Appraisement of deforestation antecedents, upshots, and approaches to mitigate the impacts on provincial people of Oriire Local Government Area in Oyo State.

Adegbola Gbolagade Adeyemi[a], Odey Bernard Ogbor[b], Soyewo Luke Temitope[c], Ajani Adeyemi Babatunde[c]

[a]*Southern Guinea Research Station-Forestry Research Institute of Nigeria, Mokwa, Niger State, Nigeria*

[b]*Trial Afforestation Research Station, Forestry Research Institute of Nigeria (FRIN), Afaka-Kaduna State,*

Nigeria

[c]*Forest Conservation and Protection, Forestry Research Institute of Nigeria (FRIN), Ibadan, Nigeria*

[a]*Email: adeyemi.adegbola9@gmail.com*

This study examined the antecedents, upshots of deforestation and the approaches to mitigate deforestation in some selected villages in Oriire Local Government Area of Oyo State. Questionnaires designed to obtained desirability related information on the antecedents and the upshots of deforestation in their villages and the approaches of controlling them. Data collected from 120 people in the villages using a set of structured questionnaire. Data analysed using descriptive statistics such as percentages and frequency. Findings revealed that the major occupations in the study area are agriculture (60%), followed by trading (17.5%), civil servant (8.3%) and others (14.2%). As revealed by the respondents, the main antecedents of deforestation in the study area include the following: Agriculture (37.5%), charcoal making (26.7%), overpopulation and poverty (15%), illegal logging, fuel wood removal (9.2%), and overgrazing (5.8%).

However, it discovered that climate change (29.2%) was the major upshot of deforestation in the study area, followed by social consequence (25%), habitat and biodiversity (22.5%), soil erosion (15.8%) and economic losses (7.5%). The major approaches to reduce deforestation in the study area has revealed by the respondents, include community forest management (15%), environment education on forest management (20.8%),

Restoration of degraded forest (16.7%), policy and government reform, (25%) and encouraging substitute was (22.5%). Recommendations suggested by the respondent were: government laws and policy should be strictly enforced against deforestation nationwide, and poverty alleviation program should be encouraged. However, other cheaper accessible source of energy instead of charcoal should be encouraged to deter people from deforestation; besides, agroforestry, afforestation, education, and provision of alternative livelihood for the people were good recommendations suggested.

Keywords: deforestation; antecedents; upshots; community; approaches.

INTRODUCTION

Deforestation is the alterations of forest areas to a different permanent non-forested land for the purposes of agriculture, grazing, urbanization or mining activities Van Kooten and Bulte (2000). Forests are complex ecosystems that affect most all the species on the earths; however, it plays a key role in livelihoods of the people around the world Bahar *et al.* (2020).

Forest accommodates various types of wildlife animals Kolovos *et al*. (2011) and offer watershed protection, forest also provides subsistence for humans, providing wood fuel as energy for daily cooking Semper- Pascual *et al*. (2019) control soil erosion, palliate climate change Gomes *et al*. (2019), not mentioned of by-products that go into daily items like medicinal drugs, ornamentals, and detergents. Composition of a forest not only trees, but many species of flora and fauna that live in the soil, understory, and canopy May (2010).

The total numbers of species on the earth rate from 3 million to 100 million May (2010). Despite, our reliance on forests, we were still allowing forest to go into extinction. When the forest depleted, not only trees will be affected; the entire ecosystem will be affected, through different health challenges and environmental crisis. Specifically, nobody knows the actual world's rainforests that have been wrecked and continue to be wiped out annually World Rainforest Movement (1990).

Unfortunately, clearing and excess exploitation of the forest reserves to meet our daily needs of an upsurge population and for supporting economic development have caused great damaged to the forests; specifically, in

the tropics, where more than two-thirds of the global biodiversity found Giam (2017). Such damaged due to deforestation cause momentous loss of biodiversity Barlow *et al.* (2016) in addition to releasing between 10% and 25% of global carbon emissions Houghton (2012).

About 3.9 billion hectares of earths covered by forests, or 30% of the earth's land area. It estimated that the initial forest cover was about 6 billion hectares Bryant *et al.* (1997). In fact, between 1990 and 2015, the world lost about 129 million hectares (ha) of forests, an area of the size of South Africa FAO (2015) with about high percentage of it occurring in the tropics NYDF Report (2020).

To avoid further destruction and the upshots on human beings and the economy, it is important urgently that we take immediate steps to control or even reverse the trend of forest cover loss at any level. Loss of tropical forests caused by many ways, which occur at various levels Van Khuc *et al.* (2018). Since antecedents of deforestation occur across levels, to reduce or eliminating any of these antecedents, it requires community and government cooperation.

Due to the complexity of the deforestation, previous studies suggested the need to know the main causes before introducing any activities or interventions that are useful in reducing them Curtis *et al.* (2018).

Although, in the previous literature, they analysed deforestation adverse effects on the environment, which include environmental hazards, health implications, loss of biodiversity, increase in evaporation and transpiration, disruption of hydrological cycle, scarcity of wildlife resources, accumulation of greenhouse gases which heighten unsustainable environment, however, most of the activities associated with deforestation carried out without the knowledge of its consequences on human Jayathilake *et al.* (2020).

In Nigeria, with richness in endowment of natural and human resources, the level of poverty stand, is very high in contrast to the country's gigantic and tremendous wealth. Loggers, charcoal producers and rural community activities, such as agriculture, all exploit forests in unsustainable manners in searching for profits and means of subsistence. Many literatures indicated that agriculture were the main upshots of deforestation, followed by settlement expansion, charcoal makings, timber logging, livestock grazing in forests and infrastructural

development Jayathilake *et al*. (2020). Precisely, forests cleared for cereal crops cultivation in these typical conservation prospect.

In most of the developing countries including Nigeria, as the population increases, poverty increases and increased demand for cooking fuel has made the use of forest products a popular phenomenon for their survival and to meet their daily needs Ogwumike and Ozughelu (2001). The demand for this has been increasing because most people cannot afford kerosene and gas for cooking due to its incessant increase in price and artificial scarcity. Forest products such as charcoal and fuel wood, seen as the available products for cooking.

As the antecedents involved many actors, any policy interventions doomed to failure if they do not address the local forces of the cause of deforestation Skutsch *et al*. (2020). This showed that it is essential to ascertain the causes of deforestation at the local level through direct interviews and field observations before proposing any policy interventions for potent implementation. This study aims at appraising of deforestation antecedents, upshots, and approaches to mitigate the impacts on provincial people of Orire Local Government Area of Oyo State**.** Field questionnaire surveys, focus group discussions, and field observations conducted in three communities. Data got were analysed using the Likert scale scoring method.

Research questions

This study intends to provide answers to the following research questions:

- ➢ What are the antecedents of deforestation in the study area?
- ➢ What are the upshots of deforestation in the study area?
- ➢ What are the approaches to involve in reducing deforestation?

Objectives of the study

The broad objective of this study is to examine the causes, environmental impact and the resident's awareness of the implications of deforestation in some selected villages in Orire Local Government Area of Oyo State. The specific objectives are to:

> ➢ examine the antecedents of deforestation in Orire local government area.

> ➢ examine the upshots of deforestation in the study area.

> ➢ examine the approaches to use in reducing deforestation.

MATERIALS AND METHOD

Study area

Orire Local Government Area is in Oyo State, Nigeria. It headquarter is in the town of Ikoyi and is quad –ethnic in composition within the ten wards. It has an area of 2,116 km^2 and population of 150,628 at the 2006 census inhabiting over 100 communities such as Olopoto, Ipeba, Odogbo, Igbori, Apiko, Olokiti, Saamo, Iluju, Opeola, Odun-Ifa and Tewure and many others. It is co-ordinate around latitude 8^0 30'N of the equator and longitude 3^0 54'S of the Greenwich meridian. The study area has a bimodal rainfall pattern, with rainfall peaks in the months of July and September and breaks in August. The mean annual rainfall of approximately 1200 mm while the mean maximum temperature was not above 33 °C and minimum temperature not below 16 °C.

The area is derived savanna climatic zone. Agricultural products such as, cola nuts, cashew, melon, mango, shea-butter, yam, cocoa, palm-oil and other products can be found in the area. The relative humidity of the area is not less than 80% between the months of April-November while it is low between December-March when dry wind (harmattan) blows from the northeastern part of the country Olaniyi (2006). However, most of the people of these villages engaged in farming activities while some are involved in businesses such as traders, fish farming and hunters among others.

For the purpose of this study, some villages which are prominently based on forest products uses selected in Orire Local Government Area.

Sampling Techniques and Sample Size

Three villages Olokoto, Odun-Ifa and Igbori were selected from Orire Local Government Area of Oyo State. One twenty (120) respondents in the study areas selected. Proportional allocation used in selecting the number of respondents in each village.

Method of Data Collection and Analysis

A well-structured questionnaire developed with an objective of obtaining meaningful information from the household members living within the study area, to know the level of deforestation in their domains.
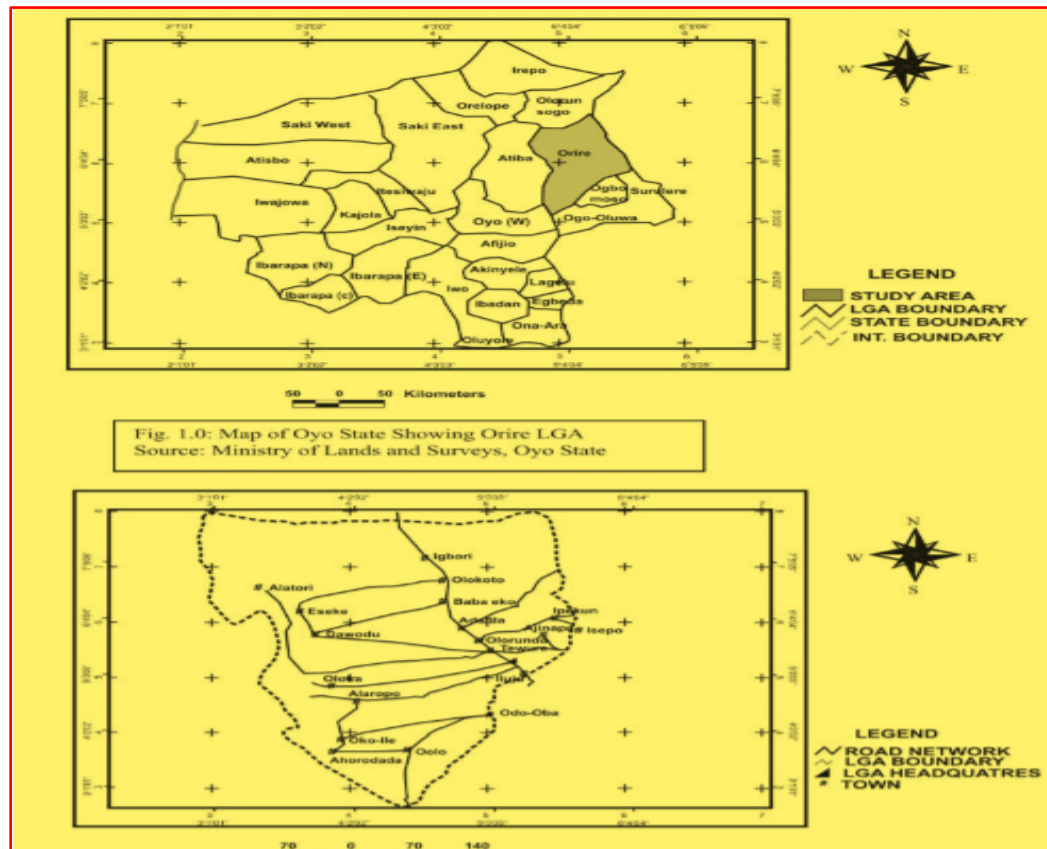

Figure 1: Map of the study area showing Orire Local Government Area of Oyo state

Both primary and secondary data used in this study. Primary data sourced through questionnaire administration and personal observations. Secondary data used include population size and other relevant information obtained from the local government.

A reconnaissance survey of the study area carried out to have an overview of the socio-economic activities and environmental level of the study area. The entire population of the three villages provided a convenient sample frame. An active aged people selected based on convenience from each dwelling unit for interview guided by

well-structured questionnaire. These interviews accompanied by personal observations, which allowed to show the reliability of the answers given.

Descriptive statistics such as frequency counts and percentages used to summarize the data. The deforestation antecedents, upshots, and control approaches to be adopted by the villagers assessed using Likhert scale, scores 1, 2, 3, 4, and 5 refer to strongly disagree, disagree, neutral, agree, and strongly agree, respectively, regarding the associated questionnaire statement.

RESULTS AND DISCUSSION

Respondent's profiles

Table 1 shown the socio-economic characteristic of the respondents

The level of education in these villages were 5%, 40%, 38.3% and 16.7% for non-circular, primary education, secondary education and tertiary respectively. The marital status of the respondents were 32.5%, 65.8% and 1.7% for single, married and divorced respectively. A large proportion of the sampled population were male (91.7%) while (8.3%) were female. 8.3% of the sampled respondents are in the civil service, while 60% and 17.5% were agriculture and trading respectively. Most of the active age males in the villages have at one time or the other engaged in the process of deforestation such as farming, charcoal making, and firewood collector. As the country is dwelling in the poverty, especially in the rural areas, forest seen as significant and dominant means to generate income locally to meet their family needs.

Table 1: Socio-Economic Characteristics of the Respondents

Socio-Economic	Frequency	Percentages
Age (Years)		
15-30	35	29.2
31-45	46	38.3
46-65	34	28.3
Above 65	5	4.2
Educational Status		
Non circular Education	6	5
Primary Education	48	40.0
Secondary Education	46	38.3

Tertiary Education	20	16.7
Marital Status		
Single	39	32.5
Married	79	65.8
Divorced	2	1.7
Widowed	-	-
Gender		
Male	110	91.7
Female	10	8.3
Occupation		
Trading	21	17.5
Civil servant	10	8.3
Agriculture	72	60.0
Others	17	14.2

Table 2: Presents the summary of descriptive statistics of the respondents to the Likert-scale questionnaire on deforestation. However, the top four antecedents of deforestation were agriculture (37.5%), charcoal making (26.7%), overpopulation and poverty (15%), illegal logging and fuel wood (9.2%) and shown on figure 2. The other antecedents such as overgrazing (5.8%) and others (bush burning, road construction, and mining among others) were very low (5.8 %).

Table 2: The Major antecedents of deforestation in the study area

Numbers	Factors	Frequency(n = 120)	Percentage (%)
1	Agriculture	45	37.5
2	Charcoal making	32	26.7

3	Overpopulation and poverty	18	15
4	Illegal Logging & fuel wood	11	9.2
5	Overgrazing	7	5.8
6	Others	7	5.8

Source: Authors' Field Survey, (2021)

Illegal logging and fuelwood collectors

The respondents agreed that illegal logging and fuel wood collectors (9.2%) were contributed to forest degradation, this conforms to Putz *et al*. (2001). The communities' forest encroached, and the trees felled by communities and outsiders, due to the lack of alternative resources for their daily subsistence and livelihoods. According to the focus group discussions, illegal logging have little impact in degrading their forest although, there is increasing loss of forest cover in their community and surrounding areas. However, fuel wood gathering often concentrated in the dry forests and degraded forest areas Rowe *et al*. (1992). The respondents agreed that there were few forests left near their community, and their community forests perpetually threatened by the illegal loggers. The respondents noted that the people with a lower socio-economic background committed most of this illegal logging. Although, illegal logging has also been reported by many researchers as a major cause of deforestation and loss of carbon stocks in the tropics Brancalian *et al*. (2018).
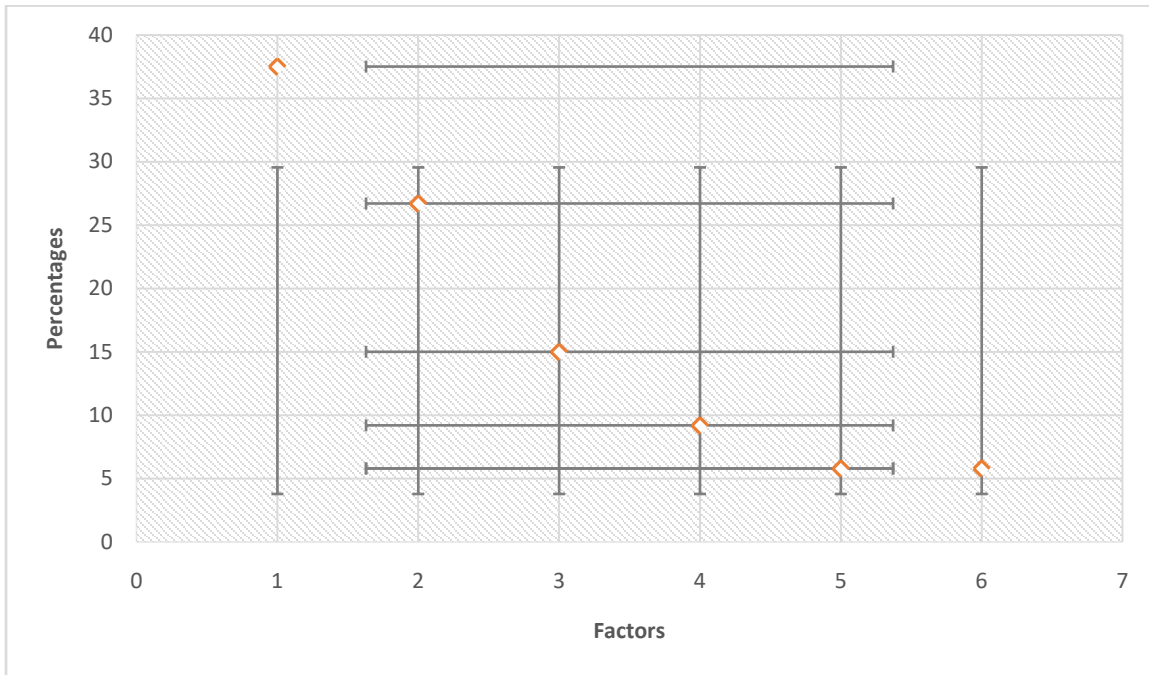
Figure 2: Standard deviation graph of the major antecedents of deforestation in the study area

Overgrazing

Overgrazing was 5.8%. Although, overgrazing usually occurs when the rate of consumption of vegetation biomass by animals (Wildlife) exceeds the vegetation's ability to recapture the loss in a timely fashion, thus exposing the soil and reducing the vegetation productive strength. Flaying trees to provide fodder for grazing animals can also be a problem in some rural areas but is probably not a major antecedent of deforestation in the present study.

Overgrazing are causing large areas of grasslands to turn into a desert. Overgrazing represents an environmental problem whereby wildlife or life stock excessively feeds on pasture. According to the focus group discussions, people share land, especially in their domains and raises animals for themselves and try to enrich them by raising as many as they can.

Overpopulation and poverty

Overpopulation and poverty accounted for 15% by the respondents. Poverty and overpopulation are irredeemable linked. Hardship was not disputable, responsible for much of the damage to the forests. Poorness

is increasing day by day and people are looking for the way to survive the harsh economy, however, most of them resulted into deforestation in one way or the other to generate income.

The growing population in rich industrialized nations are therefore responsible for much of the exploitation of the earth and there is a clear link between the overconsumption in rich countries and deforestation in the rural areas Colchester and Lohmann (1993).

The respondents in the study area believed that the increase in population in the study area was due to the rapid growth and coming in of land migrant, and this put greater pressure on forest land use. Migrants cleared the forest themselves for agriculture and settlement purposes. The role of population in deforestation is a litigious issue. More people need more food and more space with more land for agriculture purpose and living. This has leads to more clearing of forests.

Charcoal productions

This was one of the major antecedents of deforestation in the study areas, it contributed about 26.7%. Although, based on focus grouped discussion, the participants agreed that charcoal production contributed to deforestation and degradation of forest in their domains. Charcoal kilns planted in different part of the busy in the study area for commercial charcoal production. Charcoal production has caused forest degradation and deforestation in the study area, this conforms to Forestry administration (2010).

In fact, the present study shows that even though the people in the villages aware of the upshot of charcoal production, they still involved in it, since, it is their major sources of revenue generation, especially during harmattan, and it has a potential effects in promoting other trade sectors of their economy as well as reducing social vices, which some poverty-riders elements of the communities may have committed, if there was no charcoal production Jelili *et al*. (2015).

Agriculture

This is the major antecedent of deforestation in the study area it was accounted for 37.5% meanwhile, the respondents said to grow more crops on fertile land for agricultural purposes, the farmers cleared more forest

land for cultivation. A recent study indicated that clearing the forest for agriculture could be due to declines in crop productivity; to support the livelihood of the increasing number of family members, communities, and even the nation more crop sown to maintain sufficient output Forestry administration (2010).

Consequently, they have no option but to clear the virgin forest. Depending on the rural areas, not all cultivation causes deforestation or forest degradation. This discovery against the studies In Indonesia (where slash-and-burn agriculture is practised) Henley and Swidden (2011). Clearing land for agricultural activities is often the only option available for the livelihoods of farmers living in forested areas Angelsen (1991).

Table 2: Upshots of deforestation in the study area

Numbers	Factors	Frequency (n=120)	Percentage (%)
1	Climate change	35	29.2
2	Soil erosion	19	15.8
3	Economic losses	9	7.5
4	Social consequences	30	25.0
5	Habitat loss and decreased biodiversity	27	22.5

Source: Authors' Field Survey, (2021)

Climate change

The percentage score of the data collected from the respondents on climate change was 29.2%, and it is shown on figure 3. However, deforestation interrupt natural weather model producing hotter and drier atmospheric condition thus enhancing desertification and drought, soil loss, crop failures, erosion, flooding, and displacement of major vegetation dynasty Sumit *et al*. (2012). Desertification is the implications of terminal in climatic variation and unsubstantiated land use practices including overexploitation of forest cover Anonymous (1994). Deforestation on lowland plains moves cloud structure and precipitation to higher level Lawton *et al*. (2001).

Deforestation contributes to global warming which occurs from increased atmospheric concentrations of greenhouse gases (GHG) leading to the net increase in the global mean temperature as the forests are pre

terrestrial sink of carbon. Thus, deforestation interrupt the global carbon cycle, increasing the concentration of atmospheric carbon dioxide.

Tropical deforestation is responsible for the emission of roughly two billion tonnes of carbon (as CO_2) to the atmosphere per year Houghton (2005). Release of the carbon dioxide due to global deforestation is equivalent to an estimated 25 per cent of emissions from combustion of fossil fuels Asdrasko (1990).

Soil erosion

One of the effect noticed in the study areas as the respondent said and with the focus grouped discussion was soil erosion (15.8%). Water resources affected by deforestation include drinking water, aquatic animals, dams, and river affected by siltation and damage to crops and irrigation systems from erosion. However, with removal of part of the forest, the surface cannot hold as much water thereby creating a drier environment Chomitz (2007). Urban water protection is potentially one of the most important services that forest renders Chomitz (2007) Deforestation and other land use changes have increased the proportion of the basin subject to erosion and so over the long run have contributed to siltation; however, heavy siltation increased the river bed, it will also increase the risk of flood in the environment.

Economic losses

This was 7.5% through the data collected from the respondents. Over exploitation of forests will destroy revenue generation by individual, the rural areas, government and affected all stakeholders; because what has been
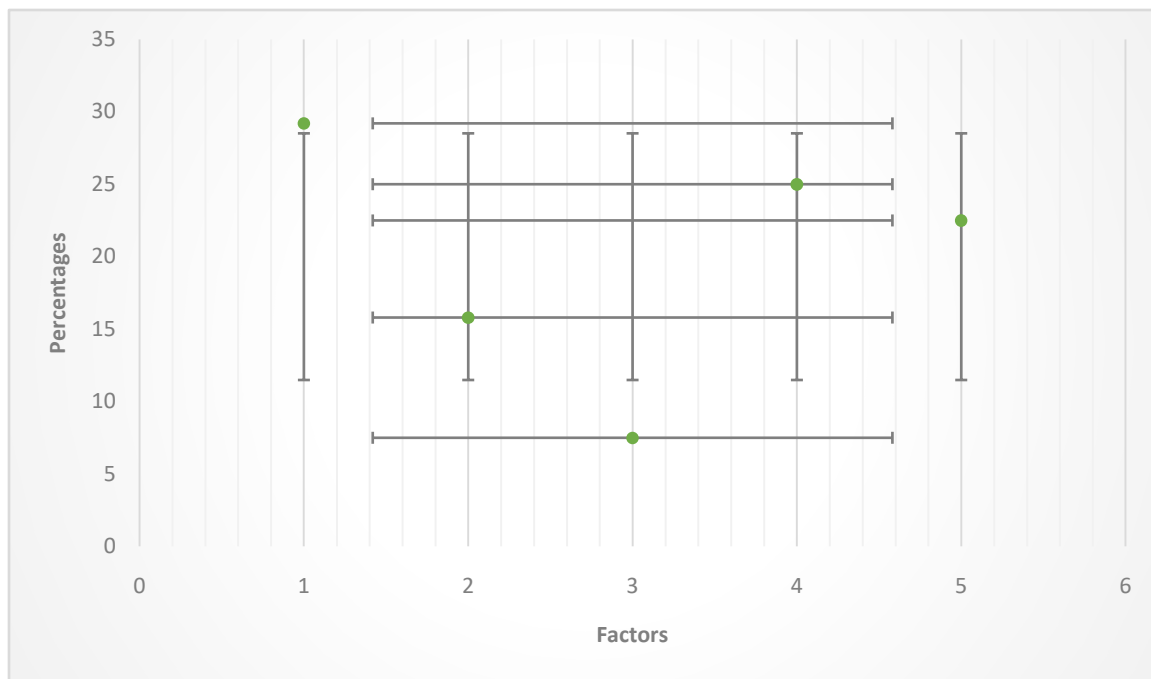
Figure 3: Standard deviation map on the major upshots of deforestation in the study area.

destructed in several years cannot be revived in a day. By destroying the forests, all potential future revenues and future employment that could be derived from their sustainable management for timber and nontimber products will disappear, and increasing rate of jobless.

Social consequences

The most essential social upshots of deforestation occurs in the rural areas, with the damage to ecological services rendered by the forests. In the data collected, 25% of the respondents agreed that social consequences as an environmental implication in their domains. Forests impart humans valuable services such as prevention of erosion, control of flood, treatment of water, aquatic protection, however, functions that are particularly essential to the rural poorest people who rely on natural resources for their daily survival.

By overexploiting the forests, we risk our health, loss of crops, loss of water, loss of fertile land, other quality of life, gamble with the stability of climate and local weather; however, threaten the living of other animals, scarcity of local herbs' ingredient for malaria, fever among others and subvert the precious services rendered by biological diversity. According to the World Health Organization, about 80 per cent of the world's population relies on primary health care at least partially on traditional medicine.

Habitat loss and decreased biodiversity

22.5 percent of respondent agreed to this (Table 2). Specifically, forests in the rural area serve as storehouses of biodiversity. However, deforestation destroys the biodiversity completely and habitat for nomadic species including the endangered ones, some of which have still to be compendium. Two thirds of all known species support by tropical forests and contain 65% of the world's 10, 000 endangered species, Myers and Mittermeier (2000). Protecting the biodiversity of the forested areas is like keeping a form of capital, until more research carried out on the importance of various plants and animal species in the forest, Anonymous (1994). The biodiversity loss and associated large changes in forest cover could trigger coarse, irreversible and detrimentally changes.

Table 3: Approaches to reduced deforestation in the study area

Factors	Frequency (n=20)	Percentage (%)
Community forest management	18	15
Environmental education on forest management	25	20.8
Restoration of degraded forest	20	16.7
Policy and government reform	30	25.0
Encouraging substitute	27	22.5

Source: Authors Field Survey (2021)

Community forest management (CFM)

Based on the focus group discussions, participants strongly believed in community forest management (Table 3). However, it refers to a coordinated strength to manage the forests within the communities, on which communities rely upon for daily activities. About 15% of the respondents were of the opinion that this activity is practically good to address deforestation. They strongly believed that community forest management could protect the remaining forests. They have witnessed the advantage of community forest management primarily in the past. Not only that, but they strongly agreed (figure 4) that only few of community forests available, as all the forested land apart from the few community forests had already been fully tampered with for agricultural purposes or cleared for other reasons. Community forest management around the world is important because

most of the activities occurring in the forests well known to the people of the community, however, for the long-term successful management of forests protection, community must be carried along.

Environmental education on forest management (EEFM)

The respondents (20.8%) agreed that environmental education is a necessary solution to reduce the causes of deforestation. Continuous enlightenment and education of rural people on sustainable use and harvesting of forest and non-forest products such as bamboo shoot, wild fruits, wild vegetables, mushrooms, wild animals, honeys and bees, traditional medicines and other forest products can be an important avenue for reducing deforestation and protecting forests resource and will deter people in the rural area from charcoal making, illegal logging, and land clearing without government permission and meaningful replacement.

Therefore, environmental education about how all necessary forest resources can be obtained in a sustainable pattern is essential for rural people. Meanwhile, the sustainable exploitation and use of wood can save many rural young people and nearby vegetation. Therefore, environmental education on forest management can assist rural people in wider forms, this conforms to Godoy *et al.* (1998).

Restoration of degraded forests (RDF)

Based on the focus group discussions, participants strongly (figure 4) believed on restoration of forest, especially on degraded land. This activity simply means planting of enrichment trees on degraded forest land. About 16.7% of respondents agreed that restoration of degraded forests could solve the problems of deforestation in the study area. However, this strategy is suitable for areas upset by excessive exploitation of forest, natural disasters, and human-induced forest fire this conforms to Edwards *et al*. (2010). It has been reported that restoration could avoid further deforestation and even increase carbon stocks in the rural areas Edwards *et al*. (2010).

Policy and governance reform (PGR) -enforcement and compliance

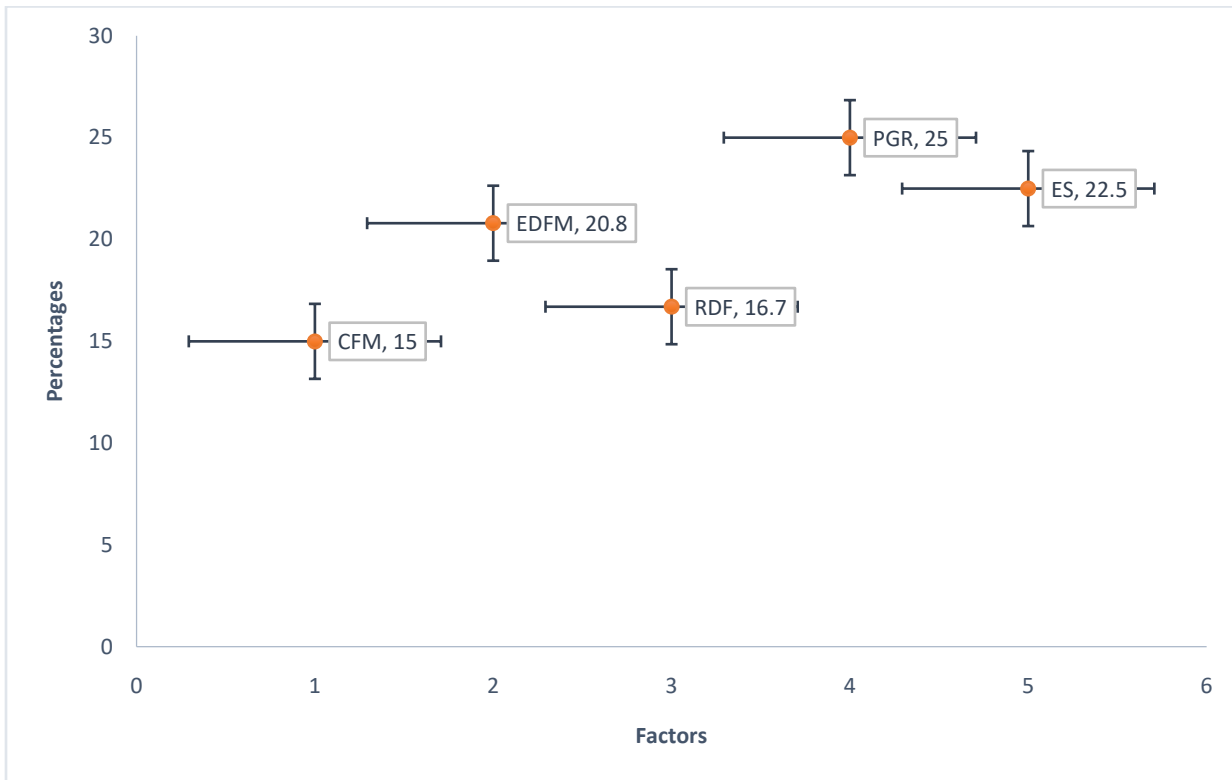Table 3 showed that 25% of respondents agreed that the government needs to reform its policies and governance

Figure 4: Assumption approaches graph in the study area to reduced deforestation.

toward natural resource use in favour of their expected activities. Many policy, legislative and regulatory measures established to protect forests, but no one is effectively enforced on the people. Rural people did not have trust in the government again because of the corruption, bribery and different patterns of illegal logging in their domains. However, effective policy and governance reform can limit corruption among the agency that enforcing law at various levels of the government so, those involved or perpetrators of illegal logging should be seriously dealt with. A previous study indicated that governance and policy reform could lead to reducing illegal logging and improving trust between rural people and the government Larson *et al.* (2011).

Encouraging substitutes (ES)

Based on the focus group discussions, participants strongly believed that encouraging substitutes will help in protecting the forest. The reduction in the cost of petroleum products, such as gas and kerosene, will reduce charcoal production and fuel wood consumption demand, and it could protect the remaining forests. For all

purposes where tropical or other timber used, other woods or materials could be substituted also. 22.5% of respondents (Table 3) agreed that we can stop using timber and implore others to do the same in the study area. As long, there is a market for wood products, trees will continue to be cut down has reported by Anonymous (1994).

CONCLUSION

The research findings revealed that most of the economic activities in the study area to some extent are the antecedents of deforestation, but some are more severe than the others. Agriculture and charcoal making revealed as the main livelihood activities that have gigantic upshot on a forest and everything that exists within it. It revealed that farm expansions as a result of population growth leads to land rive and clearing more virgin lands for agricultural activities. High demand of charcoal and wood logs from both rural and civilized countries have worsened deforestation in the study area. However, poverty and ignorance among the rural people in the study areas did not encourage environmental consciousness and these prevent them from adapting to approaches that would help sustainable forest resource management. However, lack of alternative source of livelihood trigger the main cause. To prevent perpetual occurrence of deforestation and forest degradation in our protected forests, the following recommended:

RECOMMENDATIONS

➢ Public enlightenment and awareness should be carried out to educate the public on the importance of agroforestry practices so far agriculture is unavoidable and trees planting should be encouraged.

➢ Forest and environmental conservation should be embarked upon by all tiers of governments.

➢ Government should try as much as possible to subsidize prices of petroleum products and ensure its stability to give the poor masses a privilege to afford it.

➢ Integrating rural people views and decisions in government environmental policies to formulate good policies can handle challenges of community's forest. However, this would encourage community participation in an environmental protection as well as forest management.

- ➢ Government should intervene through the provision of alternative livelihoods such as rearing of animals, mushroom, beekeeping, and other skill training that could empower the rural people to gain self-employment as well as income.

- ➢ The existence of Government laws and policy should be enforced strictly against deforestation nationwide to apprehend and punish those who engage in activities such as illegal wood logging and charcoal production would save as determent.

- ➢ Conservation education should be included in schools curriculum to teach students about conservation of biodiversity and the negative effect of felling of trees without a meaningful replacement.

- ➢ Housing management of cattle should be encouraged for herdsmen due to their quick turnaround, to protect the forest sapling and coppicing.

Conflicts of Interest

The authors declared that they have no competing interests.

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