



AMERICAN JOURNAL OF LIFE SCIENCE AND INNOVATION (AJLSI)

ISSN: 2833-1397 (ONLINE)

VOLUME 1 ISSUE 2 (2022)



INDEXED IN



PUBLISHED BY: E-PALLI, DELAWARE, USA

Impact of Forest Policy and Law on Forest Management in Gambari Forest Reserve in Oyo State, Nigeria

Olaniyi I.S^{1*}, Kilasho A.R¹, Oluborode J.O², Jackson V.O²

Article Information

Received: September 24, 2022

Accepted: October 05, 2022

Published: October 10, 2022

Keywords

Forest Policy and Law, Forest Management, Forest Offences, Sustainable Forest Management, Deforestation, Forest Degradation.

ABSTRACT

This study assessed the impact of forest policy and law on the management of Gambari Forest Reserve in order to identify factors that would improve forest policy and law as well as their implementation and enforcement. Random sampling techniques was used in this study. Both questionnaire and interview methods were used in collecting the needed information from the respondents. One hundred and twenty (120) copies of structured questionnaires were used to obtain information from the community dwellers. Descriptive statistics was used to analyze the demographic characteristics of the respondents. The Landsat Imagery of the forest reserve was analyzed using ArcGIS to generate information about the forest cover changes between 1987 and 2020. Logistic regression was also used to determine the factors responsible for enhancement of implementation and enforcement of forest policy and law. Results show that 54.4% of the respondents agreed that the forest policy and law were effective in upholding the management of the forest sustainably, 34.2% stated that the forest policy and law were slightly effective, while only 11.3% of them implied that forest policy and law was ineffective. It was also revealed from the study that about 21% of the forest land cover has been degraded from 163.50km² in 1987 to 143.67km² in 2020. Findings also showed that, the enhancement of implementation and enforcement of forest policy and law would be mostly influenced by Increase staff recruitment with odd ratio (2.33), followed by Provision of training (1.28), also Increase in penalty forest offenders (1.20) and lastly, creation of awareness program (1.00). Their odd ratios are up to 1.0.

INTRODUCTION

Forests are an essential part of the universe; however, the wide ranges of benefit derived from forests are fast diminishing due to the profound dependency on its fragile resources for economic growth without steps to take adequate care of the forest itself. Since 1980's, demand for forest products, especially timber has become insatiably high as a results of increasing human population pressure and economic growth. This led to unregulated forest exploitation, thus resulting in degradation of the resources in the country.

The rate at which forests of different types are disappearing for years now is alarming and the trend remains unprecedented. Globally, the high demand for timber and other forest product has resulted in the high level of forest encroachment and high rate of deforestation and forest degradation (Yaro *et al.*, 2016). Nigeria and many other developing countries are suffering from serious environmental degradation primarily because of the rapid growth in population which has not only brought about gross encroachment and damage to natural forest, but has also brought unacceptable quality of life conditions in the human community environment (Harvey, 1998; Oduntan *et al.*, 2013). The Global Forest Resources Assessment by FAO (2005) ranks Nigeria 4th globally among countries with the highest annual deforestation rate (3.3%) and net annual area change (410,000Ha). Concern is therefore rising about the rapid rate of tropical deforestation, which is the temporary or permanent clearance of forest, for agriculture and other

purposes by man. Forest reservation as a legal measure for protection of forest resources which enables the society to have continued access to quality and quantity of forest goods and services (Oso *et al.*, 2017). Law is legally binding document which specifies right and duties based on policy vision or goals (Larinde and Chima, 2014). Forest Laws establish objectives, institutional structures and confirm ownership.

Within the past years, there has emerged expanding concern around the rate of deforestation in tropical forest and the need to sustain the remaining tropical forest. Alamu and Agbeja (2011), iterated that deforestation is highly severe in South-West Nigeria and this proceeds unabated. Various forest offences which are devoid of substantial penalties contribute to the over exploitation of our forest land. Nigeria has one of the highest rates of forest loss (3.5%) in the world; losing about 6.1 million hectares or 35.7% of its forest cover since 1990, between 2000 and 2005. Nigeria is reported to have lost 79% of its old growth forests and is losing since 2000 with 11% of its primary forest annually (Herbert *et al.*, 2013). While the rate of deforestation in Nigeria occurs at 4000km² per year, reforestation rate is a mere 10km² per year (Herbert *et al.*, 2013). As part of the sustainable wood resource supply and ecosystems management strategies, colonial Nigerian government gazetted some areas as forest reserves. These reserves have over the years suffered from poor inventory, depletion and poor management (Fasona *et al.* 2018).

Forest policy lacks legal backing and hence its enforcement

¹ Department of Social and Environmental Forestry, University of Ibadan, Nigeria

² Department of Forest Production and Products, University of Ibadan, Nigeria

* Corresponding author's e-mail: olaniyitunus@gmail.com

is difficult. The Nigeria Forestry Act, 1937, is outdated. The Forestry Policy is subsumed in the National Agricultural Policy of 1988 (Aruofor, 2001). The World Bank (2006) also stated that the concern of management of forest is broadly on implementation and enforcement of forest law.

The management of most forest reserves in Nigeria is the exclusive right of the staff and governor of respective state forestry department in accordance with the 1978 land use decree which gives ownership and decision of every land and land use within that territory to the governor of the states of Nigeria (Land use act, 1978). The rule of law must be effective to attain sustainable development. Fasona et. al, (2018) stated that ineffective policy implementation are major challenges facing the management of the reserves. Thus, this research work aims at assessing the impact of forest policy and law and the consequences of the existing element of policy and law in Gambari forest reserve in Oyo State.

METHODOLOGY

Study area

The study was carried out in Gambari Forest Reserve located in Oluyole Local Government Area (LGA) of Oyo state. It is one of the early forest reserves in the state and it is divided into 5 series namely Gambari, Ibusogboro, Onipe, Olonde and Mamu (Larinde and Olasupo, 2011). Gambari forest reserve is a lowland forest, the reserve is located between latitude $7^{\circ} 25'$ and $7^{\circ} 55'N$ and longitude $3^{\circ} 53'$ and $3^{\circ} 9'E$. It is situated at the southern part of Ibadan, bounded on the west by River Ona and on the east by the main road of Ibadan to Ijebu-ode. Both dry and wet seasons are experienced in the reserve. Dry season lasts for 3 months (December to February). The average annual rainfall is about 1140mm and average annual temperature is about $26.40^{\circ}C$ ($800^{\circ}F$) (Larinde and Olasupo, 2011).

Study Approach

This study utilized both primary and secondary sources of data. The primary data for this study was collected through structured questionnaires. While, the secondary source of data was the satellite imageries of Gambari forest reserve, which was used to generate the changes in forest cover between 1987 and 2020. Data on Oyo state forest policy and law on the use of forest resources were sourced from Oyo State Ministry of Environment, Ibadan, Oyo state, Ibadan.

Sampling Techniques and sampling size

The targeted respondents for this study were timber contractors, forest officials, and individuals who have farmlands. The reserve is divided into five (5) series of which 3 communities were randomly selected which are Onipe, Ibusogboro, and Mamu, all located around the reserve. A total of One hundred and twenty (120) questionnaires were administered to the respondents, of which twenty (20) were forest officials and staffs, fifty (50) were farmers, thirty (30) were timber contractors

and twenty (20) were those involved in trading activities within the forest reserve.

Determination of difference in vegetation index

Normalized Difference Vegetation Index was estimated through analysis of satellite images to give indication of greenness. NDVI is an indicator of vegetation health, because degradation of ecosystem vegetation, or decrease in greenness would be reflected (Menesses-Tovar, 2011). The base map for Gambari forest reserve was obtained from <https://www.protectedplanet.net/36817> which was exported to Arc GIS software. Imageries for the year 1987 and 2020 was acquired using LandsAT imagery with 60 meters' spatial resolution for LandsAT. The imageries were classified using NDVI classification. The map of the study area was geo-referenced and the shape file was created, the shape file was then clipped into the images, vectorization and area computation was done and change detected was analyzed using percentage. The 1987 imagery was obtained under LandsAT 5 with the sensor of Multispectral Scanner (MSS) while, the 2020 imagery was obtained under LandsAT 8 with the sensor of Operational Land Image (OLI) and Thermal Infrared Sensor (TIR).

Data analysis

The binary logistics models were used in the analysis of the data. The two common binary models are the Logit and Probit. The logistics model is particularly preferred because of the unique information. The logit of a response p between 0 and 1 is given as:

$$\text{Logit}(p) = \log(p/1-p) = \log(p) - \log(1-p)$$

The simplest form of Logit model is expressed as:

$$\text{Logit}(p_i) = a + b_1x_1 + \dots + b_ix_i \dots \dots \dots \text{Equation 1}$$

Where,

x_i = vector of predictor or independent variables.

p_i = probability of factors that would enhance forest policy and law.

a and b = regression parameters.

RESULTS AND DISCUSSION

Table 1 showed that, most (76.7%) of the respondents were males while the remaining 23.3% were females. This indicated that forestry profession in Oyo state is male dominated. This corroborates the findings of Feleyimu (2010) and Ajejumo *et al* (2018) that forestry activities and staff are male dominated. The age group of the respondents showed that 3.3% were between 21 to 30 years, 32.5% were between the age brackets of 31 to 40 years, 50.0% were between 41 to 50 years, while 14.2% were between 51 to 60 years. This implies that most of these respondents are in their economically active years and this put more pressure on the forest reserve.

The findings revealed that 11.7% of the respondents were primary school holders, 37.5% were secondary school holders, while 50.8% were tertiary holders. This implies that most of the respondents have above secondary school education and educated, they further to tertiary

Table 1: Demographic characteristics of the respondents

Gender of the respondent	Frequency	Percentage
Female	28	23.3
Male	92	76.7
Total	120	100
Age of the respondents (years)		
21-30	4	3.3
31-40	39	32.5
41-50	60	50.0
51-60	17	14.2
61-70	-	-
71-80	-	-
81-90	-	-
Total	120	100
Level of education		
Primary	14	11.7
Secondary	45	37.5
Tertiary	61	50.8
Total	120	100
Native of the community		
No	30	25.0
Total	120	100
Source of income		
Forester	20	16.7
Farmer	50	41.7
Timber contractor	30	25.0
Trading and others	20	16.6
Total	120	100

school.

As regarding the occupation of the respondents, majority of them were farmers (41.7%) and timber contractors (25.0%) and 16.7% for forest officials, lastly 16.6% for traders. Also, the study revealed that most of the respondents (75%) are native of the study area while only few of them (25%) must have settled in the area many years ago in search for opportunity for subsistence farming. This uphold the report of Calibre and SCC (2000) which, reported that people living in and around the forest include smallholders practicing subsistence farming and settlers who have come in the areas to search for new opportunity in agriculture.

As shown in Table 2, a total of 54.4% of the respondents agreed on the indicators that the forest policy and law was effective in upholding the management of the forest reserve sustainably, 34.2% stated that the forest policy and law was slightly effective and 11.3% implied that the forest policy and law was ineffective. Half of the respondents attested the effectiveness of forest policy and law in upholding the sustainable management of Gambari forest reserve. It is quite not impressive that 50.8% of the respondents stated that the forest policy and law was adequate in protecting the land from acquisition. Of all the respondents, the farmers stated that 74.2% of the forest land area was protected by the legal system.

The findings revealed that 54.4% of the respondents indicated that forest regulations are effective and loggers and saw milling activities are regulated, but there was no consensus whether management plan exists for the study area. When probed on whether it was conventional to acquire some land or allow settlements and farming in the forest reserve, the leader of forest officers noted that all we know is that some people can farm in certain areas in the forest reserve, and are allowed to help nurture the

Table 2: Analysis of all respondents to the effectiveness of elements of forest policy and law in Gambari

		EFF		S.EFF		INEFF	
	Indicators	FREQ	%	FREQ	%	FREQ	%
1	The management of the forest reserve	74	61.7	36	30.0	10	8.3
2	Land protected from acquisition by individuals	61	50.8	46	38.3	13	10.8
3	Perception the gazette notice	75	62.5	36	30.0	9	7.5
4	Gazetted forest areas protected by legal system	89	74.2	27	22.5	4	3.3
5	Forest lands protected from illegal entry	68	56.7	45	37.5	7	5.8
6	Reserve settlement court nowadays	53	44.2	55	45.8	12	10.0
7	Trust funds use for regeneration and afforestation	54	45.0	51	42.5	15	12.5
8	Prevention of forestry offences	58	48.3	50	41.7	12	10.0
9	Farmers adhere to the order from planting permanent crops	70	58.3	26	21.7	24	20.0
10	Prohibition of destruction of forest produce	62	51.7	36	30.0	22	18.3
11	Provision for the survey and demarcation of forest reserve	65	54.2	39	32.5	16	13.3
12	Provision for seizure and detention	69	57.5	45	37.5	6	5.0
13	Community participation program	59	49.2	49	40.8	12	10.0
14	Submission of license and permit render return and account for inspection	67	55.8	39	32.5	14	11.7
15	Safety of forest guard	58	48.3	38	31.7	24	20.0

16	Prohibition of act that might cause obstruction of any way or cause danger to navigation	61	50.8	48	40.0	11	9.2
17	Grants and support out of public revenue for the encouragement of forestry	49	40.8	47	39.2	24	20.0
18	Regulation of kindling fires	58	48.3	35	29.2	27	22.5
19	Prohibition of trespassing	51	42.5	53	44.2	16	13.3
20	Prosecution of forest offenders	84	70.0	32	26.7	4	3.3
21	Issuance of permit and permit to sawmill	87	72.5	29	24.2	4	3.3
	Total	1372		862		286	
	Average	65.3	54.4	41.0	34.2	13.6	11.3

trees but they are not allowed to harvest the timbers. In addition, although the forest officials provided information that illegal (unpermitted) logging activities were punished, either by fine or litigation in courts, this could not be justified. For examples, when the forest officials were asked for a specific example of such case(s) of punishment, one of the forest officials noted that, when arrested some of them (loggers and poachers) bribe their way out.

ANALYSIS OF THE EXTENT OF FOREST COVER

The study shows that the forested area which covers about 163.40 km² in 1987, had been reduced to 143.67 km²

by 2020 showing a 20.96% decrease in forest cover and a corresponding increase in non-forested area from 8.18 km² in 1987 to about 36.16 km² in 2020 as shown in table 3. The classified images showed the two land cover classes (Forested and Non-forested) identified from the Landsat imageries. Gambari Forest Reserve is shown to have undergone some changes and the status of the forested area has been decreasing within the last 33 years. However, the reserve is said to be known for its plantation establishment which dominated by exotic trees and would coppice under good management care. There has been reduction in the forest cover in Gambari forest reserve between 1987 and 2020 with a 20.96% reduction in the forest cover

Table 3: Land cover changes of Gambari Forest Reserve

Year	Forested		Non forested	
	Area (km ²)	Percentage	Area (km ²)	Percentage
1987	163.40	94.75	8.18	4.74
2020	136.29	79.03	36.16	20.96

Table 4: Direction of changes of Gambari Forest Reserve (1987-2020)

Land cover	1987 – 2020	
	Changes	
	Area (km ²)	Percentage
Forested	- 27.11	- 15.72
Non-forested	+ 27.98	+ 16.22

Note: + = Increase; - = Decrease.

Table 5: Logit Binary Nature of the Factors That Would Enhance Implementation and Enforcement of Forest Policy and Law

Dependent variable EFPL		
Constant	Coefficient	Odd ratio
	20.48	2.073
Independent variables	Coefficient	Odd ratio
Provision of patrol vehicle	-0.132	0.876
Increase staff recruitment	0.845	2.328*
Provision of safety kit	-0.664	0.515
Increase in penalty forest offender	0.186	1.205*
Increase in salaries	-0.138	0.871
Creation of awareness program	0.003	1.003*

Provision of training	0.250	1.284*
Quick and unbiased prosecution	-0.004	0.996
Good governance	-0.144	0.866

Source: Field study, 2021

CONCLUSION

The study revealed that forest policy and law in Oyo state have been slightly effective in controlling forest offences in the forest reserve as a result of inadequate number of forest officers. Therefore, recruitment of staffs, provision of training to the staffs and increase in penalty of forest offenders are factors that have statistically proven to be high determinant to the implementation and enforcement of forest policy and law.

RECOMMENDATION

There should be regular evaluation on the compliance with the forest policy and law in Gambari forest reserve. The existing elements of forest policy and law within Gambari forest reserve should be strongly adhered to and punishment vehemently executed for people who violate the law. Forest extension workers should work in Gambari forest reserve to educate them on the ecological and social benefits of the forest reserve and to enable them to be able to make right decision towards sustainability. The state forestry department should recruit more forest officials in monitoring of the forest reserve. Forest staffs should be trained regularly so as to increase their performances and also work effectively.

REFERENCE

- Adejumo, A.A. (2019). Benefits of forest legislation enforcement on the status of Onigambari forest reserve. *International Journal of Environment, Agriculture and Biotechnology*, 4(6). <https://dx.doi.org/10.22161/ijeab.46.26>
- Alamu, L. O. and Agbeja, B. O. (2011). Deforestation and endangered indigenous tree species in south-west Nigeria. *International Journal of Biodiversity and Conservation*, 3(7), 291-297.
- Arufor (2001). A brief on the forestry outlook study, Federal department of forestry.
- Calibre and SCC. (2000). *Number of Forest dependent People in Feasibility study for the UK Department for International Development of Forestry Research Programme*. The Statistical Service Center, University of Reading, UK.
- Dada, F. O. A., Jibrin, G. M., & Ijeoma, A. (2006). Macmillian Nigeria Secondary atlas, Lagos: Macmillian. 136,
- FAO (2005). *Deforestation data for Nigeria, 1990-2005*. Retrieved from <http://news.mongabay.com/2005/1115-forests>
- FAO. (2005). Progress towards sustainable development. 147.
- Faleyimu, O.I (2010). Status of Forest Policy Implementation in South-west Nigeria. Unpublished Ph.D Thesis, University of Ibadan, Ibadan. April, 2010. 271
- Fasona M., Soneye. A., Oludare A., Omojola. A., Akintuyi.A., Adeonipekun. P., Ariori.A., Gbenga.O., Ogundipe.O., and Udofia.S., (2018). Deforestation and land cover changes in the forest reserves and protected areas of Southwest Nigeria.
- Harvey, F.L. (1998). Final Report on Proposed Environmental Action Program. *Main Report*, 1, 2-3.
- Herbert E.B, Ashong C.A, and Abdullahi S.B. (2013). press coverage of climate change issues in Nigeria and Implications for Public Participation Opportunities. *Journal of sustainable development*. 62. 56-69.
- Larinde, S. L., & Chima, U. D. (2014). Challenges Of Forest Management And National Security Issues In Nigeria. In *Being A Paper Presented At The 37th Annual Conference Of The Forestry Association Of Nigeria (EAN), At Minna, Niger State, Nigeria*.
- Larinde, S.L. and Olasupo, O.O. (2011). Socio-economic Importance of Fuelwood Production in Gambari Forest Reserve Area, Oyo State, Nigeria. *Journal of Agriculture and Social Research*, 11(1), 201-210.
- Oduntan, O.O., Soaga, J.A.O. Akinyemi, A.F. and Ojo, S.O. (2013). Human Activities, Pressure and its Threat on Forest Reserves in Yewa Division of Ogun State, Nigeria. *Journal of Environmental Research and Management* 4(5), 260-26.
- Oso, A.O., Agbeja, B.O., Faleyimu, O. (2017). Perceived forest offences among Stakeholders and their impact on Sustainable forest reserves management in South-western Nigeria. *Academia Journal of Agricultural Research*, 5(4), 75-86.
- World Bank. (2004). *Sustaining Forests: A Development Strategy*. Washington, D.C: World Bank press, 1-99.
- Yaro, M.A.; Okon, A.E.; Bisong, F.E. and Ukpali, O. (2016). Impact of Forest Encroachment on Rural Livelihood in Akamkpa Division of Cross River National Park, Nigeria. *Journal of Environment and Earth Science* 6(2), 76-86.