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Forest Loss in Nigeria, the Impact on Climate and People from the perspectives of illegal Forest activities and Government Negligence.

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Abstracts

Forestry has attracted much attention from the time being, so it is considered as vital to human life as it provides a wide range of resources, and ecosystem services. Forests are important as storage of carbon, for production of oxygen vital for human existence on earth. They also help in regulation of the hydrological cycle, purify water, provide wildlife habitats, and they help in reducing global warming, as well as absorbing toxic gases, contain pollution and above all conserve soil.

This report aims to analyze the cause of forest decline in Nigeria as well as the effects on climate and offer useful solutions to conserve and achieve sustainable forest management. Considering all the importance and usefulness of forest, conservation of forests must be taken into cognisance to ensure a safe planet for every living organism. This report will focus mainly on vitiating factors affecting forestry in Nigeria. These factors include illegal forest activities, deforestation, government negligence.

A qualitative method was employed, accessing data and facts from secondary source of information.

The result of this thesis postulated that preventive measures to curb forest illegalities must be implemented. Encourage the stakeholder's involvement in forest management. And for the local people to feel the sense of entitlement, they need to be educated on the ecological importance of forests and tree coverage.

Language*: English* **Keywords***: Forest, Government Negligence, Illegal Logging, Forest Products, Climate.*

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1 Introduction

Nigeria, the home of tropical rainforest, has experienced a heavy decline in forest cover. The exploitation of the forest belt which accommodates woods, wildlife and other products are subjected to intense intrusion, vegetation degradation, de-reservation for agriculture use, industrialization and urban development. According to the Food and Agricultural Organization (FAO), it was reported that Nigeria has less than 10% forests coverage, with only 20,000 of hectares primary forests. Having lost about 95% of its forest coverage to a high rate of deforestation which is annually recorded at 5% ranging from 2010 and 2015 (revolvy.com/page/Deforestation-by-region Retrieved 25th January 2019).

The loss of forest coverage is characterized by illegal logging of forests wood and bad government policies. This requires adequate attention.
Unfortunately, people do not regard natural forest as an adequate use of land, and it is this feeling of waste, as well as economic necessity, that induces them to enter forest reserves for the farm. Also, whatever legal situation, they may regard themselves as natural owners of land to do with as they like.
In consequence, the local may connive with sawmillers to steal the trees from the forest or set it on fire in order to deny others what they have lost themselves (LOWE, R. G. 1984). In Nigeria, inadequate regulations and sometimes uncontrollable exploitation or illegal logging poses a great danger to the forest industry and the forest resource base. This is rooted in the failure of States Forest Department in refraining political presence for issuing timber licenses and controlling the magnitude of felling cycles, theft, such that minimum girth felling limits are achieved.

Forest plays a vital role in human life as it provides a wide range of resources, and ecosystem services such as storage of carbon, produce oxygen vital for human existence on earth, as well as they, help in regulation of hydrological cycle, purify water, provide wildlife habitat, they help in reducing global warming, as well as absorbing toxic gases, contain pollution, conserve soil and above all connect human with nature.
Nigeria as a member of African Timber Organization (ATO) and the International Tropical Timber Organization (ITTO), rich in forest resources, which account for about 2.5% of the GDP according to FRA 2010 report. Offering employment for over 2 million people via the supply of fuelwood and wood products. Nigeria is characterized by Tropical savanna climate. This climate has a pronounced dry season, with the driest month having precipitation less than 60 mm and less than 1/25 of the total annual precipitation. Represented as: Aw Tropical savannah with dry winter Pmin < 60 mm in winter (FAO 2010). The total population stood at over 200 million, with annual population growth of 2.6% (Worldmeters, 2019).

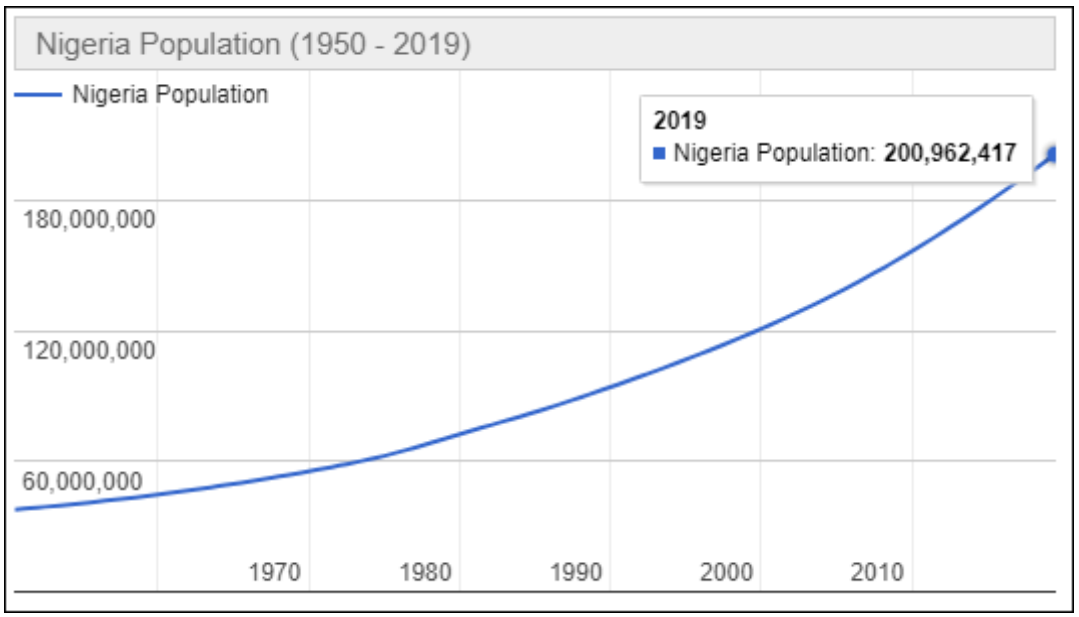

Figure 1: Nigeria Population from 1950-2019
Source: Worldmeters

Figure 1 shows the population counter displaying an incessant increase in Nigeria population from 195-2019 according to the Worldmeters' RTS algorithm processing data from Population Division of United Nations.

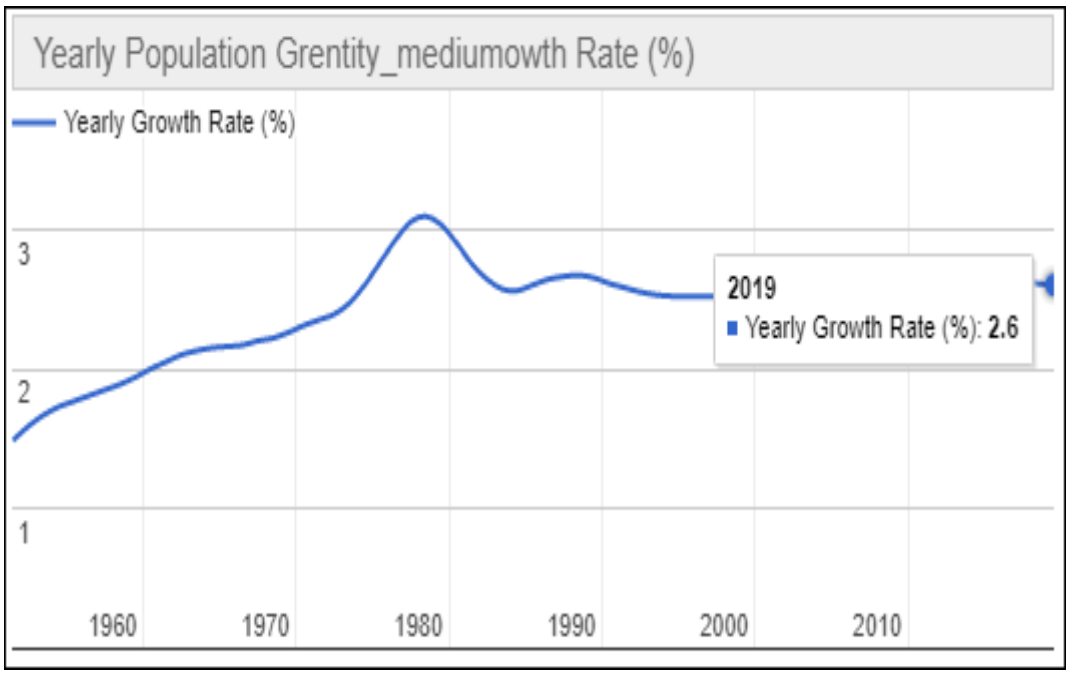

Figure 2: Nigeria Population yearly growth from 1950-2019
Source: Worldmeters

Figure 2 shows an exponential yearly growth rate above 1% from 1950 to 1959 and yearly growth of above 2% from 1960 to 2019.

2 Background/Problem description

Nigeria Forest Industry consists of both the informal and formal sectors while the forest products include, Fuelwood, Charcoal, Round wood, Sawn wood, wood-based Panels, Pulp and Paper.
The objective of this report aims to analyze the causes and effects of forest decline in Nigeria as a result of illegal forest activities, government negligence and offer useful planning to conserve and achieve sustainable forest management.
In the latter, economic development has posed a great deal of wood-processing activities. Current requirements for forest products are exceedingly large and increasing therefore, probably result in a shortage in the long term. Yet, the need for the restoration of the national forest-cover superseding the balancing of wood demand and supply. Reforestation for ecological purposes rather than economic advantage must be accorded a significant requirement.

Figure 3: Regional Tree coverage
Source: globalforestwatch.org

The loss of forest-cover means ultimate destruction of agricultural production, climate, and living conditions. Reforestation is the indispensable starting phase for a new cycle of ecological rehabilitation and the introduction of a new set of human endeavors (Kolade Adeyoju 1974,99-199).
The problem with forestry in Nigeria has been weak institutions and limited resources, as a results lack law enforcement as well as limited capacity for land use planning. In Nigeria the legal framework is unclear or neglected, paving way for illegalities to take place, which poses a threat to the biodiversity.

Nigeria: Forest types	
Tropical (% forest area)	**100%**
Subtropical (% Forest area)	**0%**
Temperate (% forest area)	**0%**
Boreal/polar (% forest area)	**0%**

Table 1: Forest types
Source: rainforests.mongabay.com

2.1 Forest Coverage in Nigeria

Nigeria total land area equates 947,800 km^2, Forest covers 10% of the total land area, with over 4,600 plant species identified, making Nigeria 11th most biodiverse country in Africa. Nigeria forests have over 560 tree species, which ranges from 30 to 70 species per hectare. Among the most popular tree species in peculiar to Nigeria includes Iroko (*Melicia excelsa*), Obeche (*Triplochiton scleroxylon*), Mansonia (*Mansonia altissima*), Mahogany (*Entandrophragma cylindricum*), Omo (*Cordia millenii*), Aye (*Sterculia rhinopetalia*), Afara (*Terminalia superba*), Ayinre (*Albizialebbek*), Danta (*esogordonia papaverifera*), and Abura (*Mitragyna ciliata*).

The area of trees cover is 10Mha, with over 189 metrics tons of biomass per hectare; above the ground level are 79.37% while below the ground are 20.63% biomass per hectare. Teak trees occupy about 60% of total forest coverage while plantation area constitutes 25% of the forest tree coverage. Nigeria has about 445 forest reserves, which are distributed over the five main ecological zones of freshwater mangrove, lowland rainforest, Savanna and Sahel, Sudan Savanna. Over 5% of the land area is dedicated wildlife conservations shred among the major ecological zones of the country. Nigeria forests provide a wide range of non-wood products and environmental benefits, which includes animal hunting, medicine, watershed protection, stabilization of hydrological regimes and carbon sequestration (Shadrach O. Akindele,2005).

The total tree coverage in Nigeria equates 8.86 Million hectares with a total estimation of 9.8% coverage, while non-forest account for 81.5 million hectares at 90.2% of the total land areas as of 2010.

There are eight National parks in Nigeria, flourishing with diverse flora and fauna resources, most of which are peculiar to Nigeria. The Forest has a huge contribution to the country's national Gross Domestic Product as well as it serves as a means of sustenance to the

livelihood of the people, as it also provides complimentary environmental and ecological services.

Figure 4: Tree coverage in Nigeria as of 2010
Source: globalforestwatch.org

Figure 4 shows the extent of tree cover in Nigeria, as well as the total land mass without tree coverage or presence.
Tree is defined as the totality of vegetation taller than 5 meters in height. However, (Hansen et al., Science 2013) defined 'Tree Cover' as the biophysical presence of tree and may assume the form of natural forests or plantations existing over a range of canopy densities.

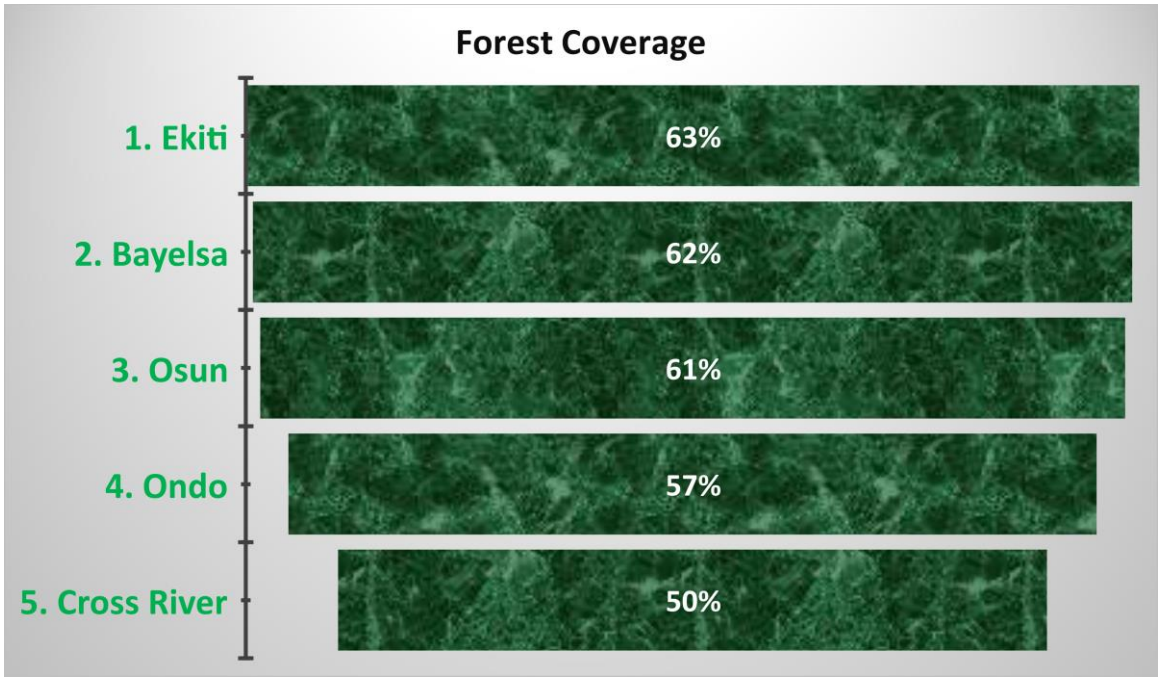

Figure 5: Location of Forest in Nigeria
Source: globalforestwatch.org

Figure 5 shows the top 5 regions which represent about 54% of all forest coverage in Nigeria.

2.2 Forest Management in Nigeria

The formation of Forest management started in Nigeria in 1889 with the opening of the "office of woods and forests "in what was then the colony and protectorate of Lagos. At the early stage, due regard was given to standard forest management practices, which bestowed a high degree of sanctity in the forestry sector (FAO, 2003). Since then, there have been several forest managements programmes in Nigeria which administers the forest areas in Nigeria, these administrative bodies lie at the topmost Federal level as such spread its jurisdiction to the state and local levels.

The Forest administration at the federal level plays an advisory role to the state Forestry Departments, as well as coordinates and monitors projects funded by the Federal Government and relates with International Development Agencies regarding forest and forest products issues. Whereas Forestry administration at the state level is empowered to implement forest policies at the State level, as well as revenue generation from the forestry sector.

Forestry in Nigeria is designated into two categories namely Forest reserves and Free areas.

Forest Land Designation	Forest Type	Area (ha)	Gross Volume (m^3)
Forest Reserve	Lowland Rainforest	788,053	140,682,489.73
	Freshwater swamp	186,621	24,397,003.35
	Sub-total	974,674	165,079,493.08
Free Area	Lowland Rain Forest	905,930	120,7422,644.93
	Freshwater swamp	1,424,995	187,474,508.28
	Mangrove Forest	948,430	212,613.14
	Sub Total	2,342,147	308,429,366.35
Sum total	Gross Total	3,316,821	473,509,259.43

Table 2: Illustration of forest designation by types
Source: FAO

2.3 Tree Cover Loss in Nigeria

Tree cover loss has to do with the change in natural and planted forest, which excludes the 'Act of Man' as the cause. In 2017, tree cover loss has grown up to171kha an equivalence of 12.1 metrics tones of $C0_2$ of emissions. However, from 2010 to 2017, Nigeria has lost 738 kha of tree cover, equating 7.3% decrease since 2000, and 56.3 metrics tones of CO_2 of emissions. Forest loss during the period 2000–2017, defined as a stand-replacement disturbance, or a change from forest to non-forest state. "It is a stand level replace of vegetation greater than 5 meters, within a selected area (Hansen et al., Science 2013).

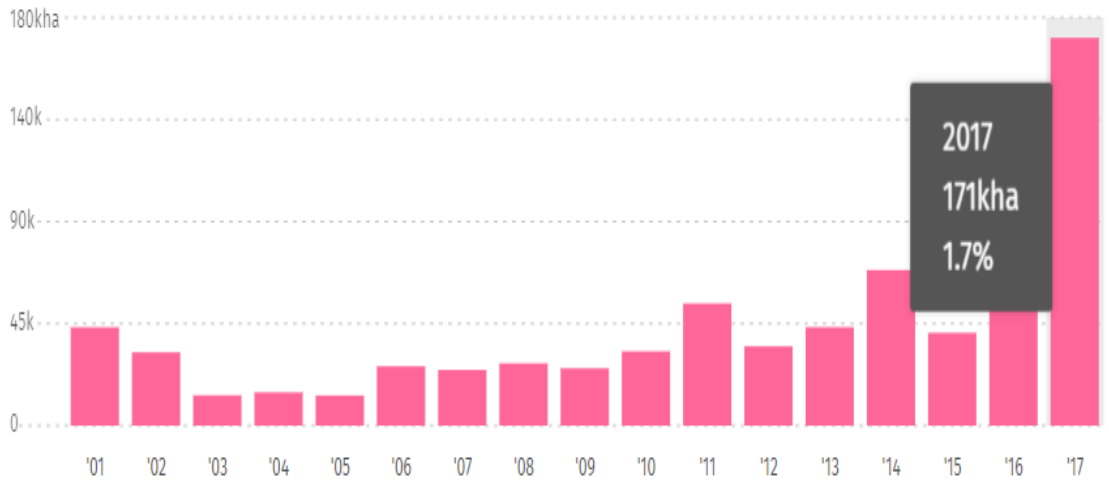

Figure 6: Tree cover Loss in Nigeria from 2000 to 2017
Source: globalforestwatch.org

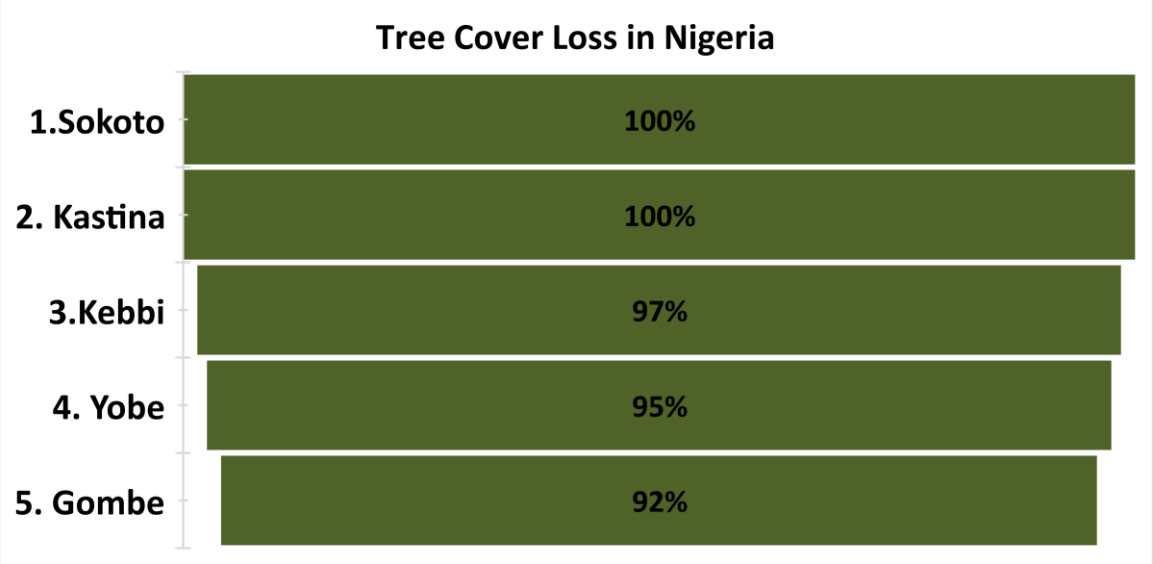

Figure 7: Location of Tre cover loss in Nigeria
Source: globalforestwatch.org

Figure 2 shows the locations with most tree cover loss in Nigeria from 2001 to 2017. These regions are situated in the Northern part of Nigeria, and relatively dry and surrounded by sandy savannah. The regions located at the extreme Northwest (Sokoto and Kastina states) has lost all their forest coverage, while other regions at the Northeastern Nigeria has lost more than 90% of their forest coverage.

2.4 Sustainable Forest Management

Sustainable forest management addresses forest degradation and deforestation while increasing direct benefits to people and the environment. At the social level, sustainable forest management contributes to livelihoods, income generation and employment. At the environmental level, it contributes to important services such as carbon sequestration and water, soil and biodiversity conservation (FAO Retrieved 10th April 2018).
FAO further stressed that to achieve a sustainable forest has to do with increasing their benefits, including timber and food, to meet society's needs in a way that conserves and maintains forest ecosystems for the benefit of present and future generations.
Forest management is currently perceived as an activity aiming at both sustaining wood production and providing firewood, food, other goods and services to bordering populations. Forests should be managed sustainably because they are the centres for cultural, spiritual, and recreational activities (Mammo Siraj et.al 2016). Sustainability is a term that has gained much popularity in recent time. It is the use of the resource in such a way that its availability is guaranteed. It is generally accepted that we must learn how to sustain our environmental resources including forest such that they continue to provide benefits for the people and other living things on our planet (Oriola,2009).

When we talk about sustainable forest management, Nigeria falls short of the required standard needed. FAO declared Nigeria's forests as one of the most threatened on the planet because of the high population growth rates, conversion for subsistence and industrial agriculture, and illegal logging. Whereas in most western nations, forests are properly managed and conserved to safeguard the future but in Nigeria, priorities are accorded to managing and conserving a few forests which relatively protected areas are (National parks).

As of late 2012, nearly half of Nigeria was forested (defined as land with more than 10 per cent tree cover), but the country's rainforests are fast declining. According to the U.N., Nigeria lost nearly 80 per cent of its old-growth forests between 1990 and 2005, giving the sardonic variance of having the highest deforestation rate of natural forest on the planet during that period (Rhett Butler 2014).
Many of our traditional forest management regions system has sustained the yields of many products over the years (such as the myth of "Evil Forest") but are in recent years facing economic pressure and deforestation.
It is important to employ up to date methods such as biological control measures as well as technological advances to ensure that the forest is properly managed. Proper harvesting techniques and methods must be put into account, total removal of trees such as clear cut must be avoided or considered for ecological purposes.

2.5 Ecosystem Services

Ecosystem Services are those services provided by the forest for human benefits. Such as benefits provided by forest ecosystems these include goods such as timber, food, fuel and bioproducts. Ecological functions such as carbon storage, nutrient cycling, water and air purification, and maintenance of wildlife habitat (Natural Resources Canada 2017). Forest ecosystem functions support the provision of ecosystem services to humans. These constitute the direct and indirect contributions of forest ecosystems to human wellbeing. In this context, ecosystem functions are a subset of the interactions between the ecosystem structure and the processes that underpin the capacity of an ecosystem to provide goods and services (European Commission Retrieved 10th April 2018).

2.5.1 Importance of Forest on Human Health

Recent research shows that connection with nature plays a significant role in restoring sanity. Nigeria has a high rate of people with an unsound mind and could employ the magnanimous ecosystem services provided by the presence of forest. Thereby, aiding the people of an unsound mind to regain their sanity and further serve as a threshold to providing soul liberation for the depressed. Nigerians appeared to have the lowest prevalence of mental illness — 4.7 per cent it was opined that the actual number is likely much higher since people living in the violence-prone regions may be hesitant to confide in strangers (nbcnews.com Retrieved 25th January 2019). Ecotherapy is another term in human connection with the physical environment (nature). Such as the principles of Japanese “Shinrin-Yoku” meaning “Forest Bath” which has been scientifically proven to help in improving individual mental and physical health (Shiring-yoku.org, Retrieved May, 2019). Report reveals that “Shirin-yoku has lots of proven benefits such as :

- Hl[s to boost immune system functioning, with an increase in the count of the body's Natural Killer (NK) cells.
- Reduction of blood pressure
- Reduction of stress
- Improving mood
- Increased ability to focus, even in children with ADHD
- Aid recovery from surgery or illness
- Helps to increase energy level
- Improved sleep (Shinrin-yoku.org, Retrieved May, 2019).

Nigeria's government and Nigerians must see forestry from the point of ecological advantage rather than an economic point of view. According to FAO, forests constitute an integral part of urban development, stimulating cities and public health.

2.5.2 Carbon Storage

Carbon is stored in trees both above and below the soil, including in trees' stems, stumps, branches, bark, seeds, and leaves, as well as in live roots. Average biomass carbon density values, as estimated from forest inventories and/or spatially explicit mapping products, can be used to estimate the total amount of carbon stored in trees within an area of interest by multiplying density values by the forest area under consideration at the relevant scale of analysis (national, subnational, or within specific areas of interest). Satellite-Based Estimates (WHRC): Estimates of the carbon stored in trees are based on the biomass density maps on GFW Climate produced by the Woods Hole Research Center at a 30-meter spatial resolution and representative of the year 2000 (Baccini et al. 2012).
According to the FAO Global Forest Resource Assessment 2015, Nigeria has a total of 1.515 million metrics tons of carbon in its forest from 2000 (FAO 2015).

Considering the increasing population of Nigeria and heavily dependent on fossil fuel as a major source of energy consumption, the available forest coverage is not enough to absorb greenhouse gas emissions. According to IPCC, a global temperature rises of 1.5°C has been highlighted as a threshold which the planet cannot exceed without seeing the worst effects of climate change. Mary Robinson a former UN envoy said "to keep temperatures from rising more than 1.5°C,there is a need to shift the trajectory of carbon dioxide emissions such that we have zero emissions by 2050. She further stressed that it is a standing order given the extent of reliance on fossil fuels to power homes, vehicles and factories (www.ipcc.ch Retrieved 31st January 2019).

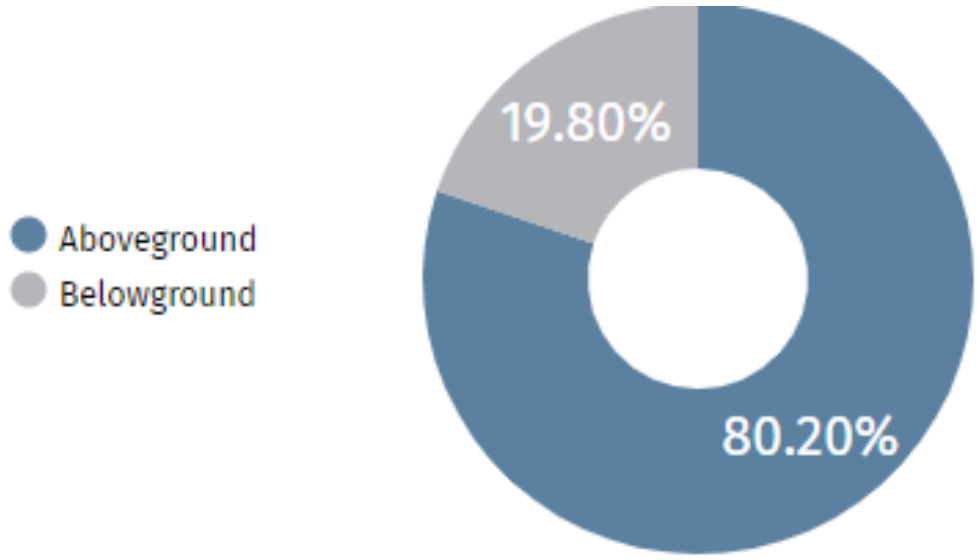

Figure 8: Total Carbon Stored in Nigeria Forest
Source: globalforestwatch.org

2.6 Forest Conservations

The world has lost nearly half of its forests for agriculture, development or resource extraction. Yet the value of the benefits that standing forests provide is immense: Tropical forests alone account for at least 30 per cent of the global mitigation action needed to halt climate change. Yet this value remains largely invisible (Conservation International Retrieved 10th April 2018). Forests provide essential environmental, social and economic functions, but alarming deforestation rates in the last 3 decades have caused at least half of the Earth's original forest cover to disappear (WWF Retrieved 10th April 2018).
Forest Conservation is the practice of planting and maintaining forest areas for the benefit and sustainability of future generation. The conservation of forest also aimed at a quick shift in the composition of trees species and age distribution. "The relationship between forest conservation and global warming deserves special attention; as forest plays an important role in absorbing carbon dioxide" (panelK.V et al. 2015).

Nigeria has lost about 96% of its natural forest, it is such a catastrophic situation that the country's vegetation is disappearing. The Director-General of Nigeria Conservation Foundation (NCF), asserted that there is absolute need to instill a concerted effort to grow more trees and stop felling of trees as fuel for cooking and furniture purposes, he further expatiated on different ways to gain back what we have lost through the eyes of illegal forest activities. He implores the people to embrace the 'Green Recovery Nigeria Initiative' which aimed at recovering about 25% of tree cover within the next three decades (vanguardngr.com Retrieved 25th January 2019).

Figure 9: Nigeria Forest
Source: vanguardngr.com

3 Methodology

Information in this thesis is gathered from secondary sources, which are mainly obtained from articles, journals, web information, online news platforms, official statistics of the government and thesis works. The information comprises a graphical representation of tree covers and loss in Nigeria since the year 2000 till date, causes and effects. The disposition of the Thesis focused on socioeconomic effects of forest loss, which is premised on vitiating factors affecting the forests coverages in Nigeria, which is formed within political and technical problems, after which I undertook a SWOT- analysis to identify future potential as well as underlying threats of Nigeria's forest industry.

The sources provided useful points of view employed for the successful completion of this thesis work as well as vital information relating to the research questions, which helps in drawing up conclusion.

4 Purpose and Research Questions

4.1 Purpose

This project work will help in creating awareness on the sustainable use of forest resources as well as providing a legal framework to improve forest industry and basis to curb illegal forest activities and ensure that issues relating with illegalities in forest industry are handled with consciousness. While the following questions are of high importance when talking about the loss of forest cover in Nigeria.

4.2 Research Questions

- Why the decline in Nigeria forest?
- What are the causes of Forest loss (the implications on climate and biodiversity)?
- Who is responsible for the causes and why?
- How can the problems be solved?

5 Theoretical Framework

There are several challenging factors militating forestry in Nigeria which is construed around two major problems facing Forestry in Nigeria. As propounded by Shadrach O. Akindele of *Department of Forestry and Wood Technology Federal University of Technology, Akure, Nigeria* “political and technical problems” as vitiating factors affecting forestry and management in Nigeria.

5.1 Political

Political instability and a long period of military rule affected the forest department in Nigeria, as the government poses undue pressure on revenue generation from forest products. There also exists a deep ignorance among the political leadership in Nigeria, such as the political will to cohere with the principles of sustainable forest management. Corruption also plays a huge role, from poor funding for researchers, late disbursement, and over-dependence on foreign loans. Sadly enough, the negligence on the part of the political leadership of Nigeria has allowed encroachment into the forest reserves economic benefits without any serious punishment for the encroacher.

5.1.1 Mismanagement

The depletion of forests in Nigeria poses an undeniable threat on the environment, due to general mismanagement. Nigeria being in the epicenter of the tropical rain forest girth has lost almost 95% of her forest cover to unmitigated mismanagement, which I viewed as negligence of government towards nature conservation.

5.1.2 Sustainability Issues

Nigeria is blessed with a large expanse of land and variable vegetation, but this important resource is not sustainably used or managed. Many rural dwellers in the past have treated our forest resources as inexhaustible (Klopez, 2010). Since the government controls 100% ownership of forest in Nigeria, the sustainability aspect is questionable. According to FAO, Nigeria has the highest rate of deforestation in Africa. Between 2000 and 2005 the country has lost 55.7% of its primary forest, and the rate of forest change has increased exponentially on a yearly basis.

Nigeria: Forest destination	
Ownership of forest land, 2000	
Public (%)	**100%**
Private (%)	**0.0%**
Other (%)	**0.0%**

Table 3: Forest designation in Nigeria
Source: rainforests.mongabay.com

5.1.3 Illegal Logging

The Nigeria forest reserve is estimated to be 10 million hectares, which totaled 10% of the country's land coverage, subjected to a high rate of deforestation; at the annual rate of 5% between 2010 and 2015 (FAO, 2015). The forest industry has been ample by huge deforestation anchored by illegal logging, resulting from weak governance and widespread corruption in the country. The increasing population in the country also serves as a catalyst to the rate of illegal activities within the forest belt, since there are no enough employment opportunities for the people. The current unemployment rate in Nigeria stood at 23.1% (CNBC Africa, Retrieved May 2019).

The Environmental Investment Agency 2017 (EIA), reports that the largest timber smuggling operations in history have been revealed, in its report showing over 1.4 million illegal rosewood logs from Nigeria, worth US$ 300 million exported to China where the former Minister of State for Environment, now Deputy Secretary General of the United Nations, Mrs. Amina Mohammed, was accused of fraudulent involvement in the illegal practices (Chinedum Uwaegbulam: guardian, Retrieved 2017). Although the allegation was later dismissed and pronounced as a mere misinterpretation of facts.

The continued illegal forest activities for commercial purposes in the country is threating the environment says Muhamadu Buhari, president of Nigeria. As much timber, teak wood and similar species are being fell without replenishment the more danger has it on the environment and the livelihood of the people (www.tribuneonlineng.com retrieved March 25 2019).

The News Agency of Nigeria 2017, reported the rate of illegal forest activities, having interviewed the farmers in Ekiti state in the Southwest region of the country. They described the act as indiscriminate and making the farmers worrisome, after which they urged the Forestry Department of the state to make efforts to curb the menace, such that the level of deforestation could be reduced to save the environment. According to the National Environmental Standards and Regulations Enforcement Agency 2017,(NESREA), The companies, organizations or individuals involved with environmental degradation through their operations will be dealt with (www.tribuneonlineng.com retrieved March 23 2019).

The illegal logging activities in the South-south and the Southwest forest belt of the country contributes more to the rate of deforestation in Nigeria (Adediran et al, 2016). The writers further stressed that there is a need for government to establish monitoring measures to prevent such illegal forest activities. The causative factor of illegal logging in Nigeria is attributed to the rate of unemployment, luring youths, custodian of community farmland engaged themselves in such illegalities to meet their ends needs.

The growing population has a huge relationship with the rate of unemployment in the country, with little or no employment opportunities for the citizens, luring the youth in the rural areas to venture into illegal forest activities as source of livelihood . 51.0 % of the population is urban (Worldmeters, 2019). The remaining 49% are rural dwellers, and much attention is not giving to the rural areas, this negligible act of the government gives rooms for the local people to encroach the forest belt to connive with the sawmillers and illegal wood exporters.

Figure 10: illegal logging in Nigeria
Source: EIA 2017

5.2 Technical

- Nigeria has a high biodiversity and host a richly diverse forest and wildlife, of about 89 species of birds, 274 mammals, 154 reptiles, 53 amphibians, and 4,715 species of higher plants (Rhett Butler, 2015). With all these natural endowments, little is known to Nigerians about many species deposited in Nigeria forest. Lack of modern equipment for most forestry operations, (no database) to foster forest management. Fire outbreaks from agricultural farms has a huge effect on the forest coverage, farmers intentionally set the farmland ablaze such that they can avoid clearing the farmland and prepare it for the next cultivation season. On the other hand, there are no adequate facilities to educate the locals and carry out research.

5.2.1 Climate Effects

As our planet has been subjected to extreme change in temperature either by virtue of "wicked problems" created by act of man or natural occurrence, so is Nigeria is not left out, and this change in climatic condition has posed a big threat to the forest sector in Nigeria, although negligence on the part of the government plays a big role in the success of the change. It is no doubt that farm owners and commercial farmers also contribute to the change through a clear cut of forest for agricultural purposes.

According to the Journal of Agriculture and Social Research (JASR) Vol. 12, No. 2, 2012, an increase in surface air temperature has been observed in Nigeria. The meteorological data as reported by UNSN (2001) shows that surface air temperature for Kano, Calabar and Lagos has increased since 1920. An increase of 0.25^0C for Calabar and an increase of between 0.25^0C to 0.5^0C for Kano. The greenhouse gas emission is an indication that surface temperature rise in Nigeria has good correlation with greenhouse gas emission which can cause a rise in sea level. The rise in sea level can result in coastal erosion, flooding, saltwater intrusion, mangrove degradation and other related socio-economic problems. Estimated land loss due to this sea level rise by 0.2m at present is 3,400m2 and future projection, say the next 50 to 100 years stand at 18,400m2 for sea level rise of 1m (Egwumah, 2009). With evidence of drought, especially in the Northern part of the country, which has reduced agricultural productivity.

Environmental impacts include the loss or degradation of forests, as illegal logging tends to be associated with poor forest management. This can result in the loss of habitats and biodiversity. For example, illegal logging is threatening the survival of some of the world's most endangered primates (Mittermeier et al., 2012), including orangutans in Indonesia (UNEP, 2011) and the Siberian tiger (EIA, 2014). Deforestation and forest degradation also have implications for climate change, as forests have a crucial role in both mitigating against and adapting to climate change. Illegal logging in nine forest producer countries is estimated to have released 190 million tons of carbon dioxide into the atmosphere in 2013 (Chatham House, 2015).
Moreover, deforestation leads to accumulation of global carbon, emitted from the burning of fossil fuels, in the atmosphere. The main consequences of this are global warming and climate change.

5.2.2 Global Warming

The current Earth's Energy Imbalance (EEI) is mostly the result of human activities and is driving global warming(Kevin E Trenberth 2009). The process of climate change had already begun and communities throughout the world were beginning to experience its effects. It is now clear that our climate future will include more weather extremes and shifts in the climate baseline (William Solecki 2011). It is in everyone's interest to meet the climate change challenge. Destabilization of the climate is having negative impacts everywhere around the globe (Will Steffen 2013).
The net carbon emissions from deforestation and degradation within tropical countries are estimated to have been 1.4 PgC yr-1 over the period 1990-2010 (about 16% of global carbon emissions). That percentage has declined in the last five years, in part, because rates of deforestation have declined and, in part, because fossil fuel use has continued to rise (Richard A Houghton 2012). Deforestation continues at an alarming rate. Globally, from 2000-2010, 13 million ha of forests and woodlands were converted annually to agriculture, biofuels, mining and urban land uses, or lost due to other causes such as fires and drought(McAlpine CA, Ryan JG, Seabrook L, Kim et al. 2015).

Nigerian Conservation Foundation (NCF) calls for urban regeneration as a means of gaining more trees cover such that could help the growing population to curb global warming. NCF

also advised that there is need to explore tree plantation for timbers, by so doing, farmlands will comprise of trees cover which could in turn serves a big advantage to the soil formation and prevent nitrogen leakage (vanguardngr.com Retrieved 25th January 2019).

5.2.3 Deforestation

Deforestation can be defined as the loss of vegetation or the selective exploitation of forests for specific or group of the first species for economic or social reasons (FAO 2008). Deforestation is ubiquitous in Nigeria, mostly on the loss of vegetation, loss of forest diversity. It is a continuous activity which accounts for vegetation degradation, loss of wildlife, plants and relative habitats.
It is envisaged that this would be achieved through providing financial incentives for countries, projects, or communities to reduce their emissions through avoiding deforestation, enhancing carbon stocks, and by ultimately sustainably managing their forests (Angelsen 2008, Knox et al. 2011, Venter et al. 2012). This is largely based on the fact that land use and land use change (mainly through deforestation and forest degradation) have contributed between 10-20 per cent of global CO2 emissions (IPCC 2014). Forest degradation as the loss of a certain forest property or function, such as biomass accumulation, canopy cover or avian diversity, which does not fully recover in the time before the next human intervention (Burivalova Z et. al 2015). Forest degradation and deforestation may negatively affect livelihood, ecosystem function, climate and biodiversity of the forest where it becomes key issues which in line with the Reducing Emissions from Deforestation and Forest Degradation (REDD) especially on tree species which also the animal's habitats (Noordyana Hassan 2014).

Specifically, forest resource deforestation continues to be a major challenge to the environmental and economic development in the country. This is due to several socioeconomic and environmental challenges that have strongly affected the capacity of forests to provide ecosystem services, causing a number of ecological consequences like soil erosion, and reduced capacity for watershed protection with possible flooding, reduced capacity for carbon sequestration, reduced biodiversity and instability of ecosystems and reduced availability of various wood and non-wood forest products and services. “Globally, 13 million ha of forest are cut down and converted to other land uses every year, specifically Africa has the largest of any region with deforestation”. According to United Nations Environmental Programme (UNEA), deforestation in Africa is twice the whole world rate. Therefore, understanding the drivers of deforestation and degradation is important for the development of policies and measures that aim to alter current trends in forest activities towards a more climate and biodiversity-friendly outcome. Deforestation and the consequences of environmental degradation are key factors challenging food security, community livelihood and sustainable development in Ethiopia (Mammo Siraj et.al 2016).
On global account, an additional 290,000 km2 of forests were cleared in the period 2007–2012 compared with 2000–2006, which is a net increase of 29% between the two periods, prior to Hansen et al.'s total of 2.3 million km2 of forest loss for the entire period (Hansen et al., 2013).

(Funmi Olasupo, 2016) The Food and Agriculture Organization of the UN says Nigeria loses about 350,000 to 400,000 hectares of land per year to deforestation. The organization, however, noted that, while the recommended forest cover for every nation is 26 per cent, the reverse is the case for Nigeria, because the country's forest cover is said to be less than six per cent. “The deforestation rate in the country is about 3.5 per cent per year, translating to a loss of 350,000–400,000 hectares of forest land per year (Institute of International Tropical Agriculture, IITA).

Figure 11: logger cutting tree
Source: vanguardngr.com

However, the forest belt of Nigeria from which wood and other products are obtained have been subjected to severe encroachments, vegetation degradation and de-reservation for agriculture, industrial development, urbanization to mention the few. Whereas lack of public awareness of forestry issues and its importance for sustainable management has been totally ignored (deforestation for arable farming).
According to EIA 2018, more than four million trees worth half a billion dollars were cut down in Nigeria from January 2017 to March 2018 EIA affirmed it to be the largest violation environmental convention in history.

Figure 12: Deforestation in Nigeria
Source: Channels TV

5.2.4 Impact on Soils

The presence of forest cover is important to conserve soil and water. It serves as a moderating variable for soil and water, thereby preventing soil erosion. FAO reported that Nigeria has lost 55.7% of its primary forest to deforestation between 2000 and 2005, making the country the highest of such vegetation degradation in the world which are mainly lost to clear-cut for logging, timber export, subsistence agriculture and among others, fetching woods for fuels (www.fao.org. Retrieved 19 February 2019). The act has impaired the environment, its negative implications on soil are no exception. Forest plays a major role in reducing soil and ecosystem hydrological effects and water balance. Trees capture, store, and distribute water to the soil and prevent erosion (Blanco-Canqui H., Lal R. 2010).

Nigeria Highland vegetation is characterized by a rich natural thick forest but due to the massive deforestation caused by urbanization, over exploitation of timber for export and increase in population created gully erosion problems, which could have been prevented through reforestation processes to prevent downpours from washing away natural habitats. (Emeodilichi H 2018). According to FAO, forests are an essential part of soil formation, as they perform functioning ecosystems and watershed, easing risks of flood and landslides.

5.3 The Causes

The cause could be rooted to the uncontrollable logging, and unregistered numbers of small and medium sized sawmills owned by local businessmen which contribute to high demand

for wood planks (over exploitation and exportation of industrial round woods to China, India etc.). There has been huge public pressure on how to manage forests in Nigeria, since there is high demand for timber products, and this will subject our forest to continuous loss.
Although, it could be said that the industry has contributed immensely to the development of the indigenous entrepreneurs, but it has on the contrary amount to a mixed blessing as it has contributed to the problems of regulating forest overexploitation. An estimated 286,000m^3 of logs is lost to illegal forest activities (felling) every year (Ikumoguniyi, 1980). Poverty could be another vitiating factor in the loss of forest in the country. High rate of poverty in the country accounted for much causes of deforestation, since 95% of the population depends mainly on the use of kerosene for cooking, but because of high cost and scarcity, as such, a substantial number of the populace has relied on the use of wood fuel for private use and for business purposes (Emeodilichi H 2018). With such manner of high demand for wood fuels (coals), cutting down of trees has become a daily activity for many people in the rural areas, which results in a high rate of deforestation.

Similarly, FAO lists five drivers as the main causes of loss of forest cover in Nigeria, as follows:

- **Commodity-driven deforestation**: long-term, permanent conversion of forest and shrubland to non-forest land use such as agriculture (including oil palm), mining, or energy infrastructure.
- **Shifting agriculture**: small to medium-scale forest and shrubland conversion for agriculture that is later abandoned and followed by subsequent forest regrowth.
- **Forestry**: large-scale forestry operations occurring within managed forests and tree plantations.
- **Wildfire**: large-scale forest loss resulting from the burning of forest vegetation with no visible human conversion or agricultural activity afterwards.
- **Urbanization**: forest and shrubland conversion for the expansion and intensification of existing urban centers.

6 Way Forward

The need to conserve forest is non-debatable as the economy is accorded much attention by governments, so it is consequential to have nature in contemplation. Not only does forest provide ecosystem services in relation to CO2 emissions, rather the human connection with nature goes a long way in the mental and psychological balance scorecard. So, the locals should embrace the presence of forest, and perceive forest conservation as civic responsibility and reforestation to be an integral part of human existence. Nigerian environment has since 1980s been suffering from serious degradation arising from pollution, population growth, deforestation and climate change in various parts of the country.

However, the negative effects of the degradation had already started manifesting in the form of desertification and water pollution, having adverse effects on the livelihood of Nigerians in many parts of the country.

6.1 Forest Legislation

The Nigeria forest legislation in charge of decision making, management, use and conservation of forest and trees resources is governed by National Forest Policy, Federal Department of Forestry, Abuja. If there is an implementation of proper forest legislation, there are huge potentials for Nigeria to be able to meet up with a minimum requirement of 10% for forest coverage, with the exception of canopies. Proper forest legislation will also help in curbing illegal activities in the forest.

6.2 Stake Holder Involvement

The local governments need to mobilise rural communities to participate in forest activities more prevalently at the Northern part of Nigeria where they experience huge environmental degradation due to acute dryness. However, that is not to ignore rural communities at other parts of the country, especially when local livelihood is majorly dependent of the forest, either for food protection, fetching of woods for fuel, preservation and formation of soil, and nutrient leakage in the forests.

Having incorporated local involvement, it is important to make the forest business accessible for interest groups to come in and invest. Since there has been a series of Non-Governmental Organisations with existing sustainable forest programmes, targeted to solving environment-related issues government must offer full supports such as ease of acquiring land for tree planting and grant subsidies for the interested groups. Involvement of civil society incorporated tree planting scheme such as the involvement of Women in Agriculture (WIA) in promoting forest activities. Although, there will be much connection with the facts that the involvement of NGOs and other privates' entities will be profits driven and anchored with an economic point of view, yet it promises to have a great connection in terms of providing ecological benefits to Nigeria's environmental problems.

6.3 A SWOT analysis of Nigeria Forest Industry

6.3.1 The objective of the SWOT analysis

The aim is to identify the strengths, weaknesses, opportunities as well as threats associated with Forest industry and management given that 100% ownership of Nigeria forests is accrued to the government. Having identified the socio-economic aspects, the summary of the SWOT-analysis of Nigeria's forest is as followed:

Strengths: Resources available Internal	Land, Labour, Capital, biodiversity, FAO support: Nigeria is blessed with arable land suitable for forest flourishing. Availability of human resources needed forest maintenance. Availability of varieties of forest types and wood species needed for natural forest coverage. Nigeria's forest industry get supports from FAO and the World Bank for forest development and to tackle sustainability issues.
Weakness: Physical environment, unfavourable condition Internal	Tree loggers' attitudes, Wildlife, Poor infrastructure, Poor forest policies, afforestation costs, landholder, the presence of military dictatorship, pest and diseases, government negligence, Climate change, Over exploitation of forest products, Poor government policies, Lack of technological know-how, Lack of proper education.
Opportunity: Economic factors External	Afforestation and reforestation, conservation of natural forests, Improvement in soil condition, Forest fertilization, high demand for timber and teak wood from overseas
Threat: Social factors External	Global warming, deforestation, lack of stakeholder's involvement.

Table 4: SWOT-analysis of Nigeria forest Industry

7 Discussion and Conclusion

It is obvious that Nigeria environment has suffered greatly from degradation sandwiched by rising population deforestation and climate change in every part of the country.

The negative impacts of the degradation are apparent in the form of pollution, desertification, having adverse effects on the livelihood of Nigerians. The Lagos Chamber of Commerce, 2018 suggest that it is better to encourage the exportation of furniture than the exportation of woods. “Value addition has a more beneficial impact on the economy than primary product export.

Forestry in Nigeria is in transition, as such a working system needs to be employed by the ministry of the environment so as to promote forest investment, considering the economic and ecological advantages and benefits in the forest. Therefore, government should encourage individuals and private organisations to invest in forestry and also ban the export of forest product, in that case, the demand for forest products will not influence the attitude to invest in the forest industry and government should introduce Forest Policing in support of functioning forest legislation. I believe that Nigeria has the minimum required land areas recommended for reforestation, as tree cover gain will be a great technology employable to tackle the climate change hitting our societies.

On the other hand, since more value has been placed on the economic benefits of the forest, reforestation is an unconditional process to apt ecological advantages in the long run. As much consciousness has been given to environmental impact and management, such consciousness must be channelled to deforestation.

Nigeria government should decentralize the forest ownership such that, stakeholders, NGO’s and other interest groups can invest in forestry as well soften the Foreign direct investment policies and so that countries like Finland, Sweden and France can be attracted to invest in forestry in Nigeria considering the suitable climatic conditions of Nigeria with about 75% arable land. This could be a win-win situation, since its takes about 30 to 40 years to harvest trees, within that period the presence of trees covers would have serves a substantial ecological benefits in absorbing the green house carbon emissions, purify the air and water and well as conserve the soils against erosion. By so doing we will be able to meet with the export demand just as in the case of crude oil, cocoa and other exportable commodities in the country without the fear of losing more forest to deforestation. Since it is business, the forest owners will enforce proper monitoring and policing to ensure that the forest belt is protected.

The implementation afforestation and tree planting scheme organized by the government is highly commendable, it is expected of the Ministry of Environment to make it continuous process especially in the areas that have experienced environmental degradation. More so, the need to restructure forest procedures and management is of high necessity to the country, thereby empowering the agency to be functional and engaged the stakeholders, as well as the implementation of "Due Process" but be taken into cognisance.

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