International Journal of Science, Environment and Technology, Vol. 3, No 2, 2014, 403 – 416
ISSN 2278-3687 (O)

IMPACTS OF DEFORESTATION ON SOCIO-ECONOMIC DEVELOPMENT OF AKWANGA NASARAWA STATE

[1]A. Aliyu, [2]M.A. Modibbo, [3]N.I. Medugu and [4]O. Ayo
[1,2]Department of Geoinformation
Universiti Teknologi Malaysia 81310, Johor Bahru, Malaysia
[3,4]Department of Geography, Faculty of Social Sciences, Nasarawa State University, Keffi
E-mails: [1]aminu.aliyu48@yahoo.com , [3]medugu@gmail.com , [4]ayo@yahoo.com

Abstract: Human activities, climate change coupled with rural poverty have led to increased deforestation in the rural areas of Nigeria. Given the low productivity of the soil in the tropics to which Nigeria belongs, the poor state of the farmers and subsistence nature of agriculture in Nigeria, green environment may be difficult to sustain. There is therefore the need to better understand the constraint and challenges of deforestation especially in the study areas of Nasarawa state. This paper seeks to assess the extent of the impacts of deforestation on socio-economic development of the study area and how the stakeholders will adopt environmentally friendly management options for forest resources. This study adopted the quantitative methodology including interviews with stakeholders using survey questionnaire. Five villages were randomly selected for inclusion in this study. The justification for the selection of the villages was based on the fact that they featured different forest management problems. Findings revealed that the knowledge base of the different stakeholders about technological dimensions of forest resources management is very low due to lack of awareness and low educational attainment. There is therefore the need to broaden stakeholders' initiatives to cope with contemporary challenges posed by deforestation in these villages
Keywords: Sustainable management; deforestation; stakeholders; socio-economic.

1. Introduction

Over the years, sustainable management of forest resources has been of primary concern due to its potential impact on biological diversity and importance in maintaining global ecological functions (Areola, 1987). In spite of its importance, the natural tropical high forest has continued to diminish rapidly in the African continent, thus dwindling sustainable forest management. Nigeria could face the possibility of timber and fuel wood scarcity towards the end of the century. It has been predicted that within the next fifty years, unless adequate measures are taken, most humid tropical forestland area in Africa could be transformed into unproductive land and the deterioration of the savannah into desert will be accelerated (Hunter et al, 2005; Kio,1990; Medugu, 2010).

*Received Jan 31, 2014 * Published April 2, 2014 * www.ijset.net*

The level of community nutrition is sometimes linked to fuel wood availability and cost, majority of the people residing on the African continent use fuel wood as their main source of energy for cooking. In many areas, due to increasing population the existing wood resources are over exploited. It is claimed that there are now places in the Sahel region where fuel wood has become so expensive that it absorbs about half the monthly budget of some poor families in urban areas. Some families could only afford one meal per day as a result of high cost of fuel wood and other alternative sources of energy for cooking (Enabor, 1981; Bowling, 2000; Mizra, 2003).

With extensive deforestation, villagers are compelled to walk long distance to fetch fuel wood and eventually tempted to substitute dried animal dung and crop residues for fuel wood. This tends to have serious consequences for local agricultural production and productivity because; the rural communities also rely on this substituted resource for improving soil fertility. Apart from the deterioration in the quality of life associated with forest degradation, there are other more insidious effects that endanger the future of humans on this planet. Nearly 500 million people around the world depend on forest for their livelihood; among them are a high number of forest and wood workers (Munich, 2010; Bowling, 2000). Therefore, sustainable forestry management must include safe, stable jobs with adequate wages and working conditions (Krausmann and Mushtaq, 2008).

In Nigeria, environmental problems that are termed degradation collectively, such as desert encroachment, erosion, flooding and drought etc all have a strong link with deforestation. In Nasarawa state for instance, escalated soil erosion, flooding, increase in aridity, all of which have strong relationship with deforestation, have affected a significant proportion of the state. Academia, scholars and researchers are of the opinion that deforestation risk reduction is a systematic approach of identifying, addressing, and reducing the risks of disaster to a community (Dong et al, 2009; Chowdhury 2003; Andrade and Scarpati, 2007). Generally, deforestation is caused by a variety of factors (Alexander 1993; Burton et al 1978; Jonkman and Kelman, 2005; Fendler 2008; Zhang et al 2008). However, (Ajibade, 2002; Wards 1978) viewed deforestation as clearing of any area of its natural vegetation cover which is normally lead to decrease in plants population resulting in loss of plant biodiversity Nonetheless, excessive deforestation over a long period has been the cause of many drought like features (Atta-ur-Rahman and Amir 2011; Hunter et al 2005; Ali 2007; Adebayo 2010; Osemeobo, 1993). Deforestation presents multiple environmental problems in our society today. The present and long term effects of human activities such as logging, bush burning and land

clearance for construction are factors that contribute to deforestation which are almost certain to jeopardize our lives on earth. As a result of the exploding population the rate of deforestation in Akwanga is becoming quite alarming, fertile agricultural land is gradually being taken over by unfertile land due to increase in aridity caused by deforestation thereby resulting in the decline of the productivity of the land. Strong hazardous wind that destroy and damage building roofs and growing plants, which for long had been occasional, is gradually becoming a yearly phenomenon. Also, the problem of flooding which cannot be said to be a new problem has taken on a more dominating dimension due to the growth of urban population and the rapid increase in agricultural practices

2. The study area

Akwanga lies between latitude 8^0 55'N, longitude 8^0 23'E and covers an area an area of 996 km^2. The town is located in central Nigeria and the vegetation of the study area can be classified as park Savannah with scattered trees and grasses. The area is situated on a gentle undulating slope on the platform that is plain. The average elevation of Akwanga is 290m above sea level. The soil of the area is derived from basement complex rocks. These soils are weakly developed and non-leached ferruginous tropical soil of alluvial origin (FAO, 1993). The climate as weather report reveals that the highest temperature in Akwanga occurs in the dry season between January and April. During this period, maximum temperature within the area ranges between 30^0 -33^0 C. The temperature drops during the rainy season to its lowest level in August that is about 20^0C. The rainfall is moderate with annual total ranging approximately between 1,100 to 1,650 millimeters with about 60% of the annual rainfall during the months of June to September.

Akwanga is composed of many ethnic groups in high proportion with their cultural backgrounds coming into play in various aspects of human endeavor, environmental conservation being one of them. It has a population of 113,430 people (NPC, 2006) and made up of diverse ethnic groups principal among which are the Mada, Eggon, Rindre and Kantana, as well as settler groups like Hausa, Fulani, Igbo and Yoruba among others. Figure 1 and 2 below shows map Akwanga town the study area and map of Nasarawa state showing Akwanga local government area respectively.

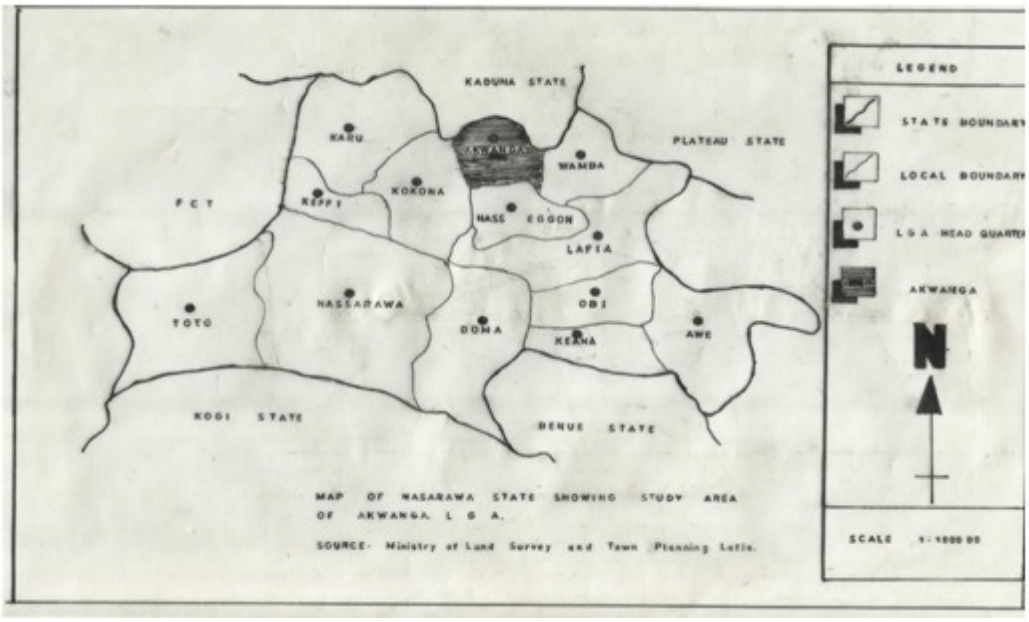

Figure 1.1: Map of Nasarawa state showing Akwanga local government council

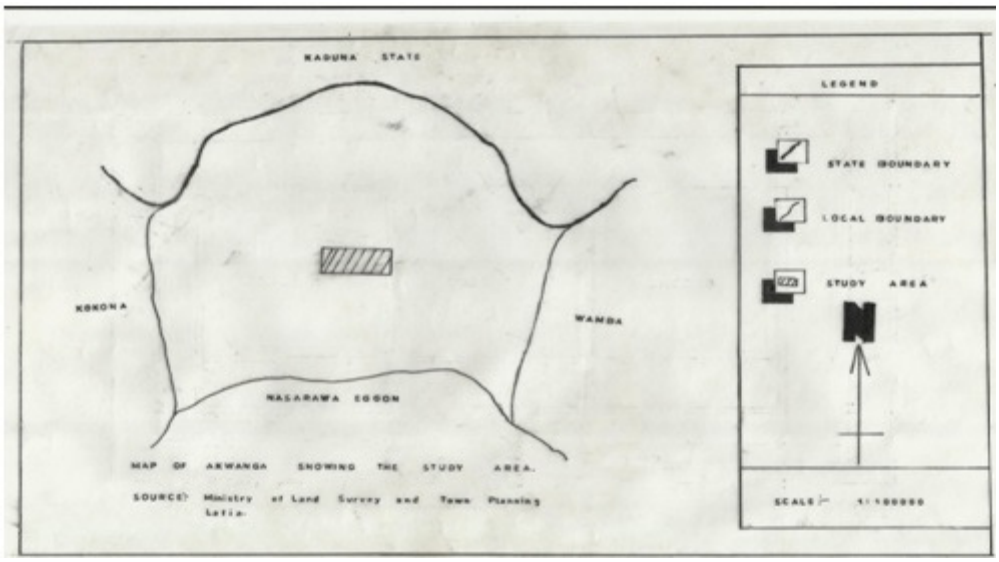

Figure 1.2: Map of Akwanga showing the study area

3. Materials and methods

The data for this study was generated from field survey conducted in the area and relevant literature on the subject matter through the administration of questionnaire. A total of 100 questionnaires were randomly administered with 20 respondent selected from in each village. For the questionnaire administration, checklist was used, and designed with the type of questions that are relevant to the study objectives. These villages include Buku, Gwanje

Andaha, Moro and Nunku in Akwanga Local Government Area of Nasarawa state. Two types of questions pattern were used; these are the structured and semi-structured. Responses were coded and analyzed using Microsoft excel package where frequencies and percentages were derived and the results were presented using tables, bar graphs and pie charts. These methods of analysis were selected to enable the phenomenon to be assessed without difficulty and to provide basis for the assessment of the problem.

The raw information were tabulated and subjected to descriptive statistical analysis to assess the impacts of deforestation on socio-economic development in the study sites thereby drawing inferences from the observed frequencies. The questionnaire covered basic information of respondents profile such as age, educational level, occupation, income among others. Other questions raised include primary source of energy for cooking, nature of the impact of deforestation, method of grazing, impact of tree felling, change in the density of trees, effects of deforestation on socio-economic development of Akwanga Local Government Area etc. While the secondary data source involved the search into published and unpublished materials relevant to the subject matter.

4.0 Results and Discussion

4.1 Basic Information

It was deemed necessary to generate information on the profile of respondent to reveal some basic information on their socio-economic activities and how they will cope with the management strategies. Thus, information on age, educational attainment, occupational characteristics and level of income were solicited from the respondents in the selected villages. Survey results indicated that the bulk of respondent are within the age bracket of 41 to 60 years and this constitute 46% and the least falls within the age bracket of 18 to 20 being the active age mostly school age group. The respondent that falls within the age group of 41 to 60 are mostly adult and farmers that are engaged in one form of tree felling or the other. This implies that the age distribution for the respondents were not even. Figure 1.3 shows the age distribution of respondents.

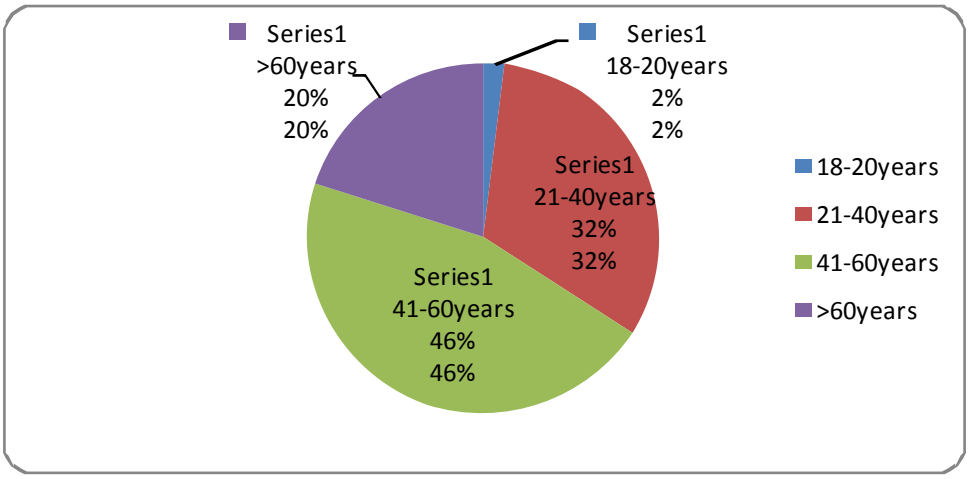

Figure 1.3: Age distribution of respondents

On the educational attainment, survey responserevealed that 58% of the respondents have no formal education, 20% of the respondents attended primary education 13% high school while 9% had bachelor's degree and above. The overall scenarioreveals that 58% of the respondents are illiterates and lack the basic knowledge of modern farming practices. Those that are somehow educated have taken up white collar jobs in bigger cities. Those residing in the villages are farmers who have little or no knowledge of the effects of deforestation on the socio-economic development of the study area, thereby engaging themselves in indiscriminate felling of trees for survival and without any thought of replacing them due to lack of awareness. Figure 1.4 provides the educational attainment of respondents

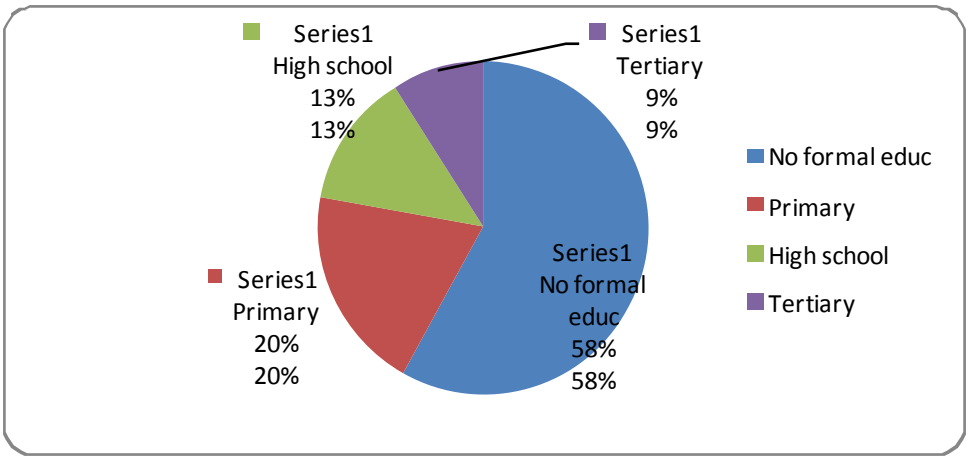

Figure 1.4: Educational attainment of the respondents

The response on occupational characteristics revealed that 47% of the respondents are farmers (cultivators and grazers), 38% sell wood for fuel while the remaining 15% are in

other occupational sector. This shows that the major occupation of the inhabitants is agriculture (farming) and fuel wood trade this is due to their low level of education, most of the respondents are subsistence farmers crowing crops such as maize, groundnuts, cassava, sorghum amongst others; no cash crops are being grown by the respondents. This practice requires clearing of large tracks of arable land that leads to deforestation due to increased demand arising from population increase. Occupation of the respondents is taken into consideration in order to ascertain how their occupation influences deforestation in the study area.The study has shown that due to the low level of education of the respondents they are oblivious to the fact that deforestation affects the socio-economic development of Akwanga Local Government Area through their unhealthy agricultural practices, the effects of these practices includes the destruction of biodiversity leading to the decline in agricultural productivity and thereby slowing the socio-economic development of Akwanga, this can easily lead to hunger, starvation and famine if not quickly checked. Figure 1.5 shows the occupational characteristics of the respondents.

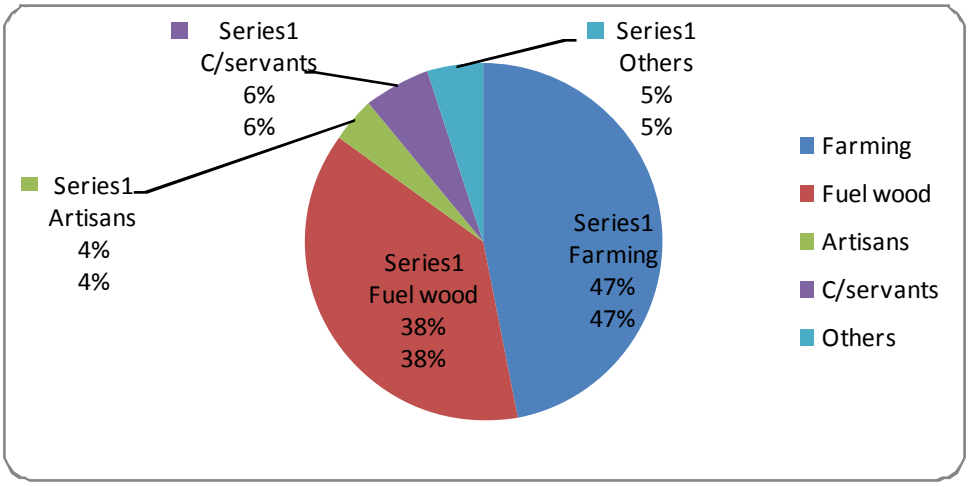

Figure 1.5: Occupation of characteristics of respondents

The figure below shows the level and nature of impact of deforestation on the study area. Majority of the respondents believe that the impact of deforestation is severe, the impact of deforestation include the loss of biodiversity plants and animals, erosion and the distortion of the hydrological circle. All these can lead to the reduction of crop yield since most of the respondents are subsistence farmers thereby affecting their socio-economic development.

4.2Primary source of energy for cooking

Figure 1.6below reveals that fuel wood constitutes the bulk of primary source of energy for cooking which is closely followed by charcoal a product from fell trees. This therefore, implies that the major source of energy consumed in most parts of the study area is closely associated with deforestation because fuel wood and charcoal are basically cheaper and affordable by the respondents. The respondents engage in indiscriminate felling of trees to obtain energy without taking into cognizance its impacts on the socio-economic effects on the environment such as climate change, ozone layer depletion, erosion and flooding. The implication is that deforestation will continue unabated because of high demand for cooking and absence of proper legislation on deforestation and the attitudes of loggers. There is a need for a pragmatic approach in the form of policy formulation through proper legislation prohibiting the general public from indiscriminate tree felling and bush burning.

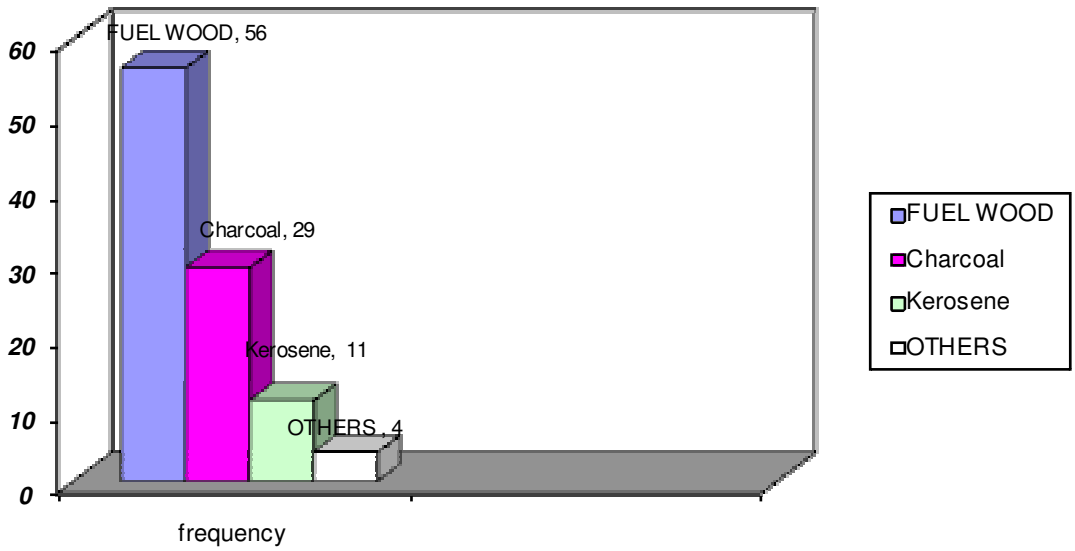

Figure 1.6: Primary Source of energy for domestic cooking

Grazing is a process by which domestic animals are being fed either on natural or cultural vegetation. Akwanga Local Government Area is highly blessed with lush vegetation which attracts herdsmen. The commonest type of grazing system is nomadic and ranching that leads to deforestation through the cutting of grasses and shrubs. During the survey, it was discovered that Fulani cattle herdsmen from the drier north of Nigeria migrate to Akwanga in search of lush vegetation that abound for their livestock as observed by (Ishaku, 2012). This occupational mobility has been a source of concern as over grazing has a multiplier effects on available vegetation leading to soil erosion and flash floods in the area. Figure 1.7 below

reveals the degree of grazing activities on vegetation of the study area. As can be seen from the figure below the effects is very severe as rated by the survey responses.

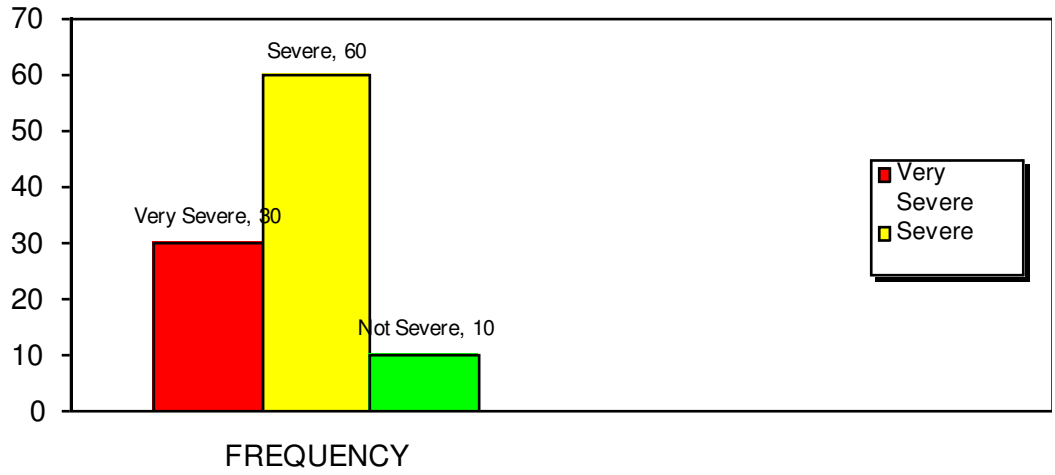

Figure 1.7: Impact of over grazing on the environment

It is noteworthy that about 82% of the respondents emphasized that, the random movement of these animals (cattle, sheep and goats) on natural vegetation is the method mostly adopted feeding animals, whereas 18% of the respondents restrict their animals within a limited vegetative area. Because of the fact that most Fulani nomads in the area practice random grazing most of the grasses are set on fire so that new ones could grow for their cattle to feed on making it difficult for other plants to sprout up. This practice has led to the extinction of various plants and thereby introducing foreign species that further impoverish the soil. Plants that have medicinal potential and other animal species are hunted for food in the study area thereby disturbing the entire ecosystem and worsening the socio-economic development of the study area.

From the survey results it was discovered that deforestation has led to change in the density of trees in the study area. Results revealed 75% of the respondents agreed to the fact that deforestation has led to the change in density of trees in Akwanga Local Government Area as can be seen in the current vegetation cover compared to what was obtainable some few years back. Most of the respondents agree that deforestation has led to the change in density of trees and that some trees they use to have in abundance before are gradually disappearing some of the trees mentioned by the respondents include Mahogany, Malina, Obeche, Shea butter tree and locust bean tree. This shows that aside from using wood as fuel energy for domestic cooking, resident embark on lumbering for commercial purposes for roofing. This

phenomenon has been one of the contributing factors for deforestation in many parts of Nigeria on general and indeed the study area to specific. Figure 1.8 shows the distribution of response in respect of tree densities

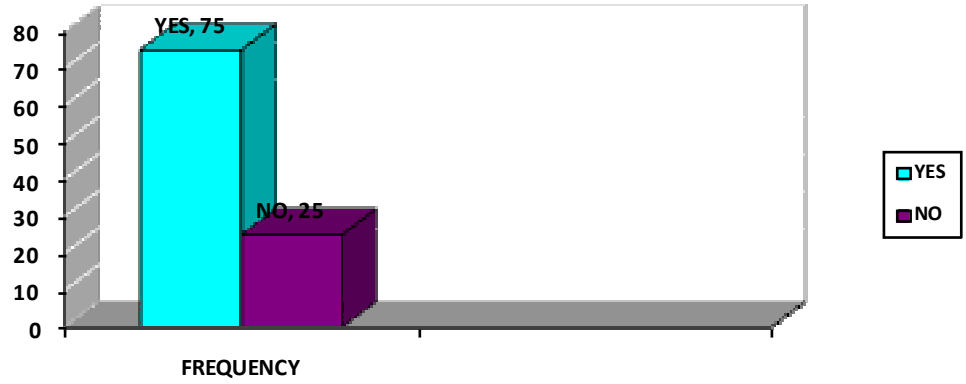

Figure 1.8: Impacts of deforestation on density of trees?

On the effects of deforestation on the socio-economic development of Akwanga, about 79% of the respondents indicated that deforestation has affected the socio-economic development of Akwanga Local Government Area negatively while 21% of the respondents disagreed with the preposition that deforestation negatively affects socio-economic development of Akwanga Local Government Area.

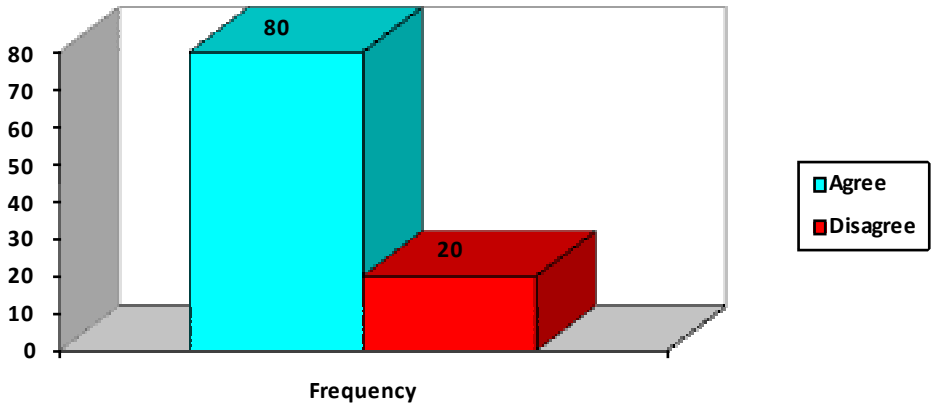

Figure 1.9: Impacts of deforestation on the socio-economic activities

Some of the socio-economic changes in Akwanga Local Government that is directly linked to deforestation include the loss of vegetation cover making the soil bare and prone to erosion. As a consequence the soil losses its fertility and there is poor crop yield. Also, it leads to accelerated erosion in the study area. Most of the respondents believe that deforestation has

reduced crop yield, this is due to the fact that the level of crop production keeps dropping in recent years as farmers are ill-equipped to combat the problem of erosion, the loss of plants that has medicinal potential and animal species that have migrated to other areas because of loss of habitat all contribute negatively to the socio-economic development in the study area. Most of the forested lands in Nigeria are located in the rural areas and in these areas where the level of environmental awareness is very low compared to the highly enlightened populace in the city centers. Therefore, the physical effects of deforestation which are mostly environmental are not foreseen by the rural dwellers. However the economic effects of deforestation which affects their substance directly cannot be over emphasized. It is thus very common to observe the high cost of forage crops and other forest products as deforestation results in their scarcity in communities and settlements where they used to be cheap and available; this is in agreement with (Oguntala, 1994).

5. Conclusions

Deforestation, partly resulting from unsustainable agricultural practices and fuelwood exploitation are exacerbating problems of environmental degradation especially desertification and soil erosion and loss of biodiversity in the more humid guinea Savanna and rain forest regions. These environmental problems may ultimately result in soil impoverishment or outright loss of the productive topsoil with an attendant decline in vegetation cover of the areas. This will consequently cause forest ecosystems to change in various ways, such as in animal and plant species distribution, changes in tree physiology and stability. This will manifest itself in stand-level effects, as well as in major disruptions or disasters caused by more dramatic weather events. Therefore, forest protection and management will have to assure that these effects can be foreseen, managed and limited to the greatest extent possible, particularly due to the very long production and ecological cycle of forests.

Therefore, it is of utmost importance that government at federal, state and local level should address the problem of unsustainable agricultural practices and fuel wood exploitation so that our land will continue to be productive and be able to support present and future generations in Akwanga local government area in particular and Nigeria in general. It is also important that households use alternative sources of energy such as biogas and solar energy, although expensive but can help combat climate change and other unforeseen environmental problems.

Therefore, all stakeholders should encourage the cultivation of woodlots in order to stem the increasing rate of depletion of natural forests given the fact that fuelwood remains the major source of energy in the rural areas. In view of the problems and impacts of deforestation on socio-economic development already mentioned, it is pertinent to appreciate the causes of these problems which are closely linked to the social, economical, cultural and educational background of the inhabitants. Undoubtedly, humans to a large extent are responsible for deforestation as a result of activities such as agriculture and road construction amongst others. But human beings have the ability and potential to change their ways. Humans will probably turn the situation around and the lost forest can be regenerated. The benefits are that many trees will help to protect the land from further erosion.

6. Suggestions and Recommendations

For the purpose of safeguarding, controlling and protecting the environment in a more effective and sustainable manner, the following suggestions have been put forward.

1) Farmers should engage in bush fallowing to allow unfertile land to regenerate after some reasonable number of years before putting the land into use

2) Plant more woodlots since man must use available natural resources to better his livelihood and avoid indiscriminate logging and bush burning

3) Government should provide farmers with farm inputs and extension services to educate rural peasant farmers on latest local techniques for maximum output

4) The local have farmers have their indigenous knowledge about forest management but very low; and therefore the government should empower them with available and sustainable knowledge on forest management

5) Existing forests need to be identified and protected to improve biological diversity status with appropriate sanctions on defaulters and incentives for promoters of tree planting campaigns

References

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

[2] Andrade, M.I., Scarpati, O.E. (2007). Recent changes in flood risks in Gran La Plata, Buenos Aires Province Argentina: causes and management strategy. GeoJournal 70: 245-250.

[3] Ajibade, S.A (2002): The use of GIS in Environmental Protection and Monitoring: A case study of utility management. NIS 37th Annual General Meeting (AGM Alexander, D. (1993). Natural disasters Kluwer Academic Publishers, London pp 650.

[4] Ali, A.M.S (2009) September 2004 flood events in South West Bangladesh: a study of its nature, causes, human perception and adjustment to new hazards. Natural Hazards 40: 89-111.

[5] Atta-ur-R,Amir, N.H. (2011). Analysis of flood causes and associated socio-economic damages in Hindukush region.

[6] Anderson, A. (1990) Alternatives to deforestation: steps towards sustainable use of Amazon rainforest, Columbia University Press, New York.

[7] Areola, O. (1987): The Political Reality of Conservation in Nigeria. In: Conservation in Africa People Policies and Practice (eds.Anderson D., and Grove R.).

[8] Bowling, J.(2000). A worker's view on sustainable forestry Managing forest in theEcosystem Sustainable forest management:in von Gadow, Pukkala and Margarida.Kluwer Academic publishers, Dordreck, Netherlands. pp 121.

[9] Chowdhury, M.R. (2003) The impact of "Greater Dhaka flood protection project" GDFFP on local living environment- the attitude of the flood plain residents. Natural Hazards 29: 309-324

[10] Dong, Y., Wang, Z., Chen, Z., and Yin, D. (2009) Centennial fluctuations of flood-season discharge of upper and middle Yangtze River Basin, China 1865-1988: Cause and impact. Front Earth Science China volume 3 issue 4: 471-479.

[11] Enabor, E. (1981) "Meeting the Demand for forest products in Nigeria: A Critical Review of Policy". The Journal of Forest Association of Nigeria, Vol. 2(1), pp.49-53.

[12] FAO. 1993. Land and Environmental Degradation and Desertification in Africa. United Nations Food and Agriculture Organisation, Corporate Document repository No. X5318.

[13] Hunter, N.M., Horritt, M.S., Bates, P.D., Wilson, M.D., Werner, M.G.F.(2005) An adaptive time step solution for raster-based storage of cell modeling of floodplain inundation. Advance Water Resource 28: 975-991.

[14] Ishaku, H.T. (2012) Community participation in rainwater harvesting: An alternative to safe water supply in rural communities of northeastern Nigeria. A PhD thesis unpublished Department of Urban and Regional Planning Universiti Teknologi Malaysia.

[15] Kio P. R. O. (1983). Management Potentials of the Tropical High Forest with Specific Reference to Nigeria in Tropical Rainforest.

[16] Krausmann, E. and Mushtaq, F. (2008) A qualitative Natech damage scale for the impact of floods on selected industrial facilities. Natural Hazards 46: 179-197.

[17] Mirza, H. (2003). Three recent extreme floods in Bangladesh: a hydro-meteorological analysis. Natural hazards 28: 35-64.

[18] Munich, R.E (2010) Extreme weather events-sign of climate change? Geo Risk Resource, Natcas SERVICE: Available online at http://www.munichre.com/en/media_relations/company-news/default.aspx? foid=2010-08-05. Accessed on 11/07/11

[19] Nigeria Population Commission NPC, (2006) Official population census result Federal Republic of Nigeria. Office of Statistics, Abuja Nigeria.

[20] Oguntala, I. A. (2000) Oyo state in Nigeria: a people united, a future assured: Survey of states vol. 2.

[21] Osemeobo, G. J. (1993). The hazards of rural poverty: Decline in common property resources in Nigeria Rainforest Ecosystem. Journal of Environmental Management Vol.38. pp 206.

[22] Ukpong, J. (1994). Plantation forestry in the Tropics, Clarendon press, Oxford.

[23] Vuren, S.V., Vried, H.D., Ouwerkerk, S. Kok, M. (2005) Stochastic modeling of the impact of flood protection measures along the River Waal in the Netherlands. Natural Hazards 36: 81-102

[24] Ward, R.C (1978). Flood local problems in Geography, A Geographical Perspective Mahelline press Ltd. London

[25] Zhang, Q. Xu, C.Y., Zhang, Z.X., Chen, Y.D., Liu, C.L., Lin, H. (2008) Spatial and temporal variability of precipitation maxima during 1960-2005 in Yangtze River basin and possible association with large scale circulation, Journal of Hydrology 353: 215-227