DEFORESTATION TRENDS IN FOREST ESTATES OF VANDEIKYA LOCAL GOVERNMENT, BENUE STATE, NIGERIA

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ABSTRACT

The variation in total forest area over time (years), the number of forest offences and annual forest fires was appraised in Vandeikya Local Government (VLG) Area, Benue State, Nigeria. Six wards were randomly selected from the twelve wards making up the Local Government .These wards were: Mbadede, Mbagbera, Mbaakaange, Mbaityough, Ningev and Tsambe. All the sixteen staff members of the VLG Forestry Service were interviewed. Secondary data was also obtained from VLG Department of Agriculture on forest areas, forest offences and annual fires .The study compares data for any observed variations that may have occurred in subject parameters at five year intervals between 1955 and 2000. A total of 1642 forest offences were recorded within the period. The total forest area for the six sampled wards was 312.9ha in 1955. This area declined to 193.5ha in 1980 and to 83.5ha in 2000. There were no significant differences (P>0.05) in the number of forest offences between the years though differences between the following pairs of wards were significant (P<0.05): Mbadede and Mbakaange, Mbagbera and Mbakaange, Mbagbera and Mbaityough, Mbagbera and Ningev, Mbakaange and Ningev as well as Mbakaange and Tsambe. Forest fires recorded within the same period totalled 192. There were significant differences in the number of forest fires reported between the wards such as Mbadede and Mbagbera, as well as Mbadede and Ningev (P<0.05), however, the number of forest fires were not significantly different over the years (P>0.05). Among other measures, increased reforestation efforts involving the rural communities using both indigenous and exotic tree species is suggested. Also, there is need to sensitise members of the public on sustainable forest management and its merits.

Key words: Deforestation trends, forest area, forest offences, forest fires, Vandeikya LGA.

INTRODUCTION

Most forests owned by Vandeikya Local Government (VLG) were established between 1945 and 1970(VLG Department of Agriculture, 2003). Under good management, these forests should be harvested and regenerated naturally and artificially. There is no economic justification in leaving mature trees to continue growing after lots of them have exceeded their rotation period for a particular purpose (Adeola *et. al*. 1995). Forest exploitation should however not undermine the sustainable supply of the forest products from generation to generation Wikipaedia, 2008). Sustainable forest management practices may include the involvement of women (Adeola *et. al*..1993), community participation in conservation of forest biodiversity and adaption of various agroforestry systems (Onumadu and Mbakwe, 2001). The post-colonial, profit-oriented exploitation of the forests was not sustainable, thus resulting in extensive damage done to forest estates (IITO/IUCN, 1990). Any act that leads to the destruction of forest vegetation is termed deforestation (Enabor,*et.al.,*1982*).*

Deforestation is also viewed as the permanent, total or partial conversion of forests, trees and /or vegetation cover to non-forest uses (World Bank, 1991). Deforestation

causes changes in land cover and land-use Butler, 2005). Forests are degraded through selective logging, industrial uses, grazing land clearing and bush burning. Ivbijaro (2002), opined that at the current rate of deforestation, Nigeria is likely to lose all her forest reserves by the year 2010.Vegetation yet untouched by man no longer exists in Nigeria (NEST, 1991). World-wide, forest area larger than New York City is lost daily and most of the world's dense wood lands could disappear in a few decades (Seemba, 2002). Negative environmental changes such as desertification, drought , insufficient food and fuel wood supply, wind and water erosion, decreasing soil fertility and reduced yield, have made man to accept the call by foresters to engage in tree planting, protection and conservation activities (Harris, 1997). Degradation and deforestation of tropical forests are closely tied to poverty, high population density, traditions, politics and the failure of rural and regional development efforts (Udoh, 1999).

This study investigates the trends in deforestation, incidences of forest offences and annual fires in VLG between 1955 and 2000.

METHODOLOGY

The Study Area

Vandeikya Local Government is located between longitude 8°30' to 9° 00' East and latitude 6°30' - 7°00' North. The local government is made up of twelve administrative wards namely-Mbaityough, Mbakaange, Mbayongo, Ningev, and Nyumangbagh (making up Tyev Development Area). Other wards include: Mbadede, Mbagbam, Mbagbera, Mbajor, Mbakyaha, and Tsambe (making up Kyan Development Area).Vandeikya Township Ward carved from Mbagbera Mbakaange and Ningev Wards is the VLG headquarters. The population of the study area projected from the 2006 National Population Census figures in 2009 is 256308.

The dry season is witnessed between the months of November and March while the wet season is witnessed between April and October. The climate is the tropical humid type with very high temperatures between March and April. The cool, dry harmattan weather is witnessed between December and February. The terrain is undulating, low-lying and is drained mainly by Rivers Aya, Sambe , Be, and Uaghshu .

The local government has 48 forest reserves dispersed in the twelve wards. Most of these forest estates were established with the assistance of the host or neighbourhood communities between 1945 and 1970. These forests were inherited from the defunct Gboko Division (formerly Tiv Native Authority). For administrative convenience, the forest estates in each ward are grouped into a single management plan. This study is based on *taungya* operations within the forest estates owned by the VLG and does not include privately owned forest estates.

Data Collection and analysis

A semi-structured questionnaire was through multi-stage random sampling administered on 200 out of 562 *taungya* farmers (representing 36% of the sample size) from the six selected council wards in VLG to elicit information on developments in forest areas, forest offences and annual forest fires in six selected wards. The selected council wards were Mbadede , Tsambe , Mbagbera , Ningev , Mbakaange and Mbaityough. Similarly, all the 16 forestry staff members of VLG (100%) were interviewed using the same questionnaire. This was to validate and cross-examine responses from the two populations.

Data collected were analysed using descriptive

statistics and analysis of variance (ANOVA). Post-mortem analysis using the least significant difference (LSD) was adopted to trace the source(s) of variation in the analysed data.

RESULTS

Socio-Economic Attributes of Respondents

The socio-economic attributes of the respondents are presented in Table 1,The forestry service staff members were all aged between 31-50 years and 87.50%of them were married. Majority of the respondents 68.75% had either primary or secondary education without any professional qualification in forestry .Only 25% of the respondents had NCE/OND qualifications. About two thirds (62.50%) of the staff earned betweenN111000-150000 per annum. The major secondary occupation of the respondents was farming (81.25%) while 19.75% of them engaged in trading as a secondary occupation. Most of the respondents (68.75%) had family sizes of 4-9 members. The family class sizes 1-3 and 7-9 each had 12.50% of respondents.

Table 1: Socio-economic attributes of Respondents from the Forestry Service in VLG.

S/No	Parameters	Frequency	Percentages
1	***Level of Education***		
	No formal education	0	0.00
	Primary	6	37.50
	Secondary	5	31.50
	NCE/OND	4	25.00
	HND/Degree	1	6.25
	Others	0	0.00
	Total	**16**	**100.00**
2	***Secondary Occupation***		
	Farming	13	81.25
	Trading	3	18.75
	Total	**16**	**100.00**
3	***Family Size***		
	1-3	2	12.50
	4-5	6	37.50
	7-9	5	31.25
	10-12	2	12.50
	>12	1	6.25
	Total	**16**	**100.00**
4	***Income (₦000)***		
	71-90	0	0.00
	91-110	1	6.25
	111-130	5	31.25
	131-150	5	31.25
	151-170	3	18.75
	171-190	1	6.25
	>190	1	6.25

Changes in Forest Area from 1955-2000

In 1955, the total forest area for the six sampled wards was 312.9Ha .This area declined to193.5Ha in 1980. It further declined to 83.5Ha by 2000 (Table 2). For Ningev and Mbaityough Wards the forest areas reached zero hectares for both wards in 1990 and 1995, respectively. Data in Table 2 is analysed in percentages and presented in Figure 1. Differences were observed in deforested areas in the wards over the period (years) covered. This was subjected to ANOVA, and the result showed that the differences were significant ($P<0.05$). For example, there were differences between Mbadede and Mbaityough as well as between Mbadede and Tsambe Wards.

Table 2: Area of Forest Estates in Sampled Wards (Ha) From 1955-2000

	Council wards						
Year	**Mbadede**	**Mbagbera**	**Mbakaange**	**Mbaityough**	**Ningev**	**Tsambe**	**Total**
1955	117.0	34.2	55.7	10.3	21.4	74.3	312.9
1960	115.0	34.2	55.7	10.3	21.4	74.3	308.2
1965	101.0	32.0	55.0	10.3	21.4	71.0	296.7
1970	101.0	32.0	51.0	10.3	21.4	71.0	288.7
1975	78.0	28.5	51.0	7.5	20.0	50.5	235.5
1980	76.5	25.0	45.5	5.0	10.0	31.5	193.5
1985	73.5	21.0	40.0	2.5	5.0	20.5	165.5
1990	70.0	15.6	35.0	2.0	0.0	20.5	143.1
1995	52.0	15.6	25.0	0.0	0.0	15.3	107.9
2000	47.0	11.2	10.0	0.0	0.0	15.3	83.5

Source: VLG Department of Agriculture, 2004.

A linear graph of percentage deforestation against time (in years) is presented jointly for the six wards sampled in Figure 1. The curve in the figure shows a continuously increasing positively-skewed curve. Using the year 1955 as the base year, in 1960, the percentage deforestation was 1.50.This percentage deforestation increased to 38.16 in 1980 and to a further 54.27 in 1990, attaining an unprecedented 73.31% in the year 2000. This trend portrays a continuing loss in forest area for all surveyed wards despite reforestation efforts (implying deforestation).The causes of this deforestation were investigated to include: uncontrolled annual forest fires; hostilities and encroachment on forest land by the host communities; poor nursery and forest management resulting in dearth of seedlings for reforestation; poor funding of forestry projects; corrupt practices by staff of VLG forestry service; corrupt practices by supervising staff of the Ministry of Animal and Forest Resources; poor quality forestry extension services accentuated by low levels of professional education by serving forestry staff; dearth of VLG legislation and

enforcement on forestry; continued clearance of existing forests for farming without reforestation planning; use of executive fiat to enhance dereservation of existing forests, in defiance of due process(es) and use of exotic species (like *Gmelina arborea* and *Tectona grandis)* in preference to indigenous species such as *Khaya senegalensis.*

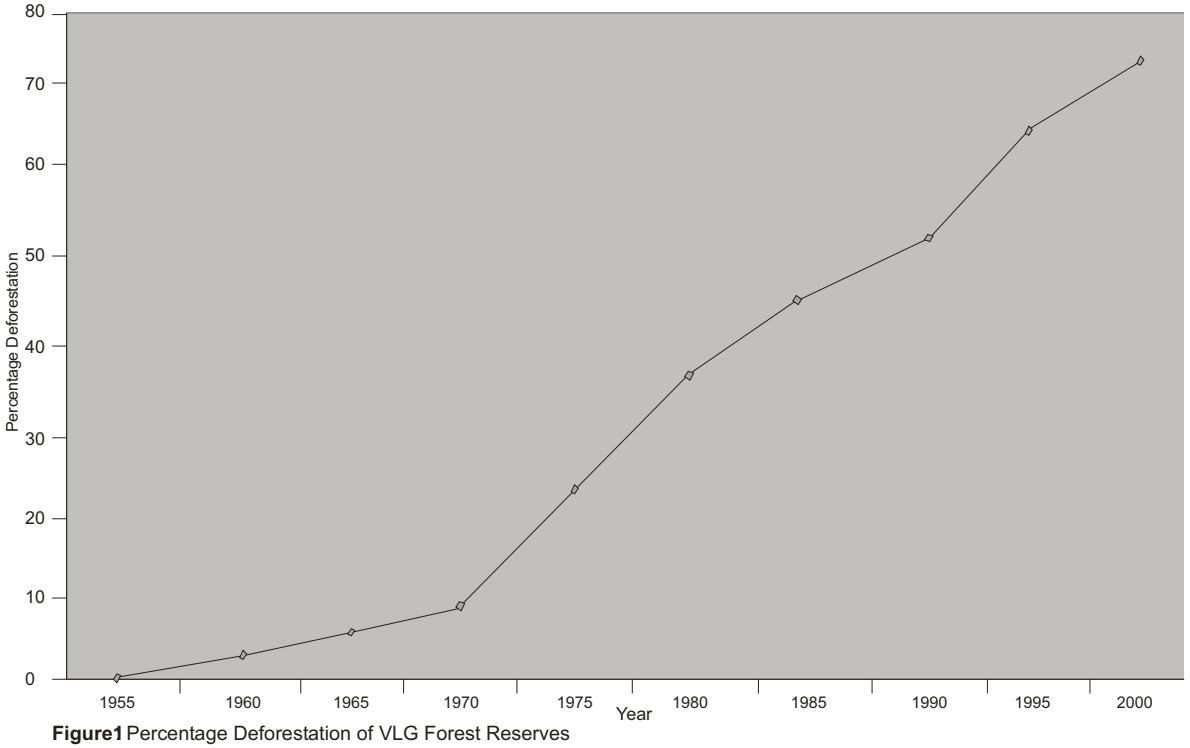

Figure1 Percentage Deforestation of VLG Forest Reserves

Forest Offences Reported (1955-2000)

The gross number of forest offences for the periods considered was 1642. Forest offences increased from 156 in 1955 to 182 in 1985 and to 215 in 2000. ANOVA computations indicated significant differences in the number of forest offences for all the wards over the years covered ($P<0.05$). LSD tests (Table 3) indicate significant differences in the number of offences among the wards, but not among years. For instance, significant differences were noted between the following pair of wards: Mbakaange and Mbaityough, Mbaityough and Mbagbera as well as for Ningev and Mbakaange.

Table 3: LSD Test on the Mean Effects of Wards for Reported Forest Offences

Wards	Mbadede 29,000	Mbagbera 29,000	Mbakaange 48,000	Mbaityough 15,300	Ningev 19,700	Tsambe 29,900
Mbadede	-	0.9584	0.0000*	0.0008*	0.0210*	0.1277
Mbagbera	-	-	0.0000*	0.0007*	0.0181*	0.1155
Mbakaange	-	-	-	0.0000*	0.0000*	0.0000*
Mbaityough	-	-	-	-	0.2536	0.0514
Ningev	-	-	-	-	-	0.4500
Tsambe	-	-	-	-	-	-

* Significant differences.

The percentage decrease//increase in the number of forest offences is presented in Figure 2. Taking the year 1955 as the base year (with a zero percent change in forest offences), the percentage decreases for 1960 and 1965 were 13.46 and 23.08, respectively. Also 2.56 and 8/97 percent decreases were observed for the years 1975 and1980, respectively. Percentage increases of 7.69, 16.67, 27.56, 12.83 and 37.12 were observed for the years, 1970, 1985, 1990, 1995, and 2000, respectively.

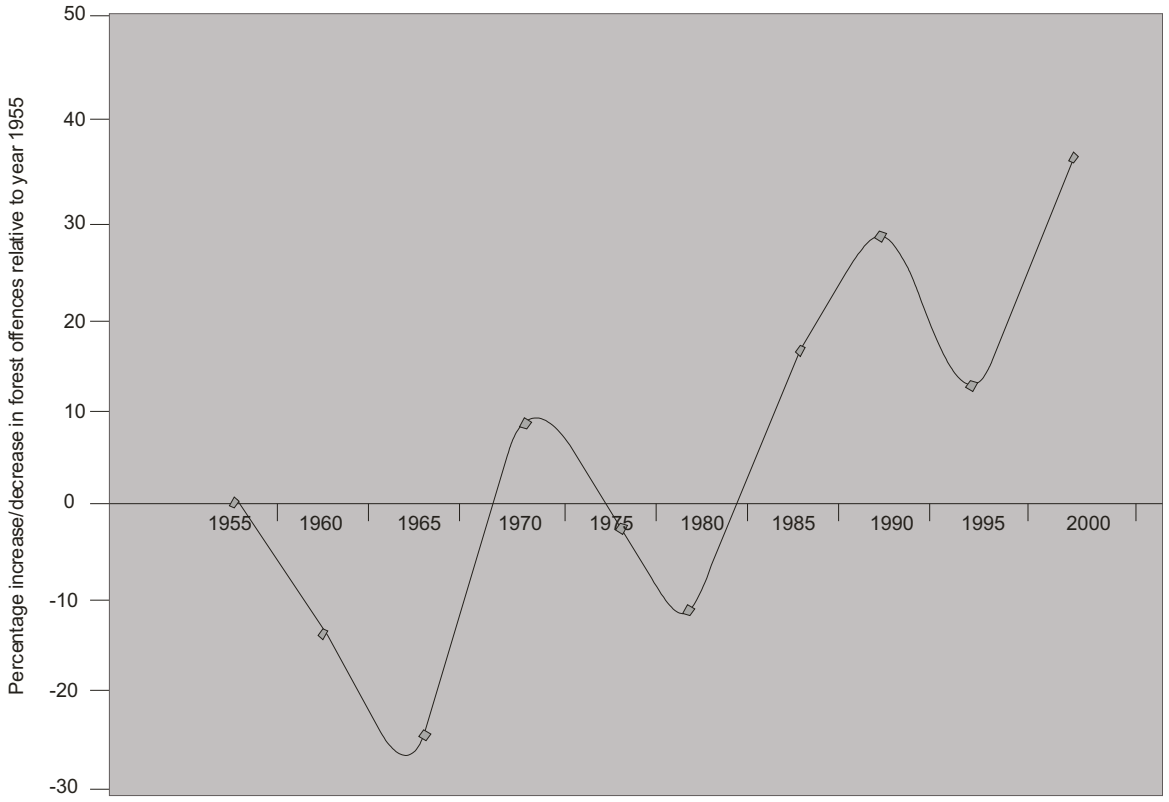

Figure 2 : Percentage change in Forest offences over the years.

Annual Forest Fires Documented (1955-2000)

The highest and lowest number of annual forest fires were recorded in Mbadede and Mbaityough which recorded a total of 59 and 17 fire incidents between 1955 -2000 . Mbakaange and Tsambe witnessed 38 and22 fire incidents respectively; these figures were significantly different. Whereas there were no significant differences ($P > 0.05$) in the number of forest fires for the years under consideration, there were significant differences in reported annual fires among the wards sampled ($P<0.05$). LSD tests showed significant differences in the following pairs of wards: Mbadede and Mbagbera , Mbadede and Mbakaange, Mbadede and Mbautyough , Mbadede and Ningev , Mbadede and Tsambe , Mbakaange and Mbaityough as well as Mbakaange and Tsambe . Thus the ward differences accounted for the significant differences in the number of forest fires evident from ANOVA computations.

DISCUSSION

The following discussion focuses primarily on forest estates owned by the Vandeikya Local Government (VLG), but does not reflect on other forest estates in VLG. Trends considered herein are limited to those identified through fieldwork and may not cover general trends on deforestation in VLG.

The major causes of deforestation within the forest estates of VLG were identified as follows: uncontrolled annual forest fires; poor nursery and forest management; neglect/poor funding of forestry projects; corrupt practices by both staff of VLG forestry service and the supervising Ministry of Animal and Forest Resources; poor quality extension service; dearth of VLG legislation on forestry; continued clearing of existing forests for farming purposes; executive abuse of due process in dereservation of forests; neglect of indigenous species and preferential use of exotic species in afforestation programmes as well as unhealthy tussle over control/ownership of the forest estates between VLG and the supervising Ministry of Animal and Forest Resource. The combined influence of the above-listed factors probably had an unprecedented effect on the unabated decline in forest area (deforestation) from 1955-2000 for all the six wards sampled. Forests are degraded through selective logging, industrial uses, grazing, land clearing and alienation as well as bush burning (World Bank, 1991). Some past Chairmen of VLG allegedly authorised conversion of forest estates to non-forest uses without notifying the forestry service. Corrupt staff members of both VLG forestry service and the supervising Ministry were accused of frequently issuing tree permits for cutting a specified number of trees but allowing and supervising the permit holder to cut more trees than the number of trees specified on the permit. Staff members of the supervising Ministry also allegedly indulged in forceful, fraudulent take-over and conversion of VLG forest estates to non-forest uses. These illegalities seem to be thriving, aiding and abating deforestation in the absence of byelaws protecting VLG forests from illegal exploitation, Environmental and socio-economic factors such as desertification ,insufficient food and fuel wood supply , wind and water erosion , decreasing soil fertility and reduced crop yield have made man to accept the call by foresters for tree planting (FAO ,2007; FAO ,2000) . It is the opinion of Udoh (1999) and ILO (1994) that degradation and deforestation of tropical forests emanated from poverty, high population density, traditions, politics and the failure of regional development efforts. The forestry service staff in the study area complained of lack of means of transport and poor conditions of service. These could negatively impact on the supervision of VLG forest estates, giving room for forest offences to be committed with impunity.

The low educational attainment of most forestry staff could be a major boost to the prevalent incidences of forest offences. Forestry laws of the Federal Republic of Nigeria stipulate that at the local government level the prosecution of forestry offences in courts of law is the function of the State Director of Forestry or an officer delegated by the Director, whose status should not be below the rank of Forest Superintendent. Holders of primary school certificate, or secondary school certificate (attempted) were appointed as Forest Guards while holders of secondary school certificates or elementary certificate in forestry were appointed into the Forest Rangers Cadre. The Forest Superintendent Cadre was composed of holders of NCE, OND, or HND Certificates. The Directorate Cadre was proposed to be the preserve of degree holders. Holders of a minimum of Diploma in Forestry or equivalent qualifications could be appointed to the Superintendent Cadre. The forestry service staff (68.75%) in the services of VLG

had either primary or secondary education (Table 1) without any professional training and below the service cadre of Forest Superintendant. This educational handicap made them ill -equipped to carry out forestry extension service as well as prosecution of forestry offences that may have been in court. Publicity on fire prevention, control and consequences of annual fires can best be appreciated by enlightened forestry extension service personnel. The reluctance of most farmers in developing countries (ILO, 1994) to embrace sustainable forest management could have been aggravated by the low professional educational attainment of the forestry service staff in VLG, resulting in the uncontrolled exploitation of forest resources of VLG. Majority (87.50%) of the forestry service staff were of the opinion that forest estates were diminishing without commensurate reforestation and that illegal felling as well as forest encroachment were on the increase. The reforestation of the VLG forest estates emphasised re-stocking with exotic species such as *Gmelina arborea* (Roxb) and *Tectona grandis* (Linn F.) to the exclusion of indigenous species such as *Triplochiton scleroxylon* and *Khaya senegalensis*. The non-inclusion of indigenous species in reforestation efforts may have undermined local species preferences, a phenomenon that saw the forest estates decline in area. Sustainability does not imply the narrowing of choices or variety but it encompasses a whole range of risk-bearing, resource-conserving aspects of traditional farming, and borrows from modern biology, technology and ecology (Butler, 2005). The establishment of single species exotic tree plantations in VLG is at variance with the principle of ecological diversity (Agarwal, 2002). Invasive single species or species composition can significantly alter carbon cycling or the disturbance regime (Chapin,*et.al,*2000). Even a change in one specie can have significant changes in biogeochemical cycles in ecosystems (Herold *et.al*., 2001). Changes in species composition due to ecosystem alterations or species introduction can also influence the radiation budget of the land surfaces. The replacement of deep-rooted trees by shallow-rooted pasture can lead to reductions in evapo-transpiration and to warmer drier climates in tropical climates.Species diversity is positively correlated with productivity. Thus, native tree species, mixed stands and genetically diverse stands should be used in afforestation/reforestation programmes to ensure biodiversity conservation. Sustainable management practice should incorporate longer rotation types and should encourage minimum fertilizer input.

CONCLUSION

This study reveals that all the wards of VLG sampled witnessed an unchecked decline in the area of their forest estates. The forest area decreased from 312.9ha in 1955 to 83.5ha in 2000. This decline does not portray sustainable forest management. The following factors chiefly impacted negatively on reforestation efforts, aggravating deforestation: annual forest fires, official corruption, rivalry between Benue State and VLG over control of the forest estates, dearth of seedlings, the low educational attainment of the VLG forestry service staff, poor funding of VLG forestry service and over-emphasis on reforestation with exotic species.

RECOMMENDATIONS

Reforestation with indigenous species, sufficient funding, good nursery

management, public enlightenment on the benefits of sustainable forest management, controlled forest fires within the estates, discipline of fraudulent members of staff, enactment of VLG forestry byelaws, bottom-up forestry policy formulation and planned forest dereservation should be promoted. There is need to identify extension requirements in the field and to delegate appropriate staff members that have the basic skills needed for on-going and planned forestry programmes.

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