Research Paper

Assessment of the spatio-temporal changes on deforestation in Mubi-South Local Government Area

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ABSTRACT
Primary and secondary data were used. The data collections were specifically for the purpose of the project. This result indicates that Mubi south is facing serious danger of deforestation. Awareness should be done on the implication of environmental and health problems around in Mubi south local government as a result of deforestation. 1988 classified image, 2003 classified image and 2018 classified image, deforestation is highly effective in the study area. About $17\%(69km^2)$ forested area of total land mass $(405km^2)$ was deforested due to reasons such as agricultural expansions for cultivation, wood for cooking, logs for roofing, selling and for commercial purposes. Workshop should be organized to expose the danger of deforestation in the environment. Women should be encouraged to participate actively in the use of gas cooker and kerosene stove so as to minimize the use of fuel wood in the study area.

I.   INTRODUCTION

One of the problems which attract the attention of environmental scientist, national government and international donor agencies in Africa, south of the Sahara is the issue of environmental decay and more particularly the phenomenon of desert advancement caused by deforestation, which is posing a serious setback to social and economic development in many part of Nigeria (Angelsen, 2006). Vegetation is a vital resource that man uses in his day to day activities especially in the developing world (Ofomata, 2001). It serves as home for wild animals. Forest still covers some 30% of the earth's surface; though the forest biomes have suffered mightily as human pressure on them have increased (Butler, 2003). The role of deforestation in global environment dynamics gaining an increasing attention at all levels ranging from small village community in advance countries (Ogundele 2016). The expansion data based on the scale and rate of deforestation in recent years has serious concern from the whole public to the extent that there is now a great perception that deforestation is one of the most pressing contemporary environmental problems. Some socio-economic activities are combined evils that perpetrate deforestation (Woodall 1992). The disheartening result of these evil in Nigeria community is growing at an alarming rate where by the original vegetation is being replaced by land which is secondary growth on the land which is characterized by fragile soil erosion, loss of fertility, destructive wind, irregular annual perpetuation and unfavorable macro- climate change (Purnamasari, 2010). These are due to deforestation which in turn called for various problems associated with it and incurred governmental dangers on the life of man and his socio economic activity in the study area. These inherent problems inflicted on man and his socio-economic, his environment has been the focus of this study, thus, hoping to advance ways to effectively combat deforestation and the attendant problems in the study area. Globally, it has been observed that, deforestation is one of the main causes of environmental problems. As a result of increase in population there is more clearing of vegetation for food production to support the population and urbanization which cause destruction of vegetation (Yin 2001). Every year additional thousands of square kilometer of forests are lost, though recent satellite surveys indicate that the overall rate of tropical forests cutting is not as great as the estimate of the 1980s and 1990s.

Globally, deforestation has contributed to the extinction of the indigenous forests like central Asia, Europe Middle East and India, this as a result of industrial development, urbanization and extensive Farming. Among the adverse effects of deforestation are lose of species and bio-diversity, increase in atmospheric carbon-

dioxide, soil erosion, decline in soil fertility, regional decrease in rainfall, increases evaporation and lower the water table and the overall effect is climate change (Ochili, 2007). The effects of deforestation in Mubi south local government area has not been taken a serious environmental problem because of notion people have that forest exist naturally it cannot be exhausted. But this research work is intended to reveal the consequences and also to understand the people perception on deforestation (World Commission on Environment and Development (WCED) 1987).

II.   THE STUDY AREA

Mubi South lies between latitude 9^0 30' and 11^0 North of the equator and longitude 13^0 and 13^0 45' East of the Greenwich Meridian. It has Latitudinal extent of 01^0 30'N and Longitudinal extent of 0^0 45'E. Mubi South L.G.A. is bounded in the north by Mubi North L.G.A., in the south-east by the Republic of Cameroon and in the south-west by Maiha L.G.A. The location of the study area is shown in figure1:

Mubi South Local Government Area lies within tropical wet dry type of climate coded as AW in Kopens classification. It has an annual rainfall ranging from 900mm to 1050 mm (Adebayo, 2004). The wet season increase steadily from May to August which has the highest amount, while the rainfall decreases from September to October at a very sharp rate. The dry season start in November and end by April. The driest months are December, January, February and March.

The mean annual temperature is 37^0C (Maximum) and 12.7^0C (Minimum) (ADADP, 2003) the hottest months are March and April while the coldest months between November and January are between November and February.

Mubi South Local Government Area falls within the Sudan Savannah belt of Nigerian vegetation zones (Areola, 1983). It is made up of grasses, aquatic weed in river valleys and dry land weeds interspersed by shrubs and woody plants.

The relief of Mubi- South generally belongs to the highland areas. The elevation of the region above mean sea level is generally from 400m to 1500m (Adebayo and Tukur, 1999) high compared to other parts of the State.

Soils in the study area vary in texture, structure, color, mineral content and moisture holding capacity. The soil of Mubi South therefore falls within the category of ferruginous tropical soils of Nigeria (base on the genetic classification made by Food and Agricultural Organization of the United Nations). The soils range from yellow to red, brown colors and generally coarse stony and very shallow with almost undefined profiles.

III.   MATERIALS AND METHODS

The study employed the use of an integrated approach of Remote Sensing (RS), Geographic Information System (GIS) and field survey in assessing changes in the vegetation cover. High resolution Google Earth Images of the study area for 1988, 2003 and 2018 were obtained online and processed in the Arcmap environment of ArcGIS 10.3. Two major sources of data collection were used in this research; primary and secondary data. Simple random sampling technique was employed and five political wards out of ten political wards in the study area were selected with the use of dip hand method. This is in line with Saleh (2003) who stated that this selection technique should be used when there is difficulty in studying the entire population of individuals or objects. The names of the ten political wards in Mubi-South were written and folded in papers, put inside the container and shock before picking at random without replacement to select the five wards. With this method, each ward out of ten (10) wards therefore has equal chance of being selected into sample to identify the ecological impact of deforestation in the study area. Selected samples are: Kwaja, Gude, Mujara, Dirbishi, and Duvu. Two percent of the household were obtained for the production in the questionnaire.

In collection of data for this study, five (5) wards were picked as earlier mentioned. This was to allow the researcher the ease of going round the selected ones in the field to administer questionnaire, conduct interview and observe the ecological impact of deforestation in these areas.

IV.   RESULTS AND DISCUSSION

The spatio-temporal changes of deforestation in the study area from image classification of 1988, 2003 and 2018
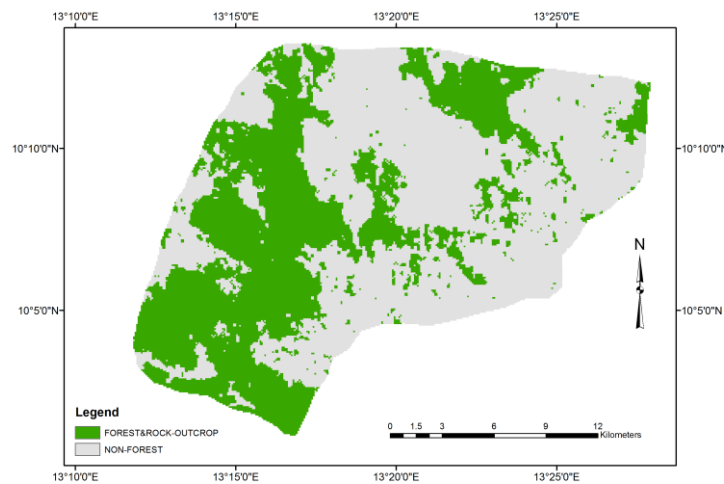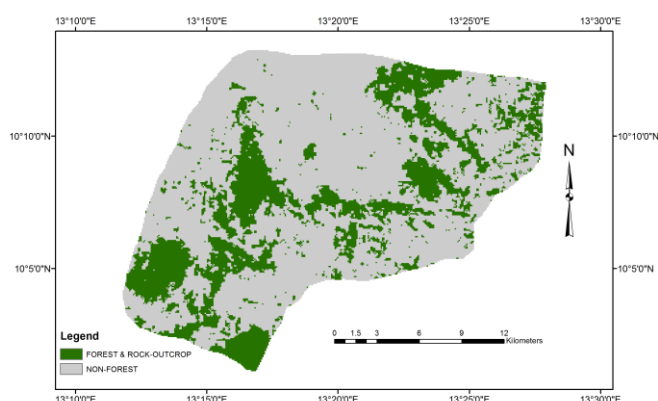

Plate 1: 1988 classified image of Mubi south local government area. Source: Land SAT 1988 Image.

The plate 1 above is a 1988 classified image of Mubi south local government area, green colour in the image represent forest and rock-out crop zones while ash colour indicates non-forest. This image classification indicates that during 1988, Mubi south was having vast area ($165km^2$) covered with vegetation which 41% of the total land mass. In the other hand, non-forest area ($240km^2$) occupied 59% of $405km^2$ which is the total land mass.
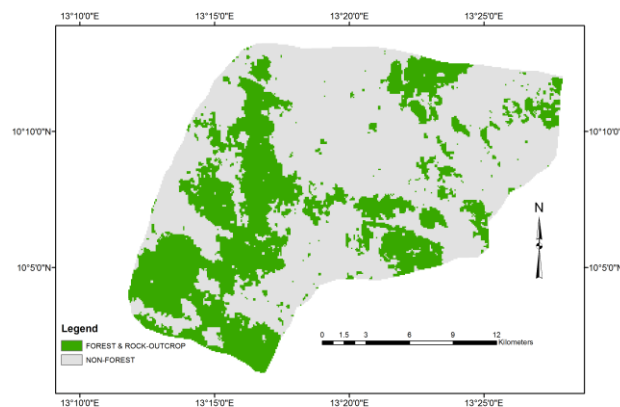
Plate 2: 2003 classified image of Mubi south local government area. Source: Land SAT 2019 Image.

Image in plate 2 indicates that ($137km^2$) 34% of $405km^2$ represented by green colour as forest and rock-out crop areas, while ash colour represent non-forested area comprising build-up area, bare land and agricultural land covered the remaining 66% ($268km^2$). Comparing 1988 and 2003 images, it is clear that the study area faced $28km^2$ (7%) decrease of forest zone. This implies that deforestation has taken place drastically.

Plate 3: 2018 classified image of Mubi south local government area. Source: Land SAT 2019 Image.

In the 2018 classified image, 24% (96km^2) of the total land mass is occupied by forested area which is mostly the mountainous areas represented by green colour, while non-forested area covered 76% (299km^2) represented by ash colour. From all indication, 10% (41km^2) decrease of forest zone was experienced from 2003 to 2018.

Comparing 1988 classified image, 2003 classified image and 2018 classified image, deforestation is highly effective in the study area. About 17% (69km^2) forested area of total land mass (405km^2) was deforested due to reasons such as agricultural expansions for cultivation, wood for cooking, logs for roofing, selling and for commercial purposes.

V.   CONCLUSION

On the basis of the results and discussion presented, comparing 1988 classified image, 2003 classified image and 2018 classified image, deforestation is highly effective in the study area. About 17% (69km^2) forested area of total land mass (405km^2) was deforested due to reasons such as agricultural expansions for cultivation, wood for cooking, logs for roofing, selling and for commercial purposes.

VI.   RECOMMENDATION

Awareness should be done on the implication of environmental and health problems around in Mubi south local government as a result of deforestation. Workshop should be organized to expose the danger of deforestation in the environment. Forest reserves should be established in mangrove ecosystem for in-situ conservation. Researches should be embarked upon by foresters with the view to developing fast growing tree species as well as those resistant to fires and pathogenic attacks.

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