RESULTS

Table 1 shows the demographic characteristics of the 134 respondents in the study area (Mashegu, Ibbi, Manigi, Kwatachin, and Kulho wards). It reveals that 71% of the respondents were male, while female made up 29% of the respondents. About 17% of the respondents were below 30 years while 28% were within the age group of 30-39 years. About 44% were within 40-49 years while 11% were 50 years and above. Majority of the respondents (63%) were married while 20% were single, 10% were widowed while 7% were separated. Only 4% had no formal education, 36% of the respondents attained primary school education, while 50% attained secondary education and 10% attained tertiary education. As regards occupation of the respondents in the study area, 30% were farmers, 22% fuel wood sellers (firewood and charcoal), 15% artisans, 11% traders, 15% civil servants and 7% hunting.

Figure 1 reveals the causes of deforestation in the study area. Farming had 31% which was the highest, fuelwood collection had 19%, logging 8%, urbanization had 13%, overgrazing had 9%, bush burning had 11%, overpopulation/poverty had 8%, and mining had 1% which was the least. Table 2 reveals the effects of deforestation in the study area. Soil erosion recorded the highest responses (29%) as the major effects of deforestation. High temperature had 19%, flooding had 14%, species extinction had 11%, health implication had 12%, desertification

Table 1: Characteristics of the respondents in the study area

Demography	Categories	Frequency	Percentage (%)
Sex	Male	95	71
	Female	39	29
	Total	134	100
Age (Years)	Below 30	23	17
	30-39	38	28
	40-49	59	44
	50 and above	14	11
	Total	134	100
Marital Status	Single	27	20
	Married	85	63
	Widowed	13	10
	Separated	09	07
	Total	134	100
Education	No Formal Education	06	04
	Primary Education	48	36
	Secondary Education	67	50
	Tertiary Education	13	10
	Total	134	100
Occupation	Farming	40	30
	Fuel wood collection	30	22
	Artisan	20	15
	Trader	15	11
	Civil servant	20	15
	Hunting	9	7
	Total	134	100

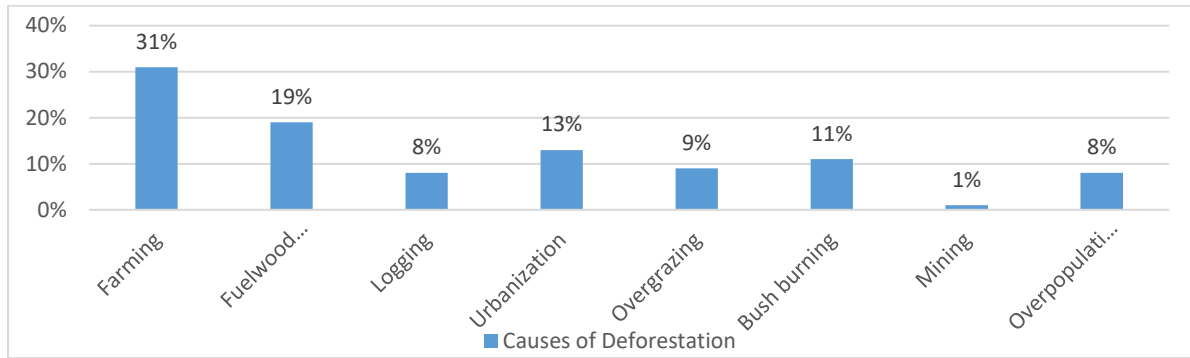


Figure 1: Causes of deforestation in the study area

Table 2: Effects of deforestation in the study area

Causes	Frequency (n = 134)	Percentage
High temperature	25	19
Soil erosion	39	29
Flooding	19	14
Extinction of species	15	11
Health implication	16	12
Desertification	17	13
Other environmental hazards	03	02
Total	134	100

had 13%, and other environmental hazard had 2% which was the least. Figure 2 shows the strategies for reducing deforestation in the area. Afforestation and reforestation had 48% which was the highest, public enlightenment had 28%, encouragement of agroforestry practice had 13%, enforcement of forest law and policy had 7%, and encouragement of alternative energy source had 4% which was the lowest.

DISCUSSION

The reason for high number of male respondents in the study area is due to the fact that males engage in jobs that involve physical strength such as farming, charcoal production, bakery, timber trade, sawmill operations, furniture making, mining, logging, herding etc. which are linked to deforestation in the study area. This is in agreement with Adeniji (2019) in his study of small-scale wood furniture industries in Borgu Local Government Area of Niger State, where all the furniture makers in his study area were male. As regards age of the respondents, the study revealed that most of the respondents were between the productive ages of 30-49 years representing 72% in total. This is very close to what was obtained by Aiyeloja et al. (2014), who revealed that 75.56% of wood furniture producers in Port Harcourt, Rivers State were between the productive ages of 31-50 years.

In terms of marital status, 63% of the respondents are married, the high profit margin in the activities involving deforestation may have been the motivational factor sustaining their households for years. In terms of education, only 4% had no formal education, 36% of the respondents attained primary school education, while 50% attained secondary education and 10% attained tertiary education. The high percentage (86%) of

respondents who attained both primary and secondary school education may be said to have contributed to the increase in deforestation in the study area, this is possible due to the low level of education attained by the majority of the respondents, as such awareness about the benefits of forests may be lacking as a result of low level of public enlightenment. In terms of occupation of the respondents, 30% were farmers, 22% fuel wood sellers (firewood and charcoal), 15% artisans, 11% traders, 15% civil servants and 7% hunting. The main occupation of the people in the study area is farming; crop farming, fish farming and livestock rearing are the major types of farming practiced. The major crops grown are yam, rice, cowpea, sorghum, maize, groundnut, tomato and sweet potatoes, amongst others (Ayodeji et al., 2014).

In the study area, survey revealed that farming (31%) is the major cause of deforestation. Considering the fact that, people in this part of the state engage in farming, therefore farm lands are cleared and prepared for cultivation. Only economic trees, such as mangoes, locust beans, shea butter trees etc., are usually left. After the soil has been cultivated for several years; it may become exhausted leading to a considerable decrease in number of tree (Abaje, 2007). This agrees with Halidu et al. (2020) who listed farming as the major causes of deforestation in their study. Several other studies including Geist and Lambin (2002), Bisong (2010), Oduntan et al. (2012), and FAO and UNEP (2020) also confirmed agriculture as the major drivers of deforestation. In addition, land preparation and farming methods in the study area include mechanized and manual, which removes the trees and in turn causes deforestation.

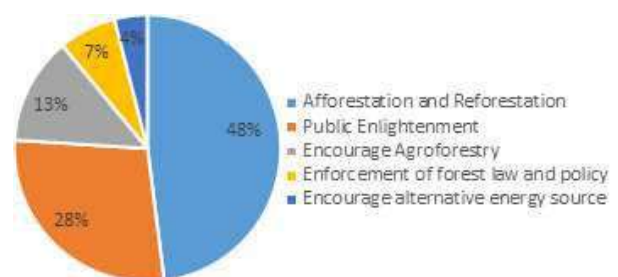


Figure 2: Strategies for reducing deforestation in the study area

Mechanized farming in the study area involves the use of motorized machines for commercial farming activities. These machines include all types of implements and devices for supplying of power on the farm such as plough, harrows, seeder and planter, cultivator and tractor. Tractor is the most important machinery because is the prime mover for all the implements (Aduayi and Ekong, 2011). Mechanization allows farmers to cultivate more lands which leads to deforestation in the study area (Daum *et al.*, 2020). Next to farming is fuel wood collection which scored 19%. Firewood mostly from forests has always been the major traditional source of energy for most rural dwellers in Niger State (Adeniji *et al.*, 2015). The felling of trees for fuel contributes immensely to deforestation, driven by poverty, desire for income and inability to afford alternative sources of energy such as kerosene and cooking gas (Buba *et al.*, 2017). Other causes of deforestation are urbanization, overpopulation/poverty, overgrazing, and bush burning.

The major effect of deforestation in the study area is soil erosion. With the loss of a protective vegetation cover, more soil is lost and causing silting of water courses, lakes and dams. Deforested areas become sources of surface water runoff, which moves much faster than subsurface flows. That quicker transport of surface water can translate into flash flooding causing destruction of life and properties (Yanez-Arancibia *et al.*, 2013). This agrees with the findings of Habtamu *et al.* (2017) that the most common effects of deforestation are soil erosion, loss of soil fertility, increase in temperature, loss of biodiversity, rainfall variability and water and fuel wood scarcity. This also agrees with the findings of Ojo *et al.* (2018) where they had 24.2% response as the effects of deforestation, a value that is quite close to the response gotten from this study (29%).

Next to soil erosion is high temperature which accounted for 19% response from the respondents, many people in the study area have the opinion that as a result of increase in the rate of deforestation, the surface is left exposed thereby leading to loss of micro-climate and increase in temperature (Liniger *et al.*, 2011). Deforestation promotes global warming which results from increased atmospheric concentrations of greenhouse gases (GHG) leading to a rise in the global mean temperature as the forests are the vital terrestrial sink of carbon. This is in line with the findings of Ojo *et al.* (2018) who noted that one of the most important ramifications of deforestation is its effect on the global atmosphere. Extinction of species is another effect of deforestation in the study area, according to Awe *et al.* (2020), most of the forest resources that communities live on are however becoming extinct or unavailable as a result of continuous and excessive exploitation without any attempt to re-plant them. If deforestation is not checked, with time, it may lead to extinction of species. Other effects of deforestation are flooding, desertification and health implications.

The best strategy for reducing deforestation in the study area as suggested by the respondents is through afforestation and reforestation with a response of 48% (Figure 2). From the personal interview conducted with the respondents, the afforestation and reforestation programme should include creation of more forest reserves, enrichment planting of the existing ones, plantation establishment, encouraging private forestry, replanting fallen trees, increasing the area of protected areas, increasing the area of trees outside forest and outside protected areas etc. This is in agreement with the findings of Ojo *et al.* (2018) who had 33% response for afforestation as one of the best strategies in reducing deforestation in Borgu Local Government of Niger State. They opined that increasing the area of forest plantations by using vacant or marginal lands and on land not ideal for agricultural production will be beneficial. Planting trees outside forest areas will reduce pressure on forests for timber, fodder and fuelwood demands.

Public enlightenment had 28% response in the study area as one of the strategies for reducing deforestation. This is in agreement with the findings of Ojo *et al.* (2018), they opined that when the communities have knowledge about the adverse effects of deforestation, the level of forest degradation would be reduced. Lack of public enlightenment about the effect of deforestation in the study area may partly be attributed to the fact that most of the respondents only attended primary and secondary school education and a few do not have formal education. As a result of this low level of education attained by many respondents, it is correct to say their level of awareness concerning forests and its benefits will be generally low. Halidu *et al.* (2020) also recommend public enlightenment of local communities as a way of reducing deforestation in their study. Therefore, public enlightenment about the effects of deforestation in the study area should be adopted as one of the strategies for reducing deforestation in Mashegu Local Government Area of Niger State.

CONCLUSION

The study revealed the causes and effects of deforestation in Mashegu Local Government Area of Niger State while providing strategies for reducing this menace. Farming activity was the major cause of deforestation in the area. Others were fuel wood collection, logging, urbanization, over-grazing, bush burning, overpopulation and poverty, and mining. The effects of deforestation in the area are soil erosion, flooding, high temperature, species extinction, threat to health, desertification, and other environmental hazards. The study would enable forestry policy makers, other stakeholders and even farmers in the area to be better informed about the implications of deforestation and seek innovative means and ways to combat its menace.

RECOMMENDATIONS

The following are recommendations from the study:

- Government should embark on massive afforestation and reforestation programme in the study area.
- The people in the community should be encouraged to practice agroforestry.
- Alternative source of energy should be provided for the community so as to reduce pressure on the forest.
- The people in the community should be sensitized and educated on the values of forests.

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