

## Environmental Effect of Continuous Use of Timber Harvesting Machines in Free Areas and the Fate of Forest Reserve in Southern Adamawa State-Nigeria

<sup>1</sup>D.A. Mada, <sup>2</sup>G.Y. Jamala

<sup>1</sup>Department of agricultural engineering technology, Adamawa state college of Agriculture, Ganye Nigeria

<sup>2</sup>Department of Forestry Technology, Adamawa state college of Agriculture, Ganye Nigeria

### -----Abstract-----

Forestry is a source of energy for cooking, domestic heating, baking, grilling and oven drying in the study zone. It provides a habitat for wild life and tools that humans use to survive in the 21<sup>st</sup> century society. Forest products such as mushroom, fruit, honey and leaves are used in the study for food and medicine. It helps to regulate gases that accumulate in the earth and atmosphere, especially air craft and boom sprayer use as an optimum tool for crop protection. Trees help in absorbing the chemicals dust and poison fumes. It sanitizes environment with fresh air. A single tree will produce 3000 sheets of paper. The study had revealed that 120,136 volumes of trees are razed monthly for fuel wood and local timber from 2000-2012 in free areas with Agro forestry machines without replanting. It had increased local temperature from 30-40 per cent and changes in hydrological cycle. Annual losses as a result overcutting trees is estimated N800, 000.00--N900, 000.00 annually caused by water and wind erosion.

**Keyword;** Environment, Effect, Forest reserve, free area, Machines

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### I. INTRODUCTION

Forest covers 31 percent total land area in the world .The live hood of 1.6 billion people depend on forest. It provides a home to more than 30million people worldwide. It is estimated that global trade in forest products was value at about USD 379 billion in 2003.

The colonial administration in study zone with foresight for future years established forest reserve in 1902 -1940 in every ecological and geographical region. These forest reserves where established for socio-economic reasons particularly in the southern part of Nigeria. It is estimated that total area of their forest reserve is 10 million hectares which is about 10per cent of the total land of Nigeria (World Bank 1992).It should be noted that forest reserves vary according to ecological classification. The forest reserve were own by state Forestry Department, which have professional and technical staff. The bulk of the forest products and services are obtained from management of forest reserves. Some of major products include; pole, saw wood, veneer and fuel wood. Other products are used for food and medicine namely; mushroom, wildlife, leaves, fruit and honey in the study zone. However, these products are still obtainable from free areas of the state.

Free areas are forest area that is not under strict management. Permission to exploit with timber harvesting machines, axe and cutlass has to be obtain from forest official and guard in the study zone

The total area of free forest area in the zone is 11,780,890 ha. They provide additional sources of forest products and services. In fact, they were considered to be very important for private forest development.

Timber harvest in free area is dominated and influence by businessmen without concerned of environmental protection.

As result of demand for source of energy, construction and building, the removal of trees, shrubs continuous to increase in the zone, due increase in population. The rampart use of timber harvesting machine in free areas is the focus of this research work.

Thus, forestry engineering deals with machines required for a forestation and exploitation of forest product in the study zone. These machines are limited in the zone which include planting, pruning felling trees and for logging.

While the roles of forestry engineers are unique, who combine skills to solve problem in natural environment with focus in the landscape, they have skills to develop and implement timber harvest. They help to design, construct and evaluate the operational systems that make forest industry work.

National policy on environment (NPE, 1999) reported the environmental effect on north western part of Nigeria which was endowed with large fruitful arable lands, vital resource for agriculture and economic activities had been severely encroached by Sahara desert. It is advancing to the study zone at an alarming rate of 6.0 percent every year. Consequently, Nigeria loses about 350,000 hectares of productive agricultural land yearly to desert encroachment. The effect of this environmental condition had led to demographic relocation of village across eleven affected state in northern Nigeria. It is estimated that Nigerian government losses \$5.1 billion every year owing to rapid drought. National action plan to combat desertification was fused into national police on environment.

The national forest resource statistical data is shown in Table 1

**Table 1:** National Forest resources study report volume1 1998-Nigeria

S/N	Forest type	Area in Forest reserves(ha)	Portion of Total Forested Area in Reserves (%)	Area in Free Forest Area(ha)
1.	Savanna wood forest	1,424,029	52.0	6,922,663
2	Low land rain forest	832,237	30.0	1,580,928
3	Fresh water swamp forest	226,320	8.3	1,430,436
4	Mangrove forest	48,859	1.8	945,592
5	Panted forest	144,610	5.3	7,044

Source: Beak consultants (1998)

## II. METHOD AND MATERIALS

The research work uses data from several sources. In November 2013 we interviewed farmers, machine operators ministry of environment and Department of Forestry along continuous use of Timber harvesting machines in free areas from 2000 – 2012.

Materials used were questionnaires distributed randomly and oral interviews in the study zone. Information gathered from these interviews and field survey was combined for quantitative database analysis. Using the field base assumptions on the following experimental methods;

### 2.1 sudden climatic changes

The method of overcutting trees can change the global and local climate, not only through the micro-meteorological process but also by increasing the concentration of carbon dioxide in the atmosphere(pinker, 1980). Consequence of felling trees will lead to climatic variation and unsustainable land use. It causes global warming which includes; desertification, temperature shift, precipitation, ozone depletion and atmospheric pollution.

### 2.2 soil resources losses and water

overcutting of tree in free areas disrupts water cycle (Bruijnzied, 2004) with removal of part of forest, the study area cannot hold much water. water resource is affected by felling of trees which include; drinking water, fisheries and aquatic life.

The long term effect of deforestation on soil resources can be severe to human and environment. It can clear vegetation cover, owing to slash and burn farming and expose soil to the intensity of tropical sun, rains and wind erosion.

Forest covers land with their leaves to make soil porous soi accommodates intense rainfall and water.

### 2.3 Sources of energy

The method of utilization of fuel wood as a predominant source of energy in the study zone, had accelerate continuous use of Agro forestry machines on free areas. Fuel wood is utilized for cooking, baking, oven drying, grilling and domestic heating.

Thus, utilization of non-wood forest products had released pressure on free areas and forest reserves such as cooking gas, kerosene solar panel and wood charcoal.

According to (FAO, 1988) about 2000 million people in rural and poor urban people depend on fuel wood.

**2.4 severe effects on biodiversity**

Free areas and forest reserves serves as a storehouse for biodiversity in the study zone. It supports about 2/3 of all known species of animals, birds and plants use for food and medicine. National geographical report (2013) that 70 percent of the world’s plants and animals live in forest. According to world health organization, about 80 percent of world population relies on traditional medicine from plants and animals.

The loss of biodiversity had trigger, abrupt and harmful to our society. New emergency in trade of bush meat had declined in the study zone. In which many people had loss their business and sudden increase in prices of domestic animals and birds.

**2.5 social and Economic consequences**

The method of continuous felling of trees in free areas is an expression of social injustice to our future generations.

Impact of overcutting trees with Agro forestry machines occurs at the local level, such as loss of biodiversity and ecological services.

Economic loss of overcutting trees each year amount to a loss in forest capital value at USD 45 billion (Hansen, 1997) by destroying the forests, all future potential revenues, employment, fuel wood and timber product will disappear in the study zone.

**III. RESULT AND DISCUSSION**

The studies in southern Adamawa state, Nigeria showed that the continuous use of Timber harvesting machines on free area influence detrimental effect on environment. Over cutting trees by slashing, chopping and chain saw had caused severe effect on wildlife and human.

Taking in account the statistical data and quantatification of information from field survey, it is possible to estimate the percent of effect category on environment as presented in tables

**Table2:** Source of energy for sustenance had escalated continuous use of agro-forestry machines.

S/no	Group	Effect category	%	Total
1	Utilization of fuel wood for cooking, domestic heating ,oven drying, baking, grilling	negative trend %	no effect 30	100
2	Utilization of wood charcoal for domestic heating	64	36	100
3	Use of non-wood source of energy release pressure on forest product	19	81	100
4	Use of kerosene, gas cooker, solar Panel and electric heater	17.5%	82.5%	100
5	Commercial purpose of feeling trees	45	55	100

Source: Field survey (2013)

The increasing demand for fuel wood and local timber in the study zone from 2000-2012 had escalated felling of trees as shown in table2:

Timber harvesting business is dominated and influenced by contractors who show less concern for environment. According to FAO [1985] about 2000 million people all over the world, mostly rural dwellers and poor urban people depend on fuel wood for cooking, grilling, baking, over draying and domestic heating. Tree branches, trunk, stump and even root are good source of energy, when dried sufficiently to catch fine. The agents of deforestation are slashes, ranchers, burn farmers’, loggers, fire wood collectors, infra structure and other indiscremate cutting down of forest. Fuel wood gathering is often concentrated in developing countries, dry and degraded forest areas [Repetto 1988, 1998, Roweetel 1992].

**Table3:** Sudden changes in local Hydrological cycle.

s/no	Group	Effect category %		
		Negative trend	No effect	Total
1.	Shifting temperature	35	75	100
2.	Frequency of rainfall	98	2	100
3.	Relocation of wildlife use for food	89	11	100

Source: field survey [2013]

Table3 shows the influence of over cutting trees on hydrological cycle. When trees were removed, soil usually starts to dry out and cannot support biomass activities. Local temperature had shifted to 35% percent due to loss of vegetative cover and shade to refresh air. Rain typically occurs less frequently due to dried vapor in the air.

The biggest effect of over cutting trees influence desert encroachment. Soil is deprived of consistent moisture; it turns to barren land and unproductive for agricultural activities.

U.S study [2012] report from Boston University that Cambodia, Burma, Thailand and vietman will loss 10-20% of their forest by 2030 with severe effect on wildlife and human. Five Asian countries have loss nearly 1/3 of their forest in 35 years.

Northern Nigeria has loss original vegetative cover as a result of continuous use agro forestry machine on free areas for commercial fuel wood and local timber figures1-3. Villages have relocated in eleven states as result of severe environmental effect on wildlife, agricultural activities and human [National policy on environment 1999].

**Table4:** Susceptibility to soil and wind erosion

s/no	Group	Effect category%		Total
		Negative trend	No effect	
1.	Escalation of erosion	94	6	100
2.	Soil degradation	92	8	100
3.	Estimated yearly damage of wind storm and erosion in the zone	N600000- N900,000.	-----	-----

Source: Field survey [2013]

The roots and stem of plant create an intricate network that makes it harder to sweep by force of erosion.

If we allow our soil to be degraded as shown in table4, it will take generations to reclaim. However, indiscriminate felling of trees will expose soil to the action of water and wind erosion. It acts on soil layer and dislodge soil particles loose for transportation.

#### IV. CONCLUSION

In this study of environmental consciousness and renewed campaign for environment protection; the drastic vegetation losses due to continuous use of agro forestry machines in free areas should be restored. By replanting of tree species in the study zone .These losses have caused serious destruction of 120,136 volume of trees removed monthly for fuel wood and local timber without replanting from 2000-2012. It had resulted to annual economic loss of N600,000-900,000, serious erosion and loss of economic trees in the study zone . The finding in the study had increased temperature from 30-40% and changed local hydrological cycle. If this trend continues without replanting the lost species of tree used for food and medicine; then the zone will be highly vulnerable to environmental hazard. It will cause different forms of environmental degradation and devastation on wildlife and human.

Legal actions which can be taken by state ministry of environment to conserve trees, save life and reserve natural forest products for future generation include;

- I. Renew and reinforce simplified forestry code
- II. Regulate permissible area for logging i.e. exclude area with high degree of biodiversity as well as park and area reserve for indigenous people
- III. Reduce premature harvesting of timber in free area to sustainable level
- IV. Re mandate forest management by law
- V. Replant species of trees annual in forest plantation, (Wing field et al 2001) suggested eucalyptus an Australian tree in South America.

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**Figure1:** commercial local timber harvest in free area without Environmental concern in study zone.

Source: Field survey (2013)



**Figure 2:** Logging and timber harvest in free area will result to severe effect on wildlife and human.  
Source: Field survey (2013)



**Figure 3:** Effect of Commercial operation of chain saw in free area has dislocated animal and bird species use for food. Bush meat trade had declined in the study area  
Source: Field survey (2013)