Assessment of Forestry Management Practices for Improving Timber Production in Kaduna State, Nigeria

Nwankwo Franca Chinenye[a], Okwori Robert Ogbanje[b], Mohammed Bala Maik[c]
Department of Industrial and Technology Education,
Federal University of Technology Minna,
Niger State, Nigeria

Email: francanwankwo@futminna.edu.ng

Abstract: *The scarcity of high grade timber, substitution of low grade timber for high grade timber by furniture makers and the inflation on the prices of available timber has caused great concern by the users of timber products. This study was carried out to identify the forestry management practices for improving timber production. The area of the study is Kaduna State Nigeria. A survey research design was employed for the study. A total of 102 respondents were used as the study population. A structured questionnaire was developed and used for data collection. The Mean and Standard Deviation were used to answer research questions, while z- test statistic was employed to test the three null hypotheses. The Statistical Package for Social Sciences (SPSS) version 20.00 was employed for all statistical calculations. The findings of the study revealed that Clear cutting, Shelter wood, Seed tree, incorporating Villagers into the protection of forest and forest reserves were the forestry management practices for timber production. It was recommended that more timber plantations should be established to meet the timber demand and also to reduce the logging pressure placed on existing forest reserves, Non-Governmental Organizations (NGOs) with interest in conservation of natural resources should be incorporated into the preservation and establishment of forest reserves. The numbers of Forestry staff should be increased because study revealed that there is inadequate staff for the forest reserves.*

Keywords: *Forestry Management, Silviculture, Timber production, Management Practices*

1.INTRODUC TION

The obvious scarcity of some high-grade timber like and high progression on the inflation on the prices of the available timbers across Nigeria has made the production of furniture more expensive and in turn putting some forest workers out of job. Scarcity and inflation of timber are either caused by a lot of factors ranging from mismanagement of forest resources, inadequate care or attention given to forest management, hoarding of timber or deforestation. Kaduna State has numerous forests and forest reserves yet the scarcity of timber is on the increase. This observation could mean that, the regulatory body governing forestry management in Kaduna State is weak, there are insufficient timber plantations in the state to meet the demand and supply need of consumers, the forestry management practices are not implemented or the regulations on timber production are not properly adhered to which directly affect the quality and quantity of timber production in Kaduna state of Nigeria. Therefore, this study will identify some forestry management practices as it affects timber production in Kaduna State Nigeria.

Forestry management is the branch of forestry concerned with the administrative, technical and scientific aspects of forest guideline and laws governing forest usage. This includes management for wildlife, recreation, silviculture, aesthetics, fish, urban values, water, forest genetic resources and other forest resource values (Canada's Ministry of Forests and Range, 2008). Forestry management can be seen as the planning of the planting of forest products,

managing resources, setting of objectives, deploying the necessary human and financial assets needed for better productivity and sustenance of forest products.

Silviculture refers to the establishment and management of trees for wood production. The potential to manipulate tree and forest growth so as to enhance their value or the benefits they provide makes silviculture the most powerful tool of the farm forester. (Farm Forest Line, 2009).

Silviculture is the art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands to meet the diverse needs and values of landowners and society on sustainable basis (United States Forest Service, 2011).
Despite the numerous forests and forest reserves and vast forest lands, Nigeria still suffer timber scarcity and availability of immature timber in the market. The forests continue to depreciate in its products making it more difficult for accessibility of desired forest products. Federal Government of Nigeria (Federal Republic of Nigeria, 2006) opined that the reservation of forests in most part of Nigeria reached its highest point in the mid 1950's particularly in the Northern States where approximately 42,000 km2 were preserved. Between 1960 and 1972 an area of over 12,900 km2 was propositioned for reservation of forest reserves in the Northern States. FGN further stated that most other forested habitats in Nigeria are rapidly declining. Several measures are in place to conserve Nigeria's forest resources but how effective these policies have been implemented should be a great concern.

Timber production is a continuous process of producing mature and durable timber. Daponte, (2004) defined timber production as the whole process involved in the processing of timber which include: site preparation, planting of the seedlings, thinning of the tree, felling/removal of the tree and conversion processes. With proper planning and adequate forestry operational practices, forest logging need not greatly interrupt forest processes nor largely weaken the future viability for a wide range of forest uses. The comprehensive forest management plan includes maps and descriptions of areas to be harvested, areas to be protected, contractual information, and other general policies (Putz, 1994). With great concern about the scarcity of some high-grade timbers like Mansonia (*mansonia altissima*) and Teak (*tectona grandis*), inflation in the cost of available timbers, it is paramount to identify the causes of these problems mentioned above.

1.1 Purpose of the Study

The purpose of this study is to identify forestry management practices for improving timber production. The specific objectives of the study are to:

i. identify existing forestry management practices adopted for improving timber production in Kaduna State
ii. Determine possible barriers militating against the implementation forestry management practices for improving timber production
iii. Determine ways for improving forestry management practices for enhancing timber production

1.2 Significance of the Study

The findings of this study will be beneficial to the Forestry Department of the Ministry of Environment and Natural Resources and other forest management bodies, foresters, loggers, researchers in academic and research institutes, Woodwork and Forestry students, Managements of Forest plantations and forest institutes.

2. LITERATURE REVIEW

The managerial techniques adopted by forest managers has a direct effect on the rate of timber production in any given nation or society. With the rate of incessant illegal logging and lack of proper managerial and administrative practices adopted by forest managers, there is an increase in the scarcity and inflation in the prices of timber. According to Reti (1983), a number of factors have contributed to the scarcity of timber especially high-grade timbers and inflation in the prices of available timbers. Some of them include: poor forest management which include the inability of forest managers to monitor the logging activities that take place in the forests, deforestation as a result of indiscriminate clearing and burning of trees, poor silvicultural practices and inability to maintain a sustainable and effective administrative forest practices. Indiscriminate clearing and burning of forests on higher elevations have adversely affected the domestic timber supply despite the variety and the abundance of large trees in African forests, these forests (covering approximately 340 million ha) contain only a relatively small number of species that can be considered commercially viable. Harvesting of timber is often below the potential volume that can be removed, due to strict market requirements that make concessionaires concentrate on harvesting only the currently highly valued species (the "redwoods"). Nigeria's forest is being progressively exhausted because activities by human arising from mining activities, road development, oil exploitation, agricultural farming. These continuous activities are barriers to the continued control and preservation of forests which were previously the trademark laws governing forestry in Nigeria. When the utilization of various forest resources are not controlled, it causes deforestation, this in turn results to disinvestment for generations to come. Illegal logging, urbanization around forest areas and trading of timber products are seen as continuous threats to Nigerian forests reserves (Olatunbosun, 2010). Kishor and Oksanen (2006) stated that the widespread failure of forest governance characterized by illegal logging, associated illegal trade, and corruption directly undermines sustainable economic growth, equitable development, and environmental conservation, this puts at risk the poor forest-dependent populations, which rely on timber and non-timber forest products; undermines responsible forest enterprises by distorting timber markets and reducing profitability; and results in a loss of government revenue that could be invested in sustainable forest management or general economic development

3. METHODOLOGY

Survey research design was adopted for this study. The area of study consists of 48 Forest reserves located in 18 local government areas in Kaduna state. The forest reserves are distributed into 18 forest stations in Kaduna. The population for the study was the whole 102 staff of the department of forestry in Kaduna State. The respondents were drawn from the Forest Heads of Sections and the Forest Field Officers of the18 forest stations in Kaduna state. Structured Questionnaire was adopted for the study. Each questionnaire item was structured to have a four-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). One hundred and two questionnaires were administered but only 100 were returned by the respondents. Mean, Standard deviation and z-test were the statistical tools employed for data analysis. The three research questions were answered using Mean, Standard deviation, while z- test statistic was used to test the null hypotheses at 0.05 level of significance. Based on the four-point scale which were assigned numerical value of 4, 3, 2, and 1 for Strongly Agreed, Agreed, Disagree and Strongly Disagreed. The Statistical Package for Social Sciences (SPSS) version 20.00 was employed for all statistical calculations.

4.RES ULTS AND DISCUSSION

Research Question 1: What are the forestry management practices adopted by the forestry staff for improving timber production in Kaduna State?

Table 4.1: Mean responses of Forestry staff on Existing Forestry Management Practices adopted for improving Timber Production (N_1= 58, N2=42)

S/N	FORESTRY MANAGEMENT PRACTICES	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_t$	DECISION
1	All trees in a given area are removed to enable planting of new ones **(Clear cutting)**	3.98	0.13	4.00	0.00	3.99	Agreed
2	Mature trees are removed in two or three harvests over a period of 10 to 15 years **(Shelterwood)**	1.57	0.98	3.05	0.22	2.19	Agreed
3	Matured trees of the desired species are protected from cutting in scattered locations throughout the forest **(Seed tree)**	3.84	0.37	3.71	0.46	3.79	Agreed
4	Groups of trees in a given area are harvested over many years. **(Group selection)**	2.60	0.85	2.19	0.86	2.43	Disagreed
5	Mature and low-quality trees are removed at each harvest. **(Single Tree selection)**	1.52	0.88	1.55	0.92	1.57	Disagreed
6	Tress are planted in conjunction with food crops (Taungya)	3.84	0.59	3.88	0.33	3.86	Agreed
7	Trees are planted for the purpose of producing of timber	3.90	0.31	4.00	0.00	3.94	Agreed
8	Particular species of trees are planted in a given area for timber production.	2.52	1.27	2.74	1.31	2.61	Agreed
9	Villagers are incorporated into the protection of forests and forest reserves	3.12	1.09	2.98	1.14	3.06	Agreed
10	Forest reserves are established by Non-Governmental organizations and individuals with permission from the government	2.64	1.25	2.69	1.17	2.66	Disagreed
11	Harvesting of low grade timber to give way for planting of high grade timber	3.33	0.98	3.33	0.99	3.33	Agreed
Average Mean		**2.99**	**0.79**	**3.10**	**0.67**	**3.04**	

Key: $\bar{X}_1$ = Forest Field officers Response; $\bar{X}_2$ = Forest Head of Sections Response; X_t = Average mean Response; SD = Standard Deviation.

N_1 = Number of Forest Field officers. N_1 = Number of Forest Head of Sections

The result on table 4.1 shows that the adopted forestry management are Group selection and Single Tree selection harvesting methods.

Research Question 2

What are the possible barriers to forestry management practices for improving timber production?

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Table 4.2: Mean responses of Forestry staff on Possible Barriers to Forestry Management Practices for Improving Timber Production (N_1= 58, N2=42)

S/N	POSSIBLE BARRIERS TO FORESTRY MANAGEMENT PRACTICES	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_t$	DECISION
1	Weak regulatory body governing forest management	2.16	0.95	1.83	0.99	2.02	Disagreed
2	Insufficient funds allocated for forestry management	3.91	0.28	3.95	0.22	3.93	Agreed
3	Forestry management regulations are not properly adhered by Forest Field Officers and protection officers	2.24	0.66	2.26	0.63	2.25	Agreed
4	Forestry management regulations are not properly adhered by Loggers	3.50	0.96	3.31	1.07	3.42	Agreed
5	Illegal logging by Unauthorized loggers encroaching into the forest	1.95	1.16	1.81	0.99	1.89	Disagreed
6	Lack of regular review of laws governing forestry management practice	4.00	0.00	4.00	0.00	4.00	Agreed
7	Insufficient forestry staff to monitor and coordinate forest reserves	3.72	0.70	3.21	1.05	3.51	Agreed
8	Irregular visitation and supervision of forests and forest reserves by government bodies governing forestry management	3.29	0.99	3.60	0.77	3.42	Agreed
9	Government negligence on forest reserves and its resources	3.97	0.18	3.95	0.22	3.96	Agreed
10	Insufficient forest reserves to meet with the timber demands in the state	3.98	1.31	3.95	0.22	3.97	Agreed
11	Deforestation due to urbanization and industrial developments around forests and forest reserves	3.90	0.31	4.00	0.00	3.94	Agreed
12	Insufficient rapid response and emergency equipment and personnel to monitor and stop wild fire from encroaching and consuming trees in the forests and forest reserves	4.00	0.00	4.00	0.00	4.00	Agreed
	Average Mean	**3.39**	**0.63**	**3.32**	**0.51**	**3.36**	

The result presented on Table 4.2 shows that weak regulatory body governing forest management and Item (3) Forestry management regulations are not properly adhered by Forest Field Officers and protection officers

Research Question 3

What are the ways of improving forestry management practices?

Table 4.3: Mean responses of Forest Field Officers and Forest Head of Sections on Ways of Improving Forestry Management Practices (N_1= 58, N2=42)

S/N	ITEMS	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_t$	DECISION
1	Restructuring and Implementation of feasible laws governing forestry management	3.90	0.26	4.00	0.00	3.90	Agreed
2	Provision of more funding from Government on forestry management researches	4.00	0.00	4.00	0.00	4.00	Agreed
3	Establishment of more timber plantations and forest reserves	3.43	0.99	3.55	0.86	3.48	Agreed
4	Increasing the numbers of Forest Field Officers and protection officers	4.00	0.00	4.00	0.00	4.00	Agreed
5	Increasing the number of forest monitoring personnel and gadgets	4.00	0.00	4.00	0.00	4.00	Agreed
6	Enacting laws to discourage structural/infrastructural developments encroaching into the forests	4.00	0.00	4.00	0.00	4.00	Agreed
7	Constant review of laws governing forestry management practices	3.38	0.50	4.00	0.00	3.90	Agreed
8	Regular visitation and inspection of forests, forest reserves and plantations	3.84	0.37	3.35	0.86	3.72	Agreed
9	Discouraging urban and industrial encroachment in forest areas	4.00	0.00	4.00	0.00	4.00	Agreed
10	Punishing unauthorized loggers and violators forest and forest reserve laws	4.00	0.00	4.00	0.00	4.00	Agreed
11	Employment of experts on modern forest management practices as facilitators in training and retraining forestry staff	3.52	0.86.	3.48	0.94	3.50	Agreed
12	Educating rural communities around forest areas on forest conservation methods and the importance of forest conservation on community and environmental protection	3.91	2.8	3.92	0.26	3.92	Agreed
	Average Mean	**3.83**	**0.48**	**3.86**	**0.24**	**3.87**	

The result presented on Table 4.3 signifies that 'ways of improving forestry management practices. Possesses all 12 items outlined on the table.

Hypothesis I

There will be no significant difference in the mean responses of the forestry Heads of Sections and Forest Field Officers on the existing forestry management practices.

Table 4.4: z-test of the Existing Forestry Management Practices guiding Timber Production

Group	N	Mean	SD	Df	z-cal	z-cri	Decision
Forest Field Officers	58	2.99	0.79	98	0.72	1.98	Accepted
Forest Head of Sections	42	3.10	0.67	98	0.72	1.98	

The result on table 4.4 shows that the null hypothesis was not rejected. The null hypothesis is therefore upheld.

Hypothesis II

There will be no significant difference in the mean responses of the forestry Heads of Sections and Forest Field Officers the possible barriers to forestry management practices for improving timber production

Table 4.5 z-test of Possible Barriers to Forestry Management Practices for Improving Timber Production

Group	N	Mean	SD	Df	z-cal	z-cri	Decision
Forest Field Officers	58	3.39	0.63	98	0.72	1.98	Accepted
Forest Head of Sections	42	3.32	0.51	98	0.72	1.98	

The result on Table 4.5 shows that the null hypothesis is not rejected. The null hypothesis is therefore upheld.

Hypothesis III

There will be no significant difference in the mean responses of forestry Heads of Sections and Forest Field Officers on the techniques for improving forestry management practices for enhancing timber production

Table 4.6 z-test Ways of Improving Forestry Management Practices

Group	N	Mean	SD	Df	z-cal	z-cri	Decision
Forest Field Officers	58	3.83	0.48	98	0.05	1.98	Accepted
Forest Head of Sections	42	3.86	0.24	98	0.05	1.98	

The result on Table 4.6 shows that the null hypothesis is not rejected. The null hypothesis is therefore upheld.

4.1 Summary of Findings

The findings of the study revealed on that Clear cutting, Shelterwood, Seed tree were adopted as timber harvesting methods but Group tree selection and Single Tree selection were not regarded as timber harvesting methods. Furthermore, the findings revealed that planting trees for the purpose of producing of timber, planting particular species of trees in a given area for timber production, incorporating Villagers into the protection of forest and forest reserves were the forestry management practices used. The findings also revealed that incorporation of Non-Governmental Organizations and individuals for establishing of Forest reserves with permission from the government were not used to manage the forest and its resources.

The findings also revealed that insufficient funds are allocated for forestry management, Government negligence of forest reserves and its resources, insufficient forest reserves to meet with the timber demands in the state, and insufficient rapid response and emergency equipment to monitor and stop wild fire from consuming trees in the forests and forest reserves were all identified as problems of forestry management in Kaduna State. Deforestation due to urbanization and industrial developments around forests and forest reserves was also identified. These findings confirms (Oriola, 2009) which stated that' There is still the need for repositioning forestry and forestry management by empowering the agency for effective operation, maintenance and management through adequate funding'. Provision of more funding from Government on forestry management researches, Increasing the numbers of Forest Field Officers and protection officers, Increasing the number of forest monitoring personnel and gadgets, Enacting laws to discourage structural/infrastructural developments encroaching into the forests, establishment of more timber plantations and forest reserve were all accepted as ways of improving forestry management practices.

5.CONC LUSION

Adopting the right Forestry management practices for any forest plantation aimed at improving timber production is the key to sufficient and timber necessary for economic activities. Incorporation of community forestry management will yield positive results in production of substantial timber and other forest products and also help in curbing illegal logging. The local communities, the private sector and government are the stakeholders who should cooperate in sharing the burden as well as the benefit. When the management practices are not implemented and reinforced, the rate of timber production will decline. Conclusively, this study identified some forestry management practices that need to be introduced, worked on and restructured in forest reserves and forest plantations. The numbers of Forest guards and forest rangers to guard the forest reserves against illegal loggers should be increased because from the findings of the study, it revealed that there are inadequate staffs for the forest reserves.

Government should enact laws to discourage structural/infrastructural developments encroaching into the forests areas either by government bodies or private bodies should be enacted.

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