



## Assessment of Forestry Laws Compliance among Farmers in Rural Forest Communities of Plateau State, Nigeria

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### Authors' contributions

This work was carried out in collaboration among all authors. Author SKV designed the study, wrote the protocol and supervised the work. Authors BJ and AAD carried out all the field work and performed the statistical analysis. Authors SKV and YS managed the analyses of the study. Authors BJ, AAD and YS wrote the first draft of the manuscript. Author SKV managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

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### ABSTRACT

The study assessed compliance with forestry laws among rural farmers in rural forest communities of Plateau State, Nigeria. The specific objectives of this study were to; describe the socio-economic characteristics of the rural forest farm families in the study area, examine the level of awareness of forestry laws in the study area, ascertain the level of compliance with forestry laws in the study area and identify the perceived constraints to forestry laws compliance in the study area. The population of the study consists of all the farmers in the rural forest communities of Plateau State. Multi-stage sampling technique was used to select a total number of 216 respondents for the study. Data for the study was garnered using structured questionnaire designed in line with objectives of the study. Analysis of the data was done using descriptive statistics and five point likert rating scale. Log it regression was used to test the hypothesis of the study. Findings revealed that the mean age of the farmers was 39 years with majority (61.0%) of them being male. The result also revealed that 85.0% of the respondents were married with majority (57.0%) of the respondents having non-formal

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education. The average household size of the respondents was 7 persons and average farm size of 2.5 hectares. The result further shows that only 49.0% of the farmers had contact with extension agents between 1 and 5 times in the last one year. Results indicate that farmers' level of compliance with forestry laws in the study area was poor. The few forestry laws complied with in the study area were: law prohibiting the pasturing or grazing of cattle in the forest reserve (X=3.02), law prohibiting the erection of buildings or roads in the forest reserve (X=3.85) and law prohibiting kindling of fire in the forest reserve (X=3.54). Constraints to compliance with forestry laws includes; Perceived lack of fairness of tree tenure (79%), lack of alternative economic opportunities (87%), as a constraint to forest law compliance in the study area, lack of awareness of forest laws (71%), increased demand for agricultural land (42%), general lack of perceived legitimacy (33%), Corruption in government institutions (28%) and weak law enforcement (5%). The null hypothesis was rejected. The study recommends that, a zero tolerance policy on non-compliance with forestry laws should be put in place to checkmate indiscriminate exploitation of forest resources.

*Keywords: Assessment; forestry; law; compliance; farmers.*

## 1. INTRODUCTION

A law helps to give a degree of order to a society by protecting individuals' rights and privileges, while at the same time limiting those rights within the boundary of the common good of the society as a whole. For effective control and management of the forest resources in any country, it is necessary to have a forest law, that forest owners and users should know and understand the provisions of the law and adhere to them. Forestry Law relates to all statutes and regulations that deal with the preservation and the prevention of illegal forest activities [1]. These laws are derived from both federal and state sources. According to [1], forest laws are primarily associated with preventing the misuse of the forest and protecting the rights of individuals and the general public in matters of access, but should also serve as an agent for development and as an incentive for good forest management. Thus, forest resources must be protected from illegal activities that are not compatible with forest sustainability [2]. A major focus of forestry law is preservation. Many forests take decades or centuries to regenerate. Indeed, some species of tree, such as the California Redwood, can take thousands of years to reach their enormous size [2]. As a result, preservation of such resources must be a primary focus of any conservation law, as these resources are not readily replaced once they are lost. Preservation laws include limitations on logging, unregulated exploitation of forest resources, clearing of forest for farming, fuelwood harvesting and uncontrolled forest fires as well as overgrazing [3]. In most African countries, forest policies and laws were enacted during colonial periods and are still in existence after many years of independence [3].

Nigeria had formulated and reviewed forest policies from time to time but the measure of success of the policy statements has not been achieved most especially in the area of compliance with forestry laws. Most of these laws were drafted under the regional government arrangements (Northern, Western and eastern Administrative Regions) which still subsist till today, except for some few states e.g. Kebbi and Cross River, that have enacted new legislation as state properties. A prominent feature of these legislations is that the states laws are largely modifications of the regional laws, which were in turn modifications of the 1938 Forestry Law [4]. In actual practice, the bulk of the laws on forestry are made by each state of the federation taking in to cognizance their peculiar geographical features. By virtue of the provisions of section 28 of the Forestry law, the executive Governor of the state is empowered to make regulations on some specific areas in the operation of the forestry industry. The law expressly prohibits and penalizes any person who in any forest reserve, without the written authority of the Director of Forestry:

- (a) Takes any forest produce
- (b) Uproots, clears any forest growth, burns strip off the bark or leaves from or otherwise damages any tree.
- (c) Sets fire to any grass or herbage without precaution
- (d) Pasture cattle or permit cattle to trespass
- (e) Make a farm or plantation or roads
- (f) Resides or erect any building
- (g) Hunt or fishes
- (h) Damage in any way or destroy any forestry property.

The prevalence of forest crime has been on the increase as a result of poor governance, corruption and illegality in the forest sector particularly in sub-Saharan countries of Africa. This has put at risk forest-dependent populations who rely on timber and non-timber forest products for their livelihoods and survival, and undermine responsible forest enterprises by distorting timber markets [5]. These failures result in loss of revenue that could be invested in sustainable forest management or economic development.

Forest laws compliance is the degree to which forest owners or industries respect the existing legal requirements governing forest use [6]. A very wide range of laws affect the way local communities use forests. The laws include: customary laws and norms, which are far more widely applied than is often assumed; international laws relating to trade, human rights and the environment; national constitutional provisions, and national and local laws relating to land tenure, human rights, conservation, wildlife and forestry. In general, community rights of ownership, use and access are often not recognised in forest-related laws, which tend to treat forests as public lands or 'state-owned' domains. The laws are frequently contradictory and incompatible, making the definition of what constitutes 'legal' forest use highly contentious [6]. The extent to which all these laws are applied varies widely, but commonly forest management laws that restrict access and use by local communities and give preferential access to large-scale forestry enterprises, are usually enforced more vigorously than complementary measures that recognise community rights. Even where procedures do exist by which communities can apply for secure rights, the procedures are commonly too onerous and costly to be widely used. Forest law enforcement initiatives tend to focus narrowly on compliance with forestry laws while neglecting laws that secure rural livelihoods. Illegal forest use—such as illegal logging and bush meat trading—is not just an outcome of poor governance and corruption, but an integral part of local and national political economies. There is an evident risk that such measures may exclude consideration of the livelihoods of forest dependent peoples and may thus encourage forest management systems that create poverty rather than alleviate it. One problem identified with forestry development in Nigeria is the issue of feeble forest laws which allows for the breach of such laws by stakeholders [7]. Most of these policies were

developed without much consultation with the local communities. It is therefore imperative that the present forest policies be reviewed or better still new ones would have to be produced very urgently so as to reduce the alarming rate at which the forest are being degraded.

Throughout sub-Saharan Africa, including Nigeria, forests and tree products are rapidly being degraded, logged and cleared for agriculture and other developmental projects. Estimates for total tropical Africa put the total loss in the forest cover between 1990 to 1995 to be about 18 million hectares and 7% annual loss [8]. Forest crime, including illicit activities such as illegal logging, illegal occupation of forest land, wildlife poaching, encroachment on both public and private forests, and corruption is rampant throughout the world, particularly in developing countries of Africa, Latin America and Asia [5]. More worrisome is the increasing spate of illegal logging in public lands in developing countries, which result in estimated losses in assets and revenue in excess of US\$10 billion annually, more than eight times the total official development assistance dedicated to the sustainable management of forests [5]. Infringement of forest reserves and violations of protected areas boundaries have more impact on the local economy as they threaten conservation of forest resources and biodiversity found in such areas. The rate of forest destruction is now so rapid that we risk a total breakdown of the planet's support systems in the next 30 to 50 years. A little over 50 years ago, almost all of the tropical rainforests still flourished intact. At the turn of this century, we have destroyed half of those forests and the pace of destruction is accelerating. As it is, more than twenty-seven million acres of tropical forest throughout the world are destroyed each year [9]. The present situation, where the environment is recklessly assaulted and degraded by individuals and corporate bodies, portrays serious danger to all life forms and it unveils man's ignorance in terms of environmental education and consciousness [10].

Government has made several attempts at putting in place programmes that would ensure the efficient management of her forest resources [11]. These include the reservation policy pioneered by the colonial administration in the nineteenth century, the establishment of industrial plantations from 1978 and land use and vegetation (LUV) survey between 1975 and 1978. Others include, rural forestry development

in Nigeria formulated in 1981, production of perspective plan for the period 1990 to 2005 and formulation of a Nigerian forest action programme (NFAP) in 1997 which was called tropical forests action programme (TFEAP) before 1992 and recently the tree planting campaigns. At the state level, there are series of forestry, agricultural and wildlife laws as well as bush burning and grazing reserve regulations. The most significant of these laws relevant to deforestation control are the Forestry Laws most of which, derive their validity from the old Northern Region Forestry Law. Such laws empower each state to manage its forest estates and grazing reserves as well as reforest their desertified areas. Nevertheless, most of the State Laws especially the Forestry laws are outdated and require review [12].

In spite of all these policies and programmes by the government, there is still high level of indiscriminate felling of trees mostly by farmers through poor agronomic practices leading to high level of deforestation, desertification, land degradation, emission of green-house gases, climate change and loss of biodiversity. None or Low compliance with existing forest management laws is one of the factors identified to be responsible for this declining state of our forest resources. According to ITTO [13], achieving sustainable forest management will only be possible when sensible rules and regulations are enforced and adhered to. [1] stated that, many people indulge in illegal forest acts due to ignorance, lack of alternative sources of livelihood, the seemingly lucrative nature of illegal acts as a result of the profits made on illegally obtained forest produce without adverse consequences, low ethical standards in the society, and inadequate penalties on offenders.

The situation in Plateau State, Nigeria is not different from other parts of the country. Habitat destruction, hunting and felling of trees are occurring at such a rapid rate that is fundamentally altering the ecological balance of the area. Human activities have depleted the few existing forests through uncontrolled lumbering, bush burning, charcoal production just to mention a few. Preliminary investigation shows that effective forestry extension service delivery which is key to educating and sensitizing the local people on existing forestry laws and sustainable forest management practices as well as government policies concerning forest use seems to be lacking. Research in recent years has focused on understanding and quantifying

the economic contributions that forest goods, whether non-timber forest products (NTFPs), environmental services, or other forms of environmental income, make to the millions of rural households who live near forests [14-19]. However, there is little or no research to assess the level of forestry laws compliance amongst rural farmers in Nigeria especially in Plateau State. It has therefore become pertinent to bridge this research gap. The broad objective of the study is to assess forestry law compliance among farmers in rural forest communities in Plateau State. The specific objectives of this study are to; describe the socio-economic characteristics of the rural farmers in the study area, examine the level of awareness of forestry laws in the study area, ascertain the level of compliance with forestry laws by farmers in the study area and identify the perceived constraints to forestry laws compliance among farmers in the study area.

## 1.1 Test of Hypothesis

**Ho<sub>1</sub>:** There is no significant relationship between farmers' socio-economic characteristics and their level of compliance with forestry laws in the study area.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was carried out in Plateau State of Nigeria. Plateau State was created in February 1976 when it was carved out of Benue-Plateau State. It is located in the North Central region of the country referred to as the Middle Belt. The state lies between latitudes 8° N and 10°N and longitude 7°E and 11°E of the prime meridian [20]. The state has a population of 3,206,531 based on the 2006 census [21]. The projected population by 2019 stands at 4614434 people going by a population growth rate of 2.8% per annum. The landscape of the state is slightly undulating and rises from the steep escarpment of the riverine plains of River Benue and descends towards Bauchi state. It shares common boundaries with Kaduna and Bauchi States to the North, Benue State to the South, Taraba State to the East and Nasarawa State to the West. The State has 17 Local Government Areas and three senatorial Zones. The senatorial zones are: Plateau North, Plateau Central and Plateau South Senatorial Zones. The altitude ranges from around 1,200 meters (about 4000

feet) to a peak of 1,829 metres above sea level in the Shere Hills range near Jos. Years of tin mining have also left the area strewn with deep gorges and lakes. Though situated in the tropical zone, a higher altitude means that Plateau State has a near temperate climate with an average temperature of between 18 and 22°C. Harmattan winds cause the coldest weather between December and February. The warmest temperature usually occur in the dry season months of March and April. The highest rainfall is

recorded during the wet season months of July and August. With 70% of the population being rural dwellers, it is not surprising that 68% of the workforce is involved in agriculture. Apart from cereal crops such as maize, shorgum, accha, millet etc, the temperate climate of the Plateau allows for the production of vegetables crops such as potatoes, carrot, cowpea, pea and tomatoes. Livestock types found in the state include cattle, sheep, goats, pigs and poultry. The map of the study area is shown below.

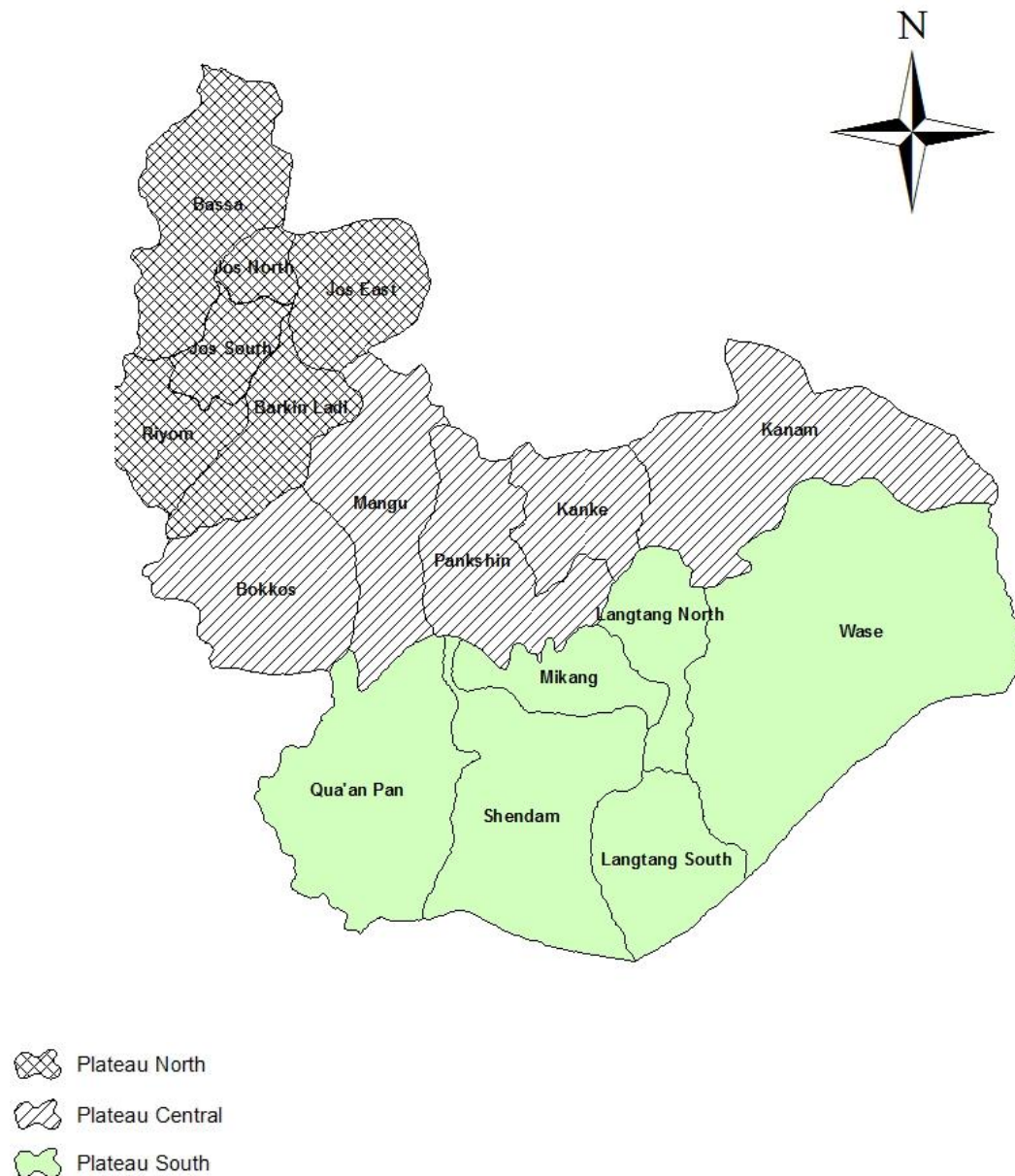


Fig. 1. Map of plateau state showing the location of the study area

## 2.2 Sampling Procedure

Multi stage sampling technique was used in the selection of sample size for this study. In the first stage, the three [3] already existing agricultural zones were adopted. They are: Plateau North agricultural zone, Plateau Central agricultural zone and Plateau South agricultural zone. The second stage involved a purposive selection of two [2] Local Governments Areas from each of the agricultural zones for the study. Thus, from Plateau North agricultural zone, Jos East and Bassa L.G.As were selected, Bokkos and Pankshin L.G.As were selected from Plateau Central agricultural zone while Shendam and Quanpan L.G. As were selected from Plateau South agricultural zone. These Local Government Areas were selected due to their high concentration of natural forests and plantations. The third stage involved a random selection of two districts from each of the local government giving a total of twelve [12] districts for the study. Thus from Bassa LGA, Miango and Amoh districts were selected. From Jos East LGA, Fursum and Pedere districts were selected. From Bokkos LGA, Mushere and Daffo districts were selected. In Pankshin LGA, Pankshin and Wokkos districts were selected. In Qua'pan LGA, Kwande and Namu districts were selected while in Shendam LGA, Derteng and Dorok districts were selected. Finally, from the sampling frame for each of the selected districts using proportional allocation of 10%, 216 respondents were randomly selected for the study. However, only 214 questionnaires were retrieved. Data for this study were generated from primary sources. Primary data were generated with the use of well-structured questionnaire.

## 2.3 Method of Data Analysis

Data collected were analysed using descriptive statistics such as frequencies, percentages and mean as well as Five point likert rating scale. Logit regression was used to test the hypothesis of the study.

### 2.3.1 Five point type Likert scale

Level of compliance with forestry laws was measured using a five- point Likert scale. That is strictly complied with (SCW) - 5, complied with (CW) - 4, undecided (UD) - 3, strictly not complied with (SNCW) - 2, and not complied with (NCW) -1 point. The five responses were added to obtain 15, which was further divided by five to obtain 3 which is regarded as mean.

Forestry laws with mean score below 3 indicates that such laws were not complied with in the study area while forestry laws with scores equal to 3 or above were regarded as complied with in the study area.

### 2.3.2 Logit regression model

The determinants of forestry law compliance in the study area were estimated with Logit regression model. The model is expressed as follows:

$$P_i = \frac{1}{1 + e^{- (B_0 + B_1\chi_{i1} + \dots + B_k\chi_{ik})}}$$

Where  $P_i$  = probability that forestry laws are complied.

$B_0$ =constant term  
 $B_1 (i = 1,2,\dots,k)$  = regression coefficients to be estimated  
 $\chi_i (i = 1,2,\dots,k)$  = independent variables  
 $l = i^{\text{th}}$  observation

Let  $Z_i = B_0 + \sum_k^B X_k$   
 Then  $P_i = \frac{1}{1 + e^{-Z}}$

As  $Z_i$  ranges from  $-a$  to  $+a$ ,  $P_i$  ranges from 0 to 1 and  $P_i$  is non- linearly related  $Z_1$ . The logit of the unknown binomial probabilities i.e. the logarithm of the odds, are modeled as a linear function of the  $X_i$ .  
 Logit ( $P_i$ ) =  $\ln \frac{P_i}{1-P_i} = B_0 + B_1 X_1 + \dots + B_9 X_9 + U_i$

The unknown Parameters  $B_i$  are usually estimated by maximum likelihood. Thus, the model is explicitly expressed as,

$$Z_1 = B_0 + B_1 X_1 + \dots + B_9 X_9 + U_1$$

Where

$Z_1$  = Compliance with forestry laws (1= complied with, 0= Not complied with)  
 $B_0$  = constant  
 $B_1 (1, 2, \dots, 9)$  = Vector of the parameter to be estimated.  
 $X_1$  = Sex of the respondents (1 if male, 0 if female)  
 $X_2$  = Age of the respondents (years)  
 $X_3$  = Occupation (1 if farming, 0 if otherwise)  
 $X_4$  = Household size (Number of persons)  
 $X_5$  = Education of the respondents (Number of years of formal education)  
 $X_6$  = Annual income of the farmers (Naira)

$X_7$ = Extension contact (1 if yes, 0 if otherwise)  
 $X_8$ = Number of extension visits (Number of times visited)  
 $X_9$ = Land tenure (1 if inheritance, 0 if otherwise)  
 $U_i$ = Independent distributed error term

### 3. RESULTS AND DISCUSSION

#### 3.1 Socio-economic Characteristics of the Respondents

Result in Table 1 revealed that, the mean age of the farmers in the study area is 39 years. This shows that the respondents were young and energetic and could actively participate in both crop and forestry farming. [22] reported that young people are more likely to be better agents for technology adoption and transfer as they may have higher aspiration to accept new technologies compared to older farmers who are skeptical and critical of innovations.

Sex of the respondents reveals that majority (61.0%) of the respondents were males while only 39.0% were females. Thus, males engage in farming more than females. This could be due to the socio-cultural milieu of the area which gives males the access to production resources like land more than females. This agrees with the findings of [23] in their study on social economic factors' affecting the adoption of technology in Ondo city, Nigeria that majority of the farmers in the study area are males.

Majority (85.0%) of farmers were married while 15.0% were single. This shows that married people dominates agricultural production in the area. This may be as a result of high labor requirement in agricultural production in which they use members of their family as labor force and partly due to the expected benefits derived in feeding members of their family from what they produced. This result agrees with [24] who revealed in their studies that majority of agro forestry farmers in Nigeria were married.

Result from Table 1 reveal that majority (57.0%) of the respondents had non-formal education followed by primary education (26.0%). Those with secondary and tertiary education were least with 13.0% and 4.0% respectively. This result implies that the respondents have low level of education. Education is an important factor influencing farmers' innovation uptake. According to [25], the level of education of a person not only increases his farm productivity but also enhances his ability to understand and evaluate new

production technologies. Awareness of forestry laws to a great extent depends on the level of education of the farmers. Literate farmers tend to be more knowledgeable about the importance of forest and forestry laws.

The average farm size of the respondents was 2.5 hectares. This implies that farmers in the study area are mainly smallholder farmers operating on little plots of farmland. This could be as a result of the fact that farm lands in most traditional societies are not communally owned and this leads to fragmentation, leaving farmers with small farm land. This collaborate the findings of [26] who also found the mean farm size of 3.2 hectares in their study on analysis of farm risk and coping strategies among maize farmers in Lere Local Government Area of Kaduna State, Nigeria. Farmers with small land size would not be interested in agroforestry practice but would rather concentrate on crop farming to satisfy the immediate food requirements of the family.

Results from the study showed that 43.0% of the respondents had 11-15 members per family, 40.0% had 16-20 members. The mean household size of the respondents was found to be 7 persons. This implies that significant component of the labour force comes from the family. Family labour is an important component of labour for small scale farmers. This is mainly because the subsistence farm households are resources poor and they may have to depend on family labour for agricultural activities which in most cases are labour intensive. This agrees with the findings of [27] who inferred that large household is advantageous in farming as labour may be derived from the members.

Higher proportion (51.0%) of the farmers got their income from sale of farm products while about 40.0% of them got their income from sale of tree products. 6.0% got their income from salary while 3.0% of the respondents got their income from non-farm businesses. This implies that agricultural production was a major means of livelihood in the study area.

The result shows that 49.0% of the respondents had contact with extension agent between 1 and 5 times while 28.0%, had contact with extension agents between 6 and 10 times in the last one year. 13.0% had contact with extension agents 11-15 times while 10% had contact with extension agents 16-20 times. This is considered very low. This low number of extension visit could be a reflection of the nature of extension services delivery which is characterized by poor

**Table 1. Distribution of respondents based on their socio-economic characteristics (N=214)**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Mean</b>
<b>Age (years)</b>			
21- 30	25	12.0	39
31- 40	107	50.0	
41 – 50	58	27.0	
50 above	24	11.0	
<b>Sex</b>			
Male	130	61.0	
Female	84	39.0	
<b>Marital status</b>			
Single	31	15.0	
Married	183	85.0	
<b>Major occupation</b>			
Farming	201	94.0	
Civil servant	3	1.0	
Trading	10	5.0	
<b>Educational level</b>			
Primary	56	26.0	
Secondary	27	13.0	
Tertiary	8	4.0	
Non formal education	123	57.0	
<b>Household size (number)</b>			
1-5	92	43.0	7.0
6-10	86	40.0	
11-15	26	12.0	
16-20	10	5.0	
<b>Size of farm land (hectares)</b>			
1.0-2.0	123	57.0	2.5
3.0-4.0	79	37.0	
Above 4.0	12	6.0	
<b>Sources of Household income</b>			
Salary	12	6.0	
Sales of forest products	86	40.0	
Sales of farm products	109	51.0	
Others (specify)	7	3.0	
<b>Number of extension visit (in the last one year)</b>			
1-5	105	49.0	
6-10	60	28.0	
11-15	27	13.0	
16-20	22	10.0	
<b>Land tenure</b>			
Rent	86	40.0	
Inheritance	128	60.0	
<b>Annual income (Naira)</b>			
10000- 20000	14	6.0	55327
21000-40000	23	11.0	
41000-60000	81	38.0	
61 above	96	45.0	



**Table 2. Distribution of respondents based on awareness of forestry laws in the study area**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	137	64.0
No	77	36.0
Total	214	100.00

information dissemination as noted by [28]. The implication is that farmers may not be properly informed about improved forestry practices and other improved farm practices.

A greater percentage (60.0%) of the respondents said they acquire their farmlands through inheritance while the remaining 40.0% of the respondents acquired their farmlands through rent. Land tenure could be a problem in adoption of improved forestry practices especially in areas where farmers cultivate communal land under traditional tenure arrangements that do not allow them to claim ownership or exclusive use rights to the trees on their fields.

The result from Table 1 also indicated that, the mean annual income of the farmers was N55327. This result indicates that farmers in the study area have high annual incomes showing that they have a good financial base for any agricultural venture.

### 3.2 Awareness of Forestry Laws

Results in Table 2 revealed that 64.0% of the people were not aware of forestry laws while 36.0% of the people acknowledge being aware of forestry laws. This result clearly indicates low awareness of forestry laws in the study area. The non-adherence to forest laws in the study area could be attributed to low awareness. Hence awareness creation needs to be intensified in the study area on the need to preserve forest and forest resources.

### 3.3 Level of Compliance with Existing Forestry Laws

Table 3 indicate that the respondent did not comply with the following forestry laws in the study area namely; law prohibiting the clearing or uprooting of any forest growth for farming (X=2.81), law prohibiting hunting in the forest reserve (X=2.34), law prohibiting indiscriminate felling of trees (X=2.58), law prohibiting exploitation of forest resources without license (X=2.60). The few laws complied with in the study area include: Prohibiting the pasturing or grazing of cattle in the forest reserve (X=3.02),

Prohibiting the erection of buildings or roads in the forest reserve (X=3.85) and Prohibiting kindling of fire in the forest reserve (X=3.54). The non-compliance with forestry regulations by the respondents was attributed to some defects in the existing enforcement structures in Plateau State. The respondents decried that many forest officers commit flaws in the course of enforcing the regulations. They alleged that some forest officers, even Directors of Forestry, own power saws and are themselves involved in indiscriminate fitching activities with impunity. There were also reported cases of connivance between forest officers and timber contractors to carry out logging activities for a token to the detriment of the forest. Further investigation revealed that the respondents cannot avoid cutting down trees from the existing reserves. This is because they have been using firewood since childhood and again it is relatively cheaper and an additional source of income. Some were aware of the forestry laws and regulations; however, they felt they are the legitimate and bona-fide owners of the forest, and so government has no control on them. Very few claimed ignorant of any forestry law. If these people are mobilized and trained based on their respective limitations and strengths specified above, they may be used in jointly managing forest resources. This approach will significantly save the forest from further degradation and the attendant negative consequences.

### 3.4 Constraints to Forestry Law Compliance

The major constraints to forestry law compliance as opined by the respondents were; Perceived lack of fairness of tree tenure (79%), lack of alternative economic opportunities (87%), lack of awareness of forest laws (71%), increased demand for agricultural (42%), general lack of perceived legitimacy (33%), corruption in government institutions (28%) and weak law enforcement (5%). Result from Table 4 reveals that perceived lack of fairness of tree tenure ranked first amongst the constraints to forest law compliance in the study area. The perception that community members should not have the right to use and fell trees on their farmland is

identified as the strong factor explaining the lack of compliance with forestry laws. Lack of alternative economic opportunities for local people ranked second as a constraint to forest law compliance in the study area. The need for wood and timber for domestic use and in support of livelihoods (e.g., building shelters, fuel wood etc) can result in passive acceptance of forest illegality. Lack of awareness of forest laws ranked third as a constraint to forest law compliance. This can be attributed to inadequate contact between farmers and extension agents. Extension agents are responsible for awareness creation of government laws and policies concerning forest use and conservation.

Increased demand for agricultural land ranked fourth as a constraint to forest law compliance. The increase in human population means more land for farming. This in turn has a negative effect on vegetation cover as more trees and forests are continuously been converted to agricultural lands. Other constraints include; general lack of perceived legitimacy, Corruption in government institutions and weak law enforcement. There is a general lack of perceived legitimacy i.e. perception that the authorities are irresponsible and illegitimate. Respondents complained of an inconsistent forest policy and legal framework. Problems arise when laws (both within the forest sector and

**Table 3. Distribution of respondents based on the level of compliance with forest laws (N=214)**

Forestry laws	SCW (5)	CW (4)	Undecided (3)	SNCW(2)	NCW (1)	Sum	Mean (X)	Remark
1. Prohibiting the destruction of or any act which may tend to destroy or cause injury to any forest product or forestry growth or forest property.	29	46	19	32	88	538	2.51	**
2. Prohibiting the pasturing or grazing of cattle in the forest reserve	160	228	180	34	48	650	3.03	*
3. Prohibiting the clearing or uprooting of any forest growth for farming	315	56	108	44	79	602	2.81	**
4. Prohibiting the erection of buildings or roads in the forest reserve.	375	324	93	12	21	825	3.85	*
5. Prohibiting taking any timber or protected tree or any protected minor forest produce.	260	80	69	20	109	538	2.51	**
6. Prohibiting kindling of fire in the forest reserve	295	296	117	16	34	758	3.54	*
7. Prohibiting hunting in the forest reserve	200	44	111	40	106	501	2.34	**
8. Prohibiting indiscriminate felling of trees	208	84	174	10	78	554	2.58	**
9. Prohibiting exploitation of forest resources without license	225	140	66	30	97	558	2.60	**

\*Complied with; \*\*Not complied with

**Table 4. Distribution of respondents based on constraints to forestry law compliance**

<b>Constraint</b>	<b>*Frequency</b>	<b>Percentage</b>	<b>Rank</b>
Lack of fairness in tree tenure rights	169	79.0	1 <sup>st</sup>
Lack of alternative means of livelihood	187	87.0	2 <sup>nd</sup>
Lack of awareness of forestry laws	151	71.0	3 <sup>rd</sup>
Increased demand for agricultural land	91	42.0	4 <sup>th</sup>
Lack of perceived legitimacy	71	33.0	5 <sup>th</sup>
Corruption on the part of government	59	28.0	6 <sup>th</sup>
Weak forest law enforcement	11	5.0	7 <sup>th</sup>

*Multiples choice responses*

between sectors) are incoherent, unrealistic and unenforceable and fail to address forest land tenure and use rights. Excessive regulations can mean that the transaction costs of legal operations are prohibitively high, making it impractical for many forest users to adhere to the law. This is particularly the case for community-based and other small and medium-sized enterprises, which are often poorly equipped to comply with convoluted administrative procedures and may therefore be forced to operate outside the law. Corruption in government institutions and the private sector and among local decision-makers is linked to a lack of transparency in policy implementation, the marginalization of rural people, and a lack of public scrutiny. One particular concern is corruption related to the allocation of forest-use rights, including timber licenses and forest concessions. In addition, poorly or irregularly paid law enforcement staff might be tempted to 'top up' their salaries by illegal means. Excessive discretionary powers and a lack of mechanisms for resolving disputes and conflicts can also lead to corruption.

### 3.5 Test of Hypothesis

#### 3.5.1 The maximum likelihood estimates of logistic regression showing the relationship between farmers' socio-economic characteristics and forestry law compliance

Based on the results, five of the tested variables significantly influenced farmers' compliance with forestry laws in the study area. These variables include age, marital status, education, Household Size and income.

The coefficient of age was found to be significant at 1% ( $P < 0.01$ ) but negatively related to compliance with forestry laws in the study area. This implies that a unit increase in the age of the respondents would decrease the probability of

complying with forestry laws. The age of the farmer could affect the farmer's knowledge and awareness of activities in the surrounding environment.

The coefficient of marital status was found to be significant ( $P < 0.01$ ) and positively related to compliance with forestry laws in the study area. The result shows that as one marries the willingness to comply with forestry laws increases. The implication could be that married people assume more responsibilities and are more conscious of the importance of obeying constituted laws guiding the forests and the environment in general.

The level of education of the household head was statistically significant at 5% ( $P < 0.05$ ) and negatively related to compliance with forestry laws. This result shows that increase in education level of the respondents will lead to a decrease in compliance with forestry laws. This finding is unexpected, a plausible explanation to this result could be that, educated members are probably aware of the flawed forest policy and legal framework coupled with corruption and lack of transparency in forest governance by constituted authorities and hence give less attention to compliance with forestry laws.

The result also revealed that the coefficient of household size was found to be significant ( $P < 0.05$ ) and negatively related to compliance with forestry laws in the study area. The implication of this result is that larger household size could lead to less compliance with forestry laws as more forests would be cleared for farming in order to take care of the large household size.

Household income was positively related to compliance with forestry laws in the study area and was significant at 5% probability level. This result indicates that a unit increase in the farmer's income will increase

**Table 5. Logit analysis of factors influencing compliance with forestry laws**

Variable	B	S.E	Wald	Df	Sig	Exp(B)
Constant	-2.212	1.544	2.052	1	.152	.110
Age	-1.090	.237	21.107*	1	.000	.336
Sex	-.343	.340	1.016	1	.313	.710
Occupation	-.291	.183	2.526	1	.112	.747
Marital status	2.896	.692	17.525*	1	.000	18.109
Education	-.316	.128	6.064**	1	.014	.729
Household size	-.445	.207	4.628**	1	.031	.641
No of ext visits	.065	.214	.093	1	.760	1.067
Land Tenure	.204	.324	.396	1	.529	1.226
Income	.312	.156	4.003**	1	.045	1.366
Chi-square	50.518					

\* Significant at 1%, \*\* Significant at 5%

the probability of compliance with forestry laws in the study area. A plausible explanation for this is that as the income of households increases, their purchasing power also tend to increase. Hence such households might not need to depend only on forest resources as means of livelihood.

Consequently, the null hypothesis ( $H_0$ ) which states that there is no significant relationship between farmers' socio-economic characteristics and compliance with forestry laws is therefore rejected. This is because the result of logit regression shows that five of the tested variables namely; age, marital status, education, household size and income significantly influence farmers' compliance with forestry laws in the study area.

#### 4. CONCLUSION

The study sought to assess the level of compliance with forestry laws among rural farmers in Plateau state, Nigeria. Based on the findings of the study, the following conclusions are made;

There is low compliance with existing forest laws in the study area as the level of awareness of forestry laws was very low. The constraints encountered by farmers in complying with forest laws include; Perceived lack of fairness of tree tenure, lack of alternative economic opportunities, lack of awareness of forestry laws, increased demand for agricultural, general lack of perceived legitimacy, corruption in government institutions and weak law enforcement. The null hypothesis which states that there is no significant relationship between farmers' socio-economic characteristics and their level of compliance with forestry laws in the study area

was rejected. This is because the result of logit regression shows that five of the tested variables significantly influence farmers' compliance with forestry laws in the study area. These variables include age, marital status, education, household size and income.

#### 6. RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

1. Extension agents should increase their extent of visits and contacts with the farmers to increase their awareness of forest laws and the need to comply with them.
2. Policies against non-compliance with forest laws should be put in place to checkmate indiscriminate exploitation of forest resources.
3. Sectoral policies and regulations such as agriculture policy, environment policy, land policy, forestry policy and livestock policy need to be harmonized in order to address issues related to land and tree tenure.
4. Measures should be put in place including public orientation of the usefulness of forest and public awareness of the existing forest laws.

#### ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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