ASSESSMENT OF FORESTRY EXTENSION SERVICES, LAWS AND COMPLIANCE IN BENUE STATE, NIGERIA

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ABSTRACT

This study was carried out to assess forestry extension services, laws and compliance in Benue State, Nigeria. The state was stratified into three geo political Zones namely Zone A, Zone B, and Zone C. Seven local Government areas were randomly selected, with at least two from Zone A and B, and three from zone C. (65) communities were used from the (7) selected local Government Areas in the 3 Zones, making (395) respondents. Benue State Ministry of Water Resources and Environment (1) as well as forestry units (7) in the selected local government areas were selected for questionnaire administration. Therefore, the sample size for the study was 403 respondents. Two (2) sets of structured questionnaires were administered. Data was analyzed using descriptive statistics frequency and percentages. A 5-Point Likert Scale rating format was used to determine forestry extension services and compliance with forestry laws in Benue State. Factorial analysis was also used to determine the most important factor influencing compliance with forestry laws in Benue State. 80.1% of the respondents were males while 19.9% were females. Age found that, 33.5% of the respondents were within age bracket of 41-50 years, while the least 8.2 % were above 60 years. Respondent level of education was revealed to be 30.5% tertiary education, 26.1% had non-formal education, 65.7% were farmers, and 4.5% were hunters, 86.6% married, while 13.2 % were singles. There is no effective extension service delivery in Benue State. The result also revealed a low level of compliance to forestry laws in Benue State. It is therefore concluded that, respondents were young, agile, married and educated and has been residing in the study area over a period of time. There should be adequate access to forest extension services; this could enhance high level of compliance with forestry laws in the study area.

INTRODUCTION

For safety, health, and survival, humans rely on their relationship with the environment (Foskett & Foskett, 2004). According to Agbogidi and Eshegbeyi (2008) and Aondoakaa *et al.* (2025), forests are crucial for the water cycle, carbon sequestration, as a genetic bank, and as a food supply. They also control water flow, promote rainfall, and shield soils from erosion. While the number of people who depend on tropical forests continues to rise, these forests are rapidly disappearing. It is noteworthy that individuals grow more environmentally concerned and wish to safeguard the environment as environmental services deteriorate and users are impacted (Pepper, 1996). According to Agbamu (2006), education and skills have always been crucial for economic expansion. It is widely accepted that technology is created at a cost through investment in research and development, and that education significantly increases labor productivity, which leads to a rise in physical capital. Governments, policymakers, non-governmental organizations, and the private sector—including extension for forest conservation and protection—must make significant investments in education and research in order to accomplish this successfully.

There are numerous forestry extension models used globally to carry out the "extension" task (Johnson *et al.,* 2007), and numerous governments have implemented various forestry extension programs in accordance with these models (Low *et al.,* 2010). While the concept of forestry extension as a channel for sharing forest management ideas has been around for a while (FAO, 1993), the use of extension to enhance private and community woodland management is still growing globally (Johnson *et al.,* 2007). To improve forest and tree management, Anderson and Farrington (1996) define forestry extension models as methodical methods of exchanging ideas, knowledge, and techniques that result in reciprocal changes in attitudes, practices, knowledge, values, and behavior. The realization of extension failures in general and forestry in particular is already causing changes in forestry extension models. Historically, forestry extension strategies have primarily addressed technical issues, including introducing new tree species, offering nursery skills, or developing technology, like better stoves. However, due to low adoption rates or technology abandonment, forestry extension has had unequal success in many parts of the world despite technological advancements (Subhrendu *et al.,* 2003).

The application of silvicultural technologies could be one of the contributing factors. However, biophysical factors, not socioeconomic ones, have been the focus of forestry adoption research until recently (Mercer, 2004; Baynes and Herbohn, 2011). Additionally, the relatively recent developments in community-based and community-driven extension practices have placed greater emphasis on getting locals to agree and work together to address issues that affect all members rather than just a select few (Kaudia *et al.,* 2003). Anderson and Farrington (1996) question whether public extension can still be helpful in light of the external size and nature of the changes as well as the fact that forestry extension has not always been successful. It has long been difficult for many nations, especially those where the state controls forest resources, to ensure good management of forest land and trees by enforcing laws and regulations. It is true that a thorough expansion strategy incorporating all pertinent parties must be developed.

Braeutigam (2003) asserts that government officials should work closely with non-governmental organizations (NGOs) to provide extension services that are driven by demand. NGOs are currently participating in forestry extension initiatives as a solution to this dilemma. Particularly in areas where forestry is "commercial" or "industrial" and local professional societies are prevalent, the private sector has also contributed significantly through consulting foresters. It is advised that forestry extension models create strong relationships and close collaboration with the agricultural extension systems at the regional and national levels in addition to taking into account the interactions between forestry and agricultural operations at the local level. In Iran, as in the majority of African nations (Temu and Kowero, 2001; Schreckenberg *et al.,* 2006), the ministry of agriculture is in charge of overseeing forestry operations. With this administrative structure, forestry elements are incorporated into already-existing agriculture extension initiatives. While each Department would retain responsibility over its own personnel, the establishment of regional cooperative extension teams would result in more effective, synergistic agro-forestry extension strategies. The creation of a single forestry extension service may also result in additional issues, primarily the separation from other sectors and the potential failure to reflect common decentralization efforts and realities at the community level, given the limited financial and human resources, particularly at the regional level (Braeutigam, 2003).

Although there are various approaches, the most popular and general applied forestry extension approach is community-based, which means that multi-stakeholders should be involved in the development of policies and legislation from the national level down to the local level, or as Chambers (1997) emphasizes, from the local to the national level. In fact, increasing local interest in and commitment to forestry extension necessitates a dynamic process of involving a range of stakeholders, from policy makers to locals, in a way that can reflect the socioeconomic and biophysical conditions of the local population in addition to elaborating and addressing the overarching objectives of sustainable forest management at the regional and national levels. Because of bad administration, corruption, and illegality in the forest sector, especially in sub-Saharan Africa,

the prevalence of forest crime has been rising. By distorting wood markets, this has harmed responsible forest firms and endangered populations that depend on timber and non-timber forest products for their survival and means of subsistence (World Bank, 2006). Revenue that may be used for economic development or sustainable forest management is lost as a result of these errors. They frequently belong to larger networks of environmental crime and corruption. Additionally, continuing initiatives to reduce deforestation and increase carbon stocks to slow down climate change are hampered by illegal and irresponsible logging. Therefore, targeted action in directly enhancing forest law enforcement to guarantee that offenders are caught and punished is necessary to combat forest-related criminal activities and ensure fair utilization of forest resources (World Bank, 2006).

MATERIALS AND METHODS

Benue State is one of the thirty-six (36) States in Nigeria, which is located in the North central geopolitical zone. It is located longitudes 6°35' E and 10°0E and latitudes 6° 30' N and 8° 10' N. It is within the guinea savanna area of Nigeria with a total land mass of 30,955 km^2 (National Bureau of Statistics 2012). The state shares boundaries with Nasarawa State to the North, Taraba State to the east and Cross river to the south, Enugu and Kogi State share borders to the east and west respectively. Benue State has an estimated population of about 4.2 million people according to the 2006 National Population Census. The climate of Benue State is tropical with distinct wet and dry seasons. The wet season lasts from April to October with annual rainfall range of 150mm -180mm. The dry season lasts from November to March. The mean annual temperature fluctuates between 23°C and 30°C (Benue State Diary, 2012). The vegetation is characteristically that of the tropical moist and wet forest with a well-defined three-layer structure in much of the region. This vegetation, range from mangrove and swamp forests in the coastal south to tropical rain forests to the savannah woodland in the Northern part of the State (Fon *et al.,* 2014). The parent materials forming soil in Benue State are largely of sedimentary origin which produce the deep loamy soils, for agricultural production in most parts of the State
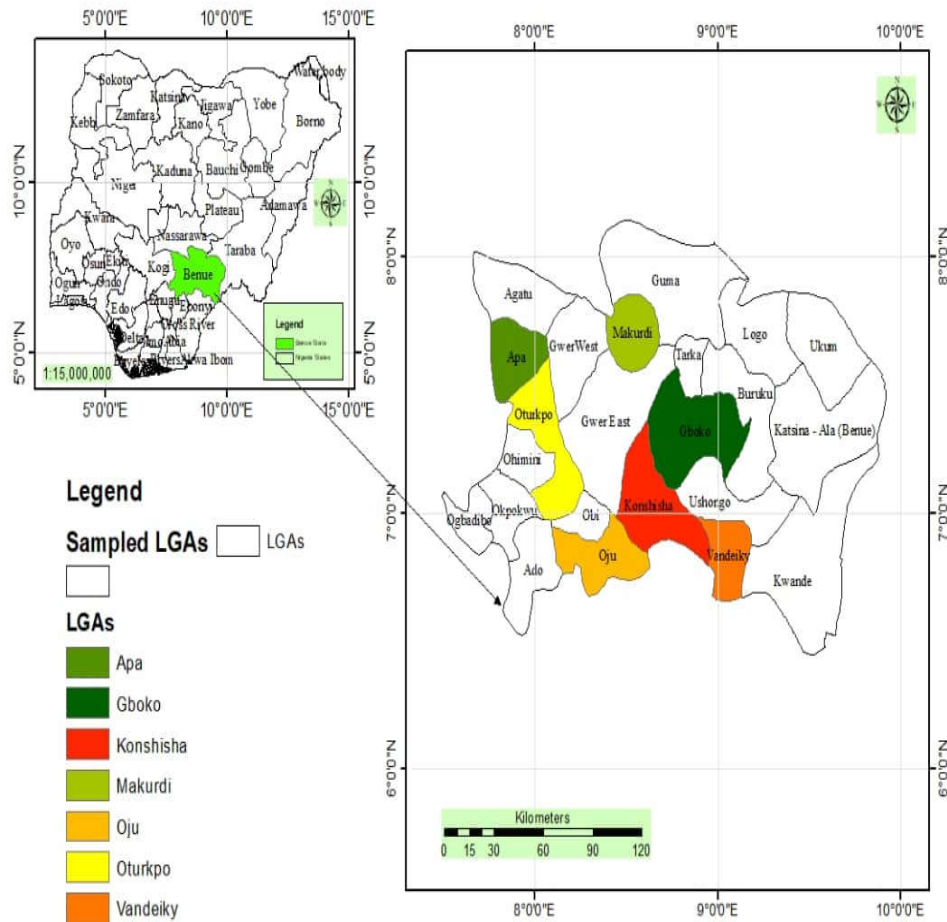
Figure: 1 Map of Nigeria Showing the Location of Benue State and Local Government Areas of the Study
Source: Remote Sensing and GIS Laboratory, Geography Department, Federal University of Technology, Minna.

Population, Sampling Procedure and sample Size

The study employed stratified random sampling techniques where the state was stratified into three geo political Zones namely Zone A, Zone B, and Zone C each comprising (7, 7 and 9) LGAs respectively. Using 30% Sampling Intensity (SI), Seven Local Government were randomly selected with at least two from Zone A and B while zone C with three. The selected Local Governments were Konshisha, Vandeikya, Gboko, Makurdi, Apa, Otukpo, and Oju. A 5% sampling intensity was adopted randomly in selecting sixty-five (65) communities out of the (7) selected local government areas in the 3 Zone which gave rise to (395) respondents. Also 1 respondent was selected from Benue State Ministry of Environment and water Resources as well as 7 respondents from Forestry units in the selected local government areas. Therefore, the sample size for the study was 403 respondents.

Data Collection

Data for the study were collected with the use of two (2) sets of structured questionnaire and secondary data. The first set of structured questionnaire was designed to elicit information about forestry extension services and compliance with forestry laws in Benue State from general Respondents who reside within the selected communities in the entire selected local governments, respondents were randomly selected based on the number of household in each of the communities. The second set of questionnaire was designed to obtain information about forestry personnel in Benue State, one (1) Respondent (Forestry personnel) each from all the selected local governments as well as Forestry Department, Benue State Ministry of Environment and Water Resources were offered a copy of questionnaire to fill.

Data Analysis

Data was analyze using descriptive statistics such as frequency and percentages to determine

the socioeconomic characteristics of respondents in the study area. Binary Logistic Regression (BLR) Model analysis as used by Aondoakaa *et al.,* (2023) was adopted to estimate Socio-economic variable influencing extension service delivery in Benue State as well as Socio-economic variable influencing compliance with forestry laws in Benue State**.** A five point Likert scale rating format as used by Dagba *et al*., (2017) and Aondoakaa *et al*., (2025) was adopted to measure extension service delivery in terms of quality and methods used, level of compliance with forestry laws, factor militating against effectiveness of extension service.

RESULTS
Socio-Economic Variables of Respondents.
According to the findings of the socioeconomic characteristics of the participants, 80.1% of the study's participants were men and 19.9% were women. The age distribution of the respondents showed that 33.5% of them were between the ages of 41 and 50, while the smallest percentage (6.0%) were between the ages of 21 and 30. Majority (30.5%) of respondents had completed university education, 26.1% had non-formal education, and just 20.1% had only completed primary school, according to the respondents' educational background. The findings also showed that 65.7% of respondents were farmers, 15.7% were civil servants, 9.5% were traders, 4.7% were students, and 4.5% identified hunting as their primary activity. 13.2% of respondents were found to be unmarried, compared to 86.6% who were married. According to the household category results, 73.6% of respondents had six to ten household members, while only 1.0% of respondents had a household size greater than fifteen. According to the respondents' term of residency, 28.3% had lived in the area for 31–40 years, whilst only 2.7% had done so for 11 years.

Table 1: Socio-Economic Variables of Respondents in the Study Area

Variables	Category	F (N=403)	%
Gender	Male	323	80.1
	Female	80	19.9
Age Category	21-30	24	6.0
	31-40	102	25.3
	41-50	135	33.5
	51-60	109	27.0
	>60	33	8.2
Level of Education	Non-Formal	105	26.1
	Primary	81	20.1
	Secondary	94	23.3
	Tertiary	123	30.5
Major Occupation	Civil servant	63	15.7
	Farming	264	65.7
	Hunting	18	4.5
	Trading	38	9.5
	Student	19	4.7
Marital Status	Married	349	86.6
	Single	53	13.2
	Widow	1	0.2
Household Category	< 5	94	23.4
	6-10	296	73.6
	11-15	8	2.0
	>15	4	1.0
Tribe	Tiv	280	70.9
	Idoma	54	13.7
	Igede	61	15.4
Period of Residence	<11	11	2.7
	11-20	80	19.9
	21-30	100	24.8
	31-40	114	28.3

	41-50	70	17.4
	>50	28	6.9
Annual Income (₦)	< 21,000	2	0.5
	21,000-40,000	8	2.0
	41,000-60,000	29	7.2
	61,000-80,000	55	13.6
	81,000-100,000	83	20.6
	>100,000	226	56.1

Source: Field Survey, 2020

Socio-Economic Variables of Respondents
Socio-Economic Variables Influencing Extension Service Delivery in Benue State

The result of binary logistic regression estimate of socio-economic variable of respondents influencing extension services in Benue State revealed that, Period of residence has a significant positive influence on extension service delivery in Benue State. (β=.019 p<0.05 hence the people with long period of residence in the communities adapt to the available extension delivery methods. The β statistics indicates that a unit increase in the period of residence will influence extension service delivery by a factor of .019. Based on the Exp (β) a value of 1.019 period of residence was ranked a first variable influencing extension service delivery. Education: has a significant positive influence on extension service delivery (β =.017 p<0.05). According to the β statistics, effective extension service delivery will be improved by a factor of β=.017 for every unit increase in the population's educational attainment. People who have received an education will be better able to comprehend and adjust to extension services. Education was placed as the second variable impacting the delivery of extension services in Benue State based on its Exp (β) value of 1.017. People's age significantly improves the quality of extension services (β=.002 p<0.05). According to the Beta figures, the delivery of extension services would be impacted by a factor of.002 for every unit rise in population age. Age was placed as the third variable impacting the delivery of extension services in Benue State, based on the Exp (β) value of 1.002. Additionally, income significantly improves the delivery of extension services (β=.000 p<0.05). According to the Beta figures, a thousand more individuals will be better able to adapt to the delivery of extension services, and those with higher incomes will be less reliant on forest resources. Income was ranked as the fourth factor influencing the delivery of extension services based on the Exp (β) value of 1.000. The delivery of extension services is significantly impacted negatively by household size (β = -121 p<0.05). A unit increase in household size will result in a -121 rise in reliance on forest resources, according to the Beta statistics. The demand for food, towns, and agricultural land will rise along with the population, all of which will have a detrimental effect on forest resources. Households were rated as the fifth variable that will affect the supply of extension services based on the Exp (β) value of 0.886.

Table 2: Socio-Economic Variables Influencing Extension Service Delivery in Benue State

Variable	B	S.E.	Wald	Df	Sig.	Exp(B)	Ranking
Period of Residence	0.019	0.012	2.369	11	0.124	1.019	1
Education	0.017	0.107	0.025	1	0.874	1.017	2
Age	0.002	0.016	0.020	1	0.888	1.002	3
Income	0.000	0.000	0.377	1	0.539	1.000	4
Household Size	-0.121	0.058	4.387	1	0.036	0.886	5

Source: Field Survey, 2020
Number of cases = 395, Model Chi-square= 109.15 (p<0.05) -2LL = 438.70; Overall percentage = 67.4%, Negelkerke R^2 = 0.261, Exp (β) = Odds ratio (probability of success/probability of failure), SE= standard error of the estimate, Sig =significance, β = regression coefficients which stand for the odds ratio of probability of success to the probability of failure and Wald statistics = (β/ SE)², df = degree of freedom.

Socio-Economic Variable Influencing Compliance with Forestry Laws in Benue State

Table 5 displays the findings of a binary logistic regression estimate of the respondents' socioeconomic factors affecting adherence to Benue State's forestry regulations. In Benue State, education significantly improves adherence to forestry regulations (β =.498 p<0.05). According to the β statistics, effective adherence to forestry rules will increase by a factor of β=.498 for every unit increase in the population's educational attainment. People who are educated will have a high degree of comprehension and adherence to the law. Education was placed as the primary variable that may affect adherence to Benue State's forestry legislation, with an Exp (β) value of 1.645. Age: of the people has a significant positive influence on compliance with forestry laws in Benue State (β=.011 p<0.05). The β statistics indicates that a unit increase in age of the people would impact compliance with forestry laws by a factor .011 Based on the Exp (β) value of 1.011 Age was ranked the second variable that will influencing compliance with forestry laws. Income: also has a significant positive influence on compliance with forestry laws in Benue State (β=.000 p<0.05). The β statistics indicates that a unit increase in income of the people will improve level of compliance to forestry laws by a factor of .000 Good income earning people depend less forest resources. Based on the Exp (β) value of 1.000 income was ranked the third factor influencing compliance with forestry laws.

Residence duration significantly impairs adherence to forestry regulations. (β = -.012 p<0.05) Based on the Exp (β) value of.988, period of residence was ranked as the fourth variable influencing compliance with forestry laws. The β statistics show that a unit increase in the period of residence will influence extension service delivery by a factor of -.012. Compliance with forestry rules is significantly impacted negatively by household size (β= -.204 p<0.05). A unit increase in household size will result in a -204 increase in reliance on forest resources, according to the β statistics. Household was ranked as the fifth variable that will affect adherence to forestry laws based on the Exp (β) value of 0.816.

Table 3: Socio-Economic Variables Influencing Compliance with Forestry Laws in Benue State

Variable	B	S.E	Wald	Df	Sig.	Exp (B)	Ranking
Education	0.498	0.118	17.683	1	0.000	1.645	1
Age	0.011	0.018	0.045	1	0.524	1.011	2
Income	0.000	0.000	13.248	1	0.000	1.000	3
Residence	-0.12	0.013	0.979	1	0.322	0.988	4
Household Size	-0.204	0.064	10.104	1	0.001	0.816	5

Source: Field Survey, 2020

Number of cases = 395, Model Chi-square = 109.15 (p<0.05) -2LL = 438.70; Overall percentage = 67.4%, Negelkerke R^2 = 0.261, Exp (β) = Odds ratio (probability of success/probability of failure), SE = standard error of the estimate, Sig = significance, β = regression coefficients which stand for the odds ratio of probability of success to the probability of failure and Wald statistics = (β/ SE)^2, df = degree of freedom.

Extension Service Delivery in Benue State

According to Benue State's extension service delivery results, the majority of respondents (MWS = 1.38), strongly disagreed that extension services are offered in the region. According to the respondent's MWS = 1.61, they also strongly disagree with the existence of forestry extension agents in the research region, but they do support the agents' sporadic visits (MWS = 1.43). In the same way, MWS = 1.28 indicates that the respondents strongly disagree with the quality of extension services in the research area. Additionally, respondents denied knowing anything about local forest resources and conservation. MWS is 1.21.

Table 4: Extension Service Delivery in Benue State

Variables	SA	A	UN	D	SD	N	WS	WMS	Ranking
Existence of Extension Service	0	0	27(81)	95(190)	273(273)	395	544	1.38	1
There is presence of forestry extension agents	0	2(8)	65(195)	106(212)	222(222)	395	637	1.61	2

	SA	A	UN	D	SD	N	WS	WMS	
Forestry extension agents frequent visit in your area	0	0	31(93)	106(212)	258(258)	395	563	1.43	3
good quality of delivery methods of forestry extension	0	0	19(57)	73(146)	303(303)	395	506	1.28	4
Knowledge conservation	0	0	10(30)	61(122)	324(324)	395	476	1.21	5

Source: Field Survey, 2020
Note: Strongly Agreed (SA) =5, Agreed (A) =4, Undecided (UD) =3, Disagreed (D) =2, Strongly Disagreed (SD) =1, N =Number, WS= weighted scores, WMS= weighted mean score. Values outside the bracket are frequencies of respondents, Values inside the bracket are the Likert weighted scores of each of the Likert rating point, Number of respondents N = 395, Mean Scores MS =3.0, Upper Limit UL = 3.O5, and Lower Limit LL =2.95

Models of Extension Service Delivery in Benue State

When the outcomes of extension service delivery models were evaluated, it was found that extension agents' training on home gardening and nursery techniques was not very important. Training on the use of non-timber forest products (NTFPs) was likewise not significant, with WMS values of 1.37 and 0.9, respectively. WMS is 1.3. In order to affect sustainable forest resources management in the research area, the respondents stated that raising knowledge about tree management and launching a campaign against bush burning were likewise not significant (WMS 1.71 and 1.66, respectively). The campaigns to prevent the destruction of endangered plants and animals and to stop illegal logging in reserve areas were ineffective and had no beneficial effect on the respondents (WMS 1.91 and 2.05, respectively).

Table 5: Models of Extension Service in Benue State

Variables	SA	A	UN	D	SD	N	WS	WMS	Ranking
Campaign against destruction of endangered tress species and wild animals	0	0	61(183)	147(441)	187(187)	395	811	2.05	1
Campaign against illegal logging in reserve areas	0	0	78(234)	103(309)	212(212)	395	755	1.91	2
Awareness creation on tree management/forest protection	0	0	26(78)	115(345)	254(254)	395	677	1.71	3
Campaign against uncontrolled bush burning	0	0	15(45)	116(348)	264(264)	395	657	1.66	4
Training on Nursery Practices	0	0	30(90)	88(176)	277(277)	395	543	1.37	5
Training on utilization of Non-Timber Forest products (NTFPs)	0	0	20(60)	79 (158)	296(296)	395	514	1.3	6
Training on Home Garden or Agroforestry practices	0	0	26(78)	105 (20)	264(264)	395	362	0.9	7

Source: Field Survey, 2020
Note: Strongly Agreed (SA) =5, Agreed (A) =4, Undecided (UD) =3, Disagreed (D) =2, Strongly Disagreed (SD) =1, N= Number, WS= weighted scores, WMS= weighted mean score. Values outside the bracket are frequencies of respondents, Values inside the bracket are the Likert weighted scores of each of the Likert rating point, Number of respondents N = 395, Mean Scores MS =3.0, Upper Limit UL = 3.O5, and Lower Limit LL =2

Level of Compliance with Forestry Laws in Benue State.

The results of the study on the degree of adherence to Benue State's forestry laws indicate that the ban on unlawful forest product collection had a score of 2.38, the ban on unlawful timber logging had a score of 2.37, the ban on the indiscriminate felling of endangered tree species law had a score of 2.35, and the ban on starting fires on forest resources had a score of 2.34.

Table 6: Level of Compliance with Forestry Laws in Benue State

Variables	VHC	HC	MC	LC	VL	N	WS	WMS	Ranking
Illegal collection of forest products	60(300)	42(168)	52(156)	62(124)	170	386	918	2.38	1

Illegal logging of timber	60(300)	42(168)	52(156)	61(122)	173	388	919	2.37	2
Indiscriminate felling of endangered trees species	57(285)	45(180)	52(156)	62(124)	177	393	922	2.35	3
Setting of fires on forest resources	56(280)	46(184)	52(156)	62(124)	177	393	921	2.34	4

Source: Field Survey, 2020

Note: Very High Compliance (VHC) =5, High Compliance (HC) =4, Moderate Compliance (MC) =3, Low Compliance (LC) =2, Very Low Compliance (VLC) 1, N = Number, WS =Weighted Scores, WMS = weighted mean scores. Values inside the bracket are the Likert weighted scores of each of the Likert rating point, Number of respondents (N) = 395, Mean Scores (MS) = 3.0, Upper Limit (UL) = 3.O5, and Lower Limit (LL) = 2.

DISCUSSION

Socio-Economic Characteristics of Respondents in Benue State, Nigeria

According to the socioeconomic characteristics, the majority of respondents—80.1%—were men, while 19.9% were women. According to the age groups, a good number of respondents (33.5%) were between the ages of 41 and 50, while the least number (6.0%) were between the ages of 21 and 30. This suggests that the people in the study area are active and able to perform any work that will earn them money. These results support the findings of Ajayi *et al.* (2007), who claimed that younger farmers are more likely to be better agents for technology adoption and transfer because they may be more inclined to embrace new technologies than older farmers who are wary of new developments. According to the respondents' level of education, 26.1% had non-formal education and 30.5% had completed postsecondary education. The outcome contradicts the findings of Lamino *et al.* (2016), who found that the primary attribute of rural residents in Nigeria's Edo and Kaduna States is non-formal education. The degree of education can have a significant impact on how well knowledge is assimilated or how well laws, rules, and regulations are generally followed. According to the respondents' occupations, farming was the primary occupation of 65.7% of those in the research region. This suggests that there will probably be a lot of farmland growth and farming activity in the research area, which could have a detrimental effect on the management of forest resources. According to the respondents' marital status, 86.6% of them were married and had a family of six to ten people. This suggests that they are individuals who require a source of income in order to sustain their household. Given that the majority of respondents had a sizable family with small children who were heavily reliant on forest supplies, the household size result shows a tendency toward increasing strain on the region's natural resources.

A large family size or number of children indicates that there is family labor available for the exploitation and use of forest resources (Mohammed *et al.,* 2019). Additionally, this finding is consistent with Aondoakaa *et al.* (2023), who reported that the majority of respondents were married and had four or more children. This suggests that the area may have a high level of livelihood activities and forest resource consumption to support household needs. Additionally, a high marital status was a clear sign of family growth, which will encourage them to look for additional forest resources to supplement their incomes. According to the annual income, the majority of respondents (56.1%) made more than 100,000 naira annually, while almost 43% made less than 100,000 naira annually. This suggests that the local population's income is woefully inadequate to cover their fundamental necessities. The Convid-19 epidemic and a high rate of inflation may result in a significant reliance on the study area's natural resources. More than 300 million people worldwide, particularly the impoverished, rely heavily on forest harvesting for their daily survival and livelihood, according to Fonta *et al.* (2010). The average annual value of forest goods collected in Nigeria, including fuel wood, building materials, wild fruits, and leaf litter, was estimated by Olujimi and Adekunle (2015) to represent 39% of the average gross cash income annually.

Socio-Economic Variables Influencing Extension Service Delivery in Benue State

According to the results of the socioeconomic variable of respondents that influences the delivery of extension services, the period of residence has a significant positive influence on the delivery of extension services in Benue State (β=0.019 p<0.05). As a result, people who stay in their communities for a long time will adjust to the methods of extension delivery that

are available. According to the Beta statistics, the delivery of extension services will be impacted by a factor of 0.019 for every unit increase in the period of residence. A length of residence of 1.019 was identified as the primary variable impacting the supply of extension services based on the Exp (β). According to Patta-nayak *et al.* (2003), household reliance on forests was positively influenced by length of residency. In their study of Siberut Forest in Nepal, people who stayed longer in their area of settlement where highly dependent on forests compared to their counterpart, which was attributed to their familiarity with the complexities of their proximate environment.

Additionally, it was discovered that education significantly improved the delivery of extension services (β = 0.017 p<0.05). According to the β statistics, effective extension service delivery will be improved by a factor of β=0.017 for every unit increase in the population's educational attainment. People who have received an education will be better able to comprehend and adjust to extension services. Education was placed as the second variable impacting the delivery of extension services in Benue State based on its Exp (β) value of 1.017. This finding is consistent with Olunga *et al.* (2015), who found that education has a major and beneficial impact on forest resource conservation in Kenya's Kipini Division of Tana Delta District. Also the findings are in agreement with Lepetu and Oladele (2009) and Ofoegbu *et al (*2017) as they found education to have significantly influenced utilization of forest resources.

The delivery of extension services was found to be significantly positively impacted by the age of the population (β=0.002 p<0.05). According to the Beta statistics, the delivery of extension services would be impacted by a factor of 0.002 for every unit increase in population age. Age was placed as the third variable impacting the delivery of extension services in Benue State, based on the Exp (β) value of 1.002. This finding is consistent with that of Shomkegh et al. (2019), who found that in the Odoba forest reserve in Benue State, Nigeria, age significantly improves the use of forest resources. Additionally, income significantly improved the delivery of extension services (β=0.000 p<0.05). Good-paying people will be less dependent on forest resources, according to the Beta statistics, which show that a unit increase in people's income will improve their level of adaption to extension service delivery by a factor of 0.000. Income was ranked as the fourth factor influencing the delivery of extension services based on the Exp (β) value of 1.000. This finding is consistent with that of Nambiro et al. (2006), who discovered that farmers who earn more money are more likely to request and use agricultural extension services.

The delivery of extension services is significantly impacted negatively by household size (β= -0.121 p<0.05). A unit increase in household size will result in a -0.121 increase in reliance on forest resources, according to the Beta statistics. The demand for food, towns, and agricultural land will rise along with the population, all of which will have a detrimental effect on forest resources. This supports the findings of Alao (2003), who believed that rising family sizes and population growth are linked to increased demand for timber for various end applications in Nigeria, including furniture, construction, sawn timber, and fuel wood and charcoal. A household's Exp (β) value of 0.886 placed it as the sixth variable that will have a negative impact on the delivery of extension services.

Socio-Economic Variable Influencing Compliance with Forestry Laws in Benue State

In Benue State, education significantly improves adherence to forestry laws (β =0.498, p<0.05). According to the Beta statistics, effective adherence to forestry rules will increase by a factor of β=0.498 for every unit increase in the population's educational attainment. People who are educated will have a high degree of comprehension and adherence to the law. Education was placed as the primary variable that may affect adherence to Benue State's forestry legislation, with an Exp (β) value of 1.645. People can abandon subsistence farming when they have an education. According to Hedge and Enters (2000), those with higher levels of education will have more options for off-farm work than those with lower levels of education.

In a similar vein, Shalli (2003) found that education level significantly influences the sustainable management of natural resources in Tanzania's coastal region. In Benue State, adherence to forestry regulations is significantly positively impacted by people's age (β=0.011 p<0.05). According to the Beta figures, there would be a 0.011 rise in

adherence to forestry laws for every unit increase in population age. Age was listed as the second variable that will influence adherence to forestry legislation, based on the Exp (β) value of 1.011. The outcome supports Leputa and Oladele's (2009) assertion that age has a major impact on Botswana's forest conservation. In Benue State, income also significantly improves adherence to forestry regulations (β=0.000 p<0.05).

According to the Beta figures, there will be a 0.000 increase in the degree of adherence to forestry rules for every unit increase in the income of the populace. People with high incomes rely less on forest resources. Income was listed as the third factor influencing adherence to forestry legislation based on the Exp (β) value of 1.000. This contradicts Bola et al. (2012), who emphasized that a large household that has no other source of income depends more on forest resources for their livelihood.

Period of residence has a significant negative influence on compliance with forestry laws. (β=-0.012 p<0.05 The β statistics indicates that a unit increase in the period of residence will negatively influence compliance with forestry laws by a factor -0.012 of based on the Exp (β) a value of 0.988 period of residence was ranked fourth variable negatively influencing compliance with forestry laws in Benue State. This agrees with Sorkwagh, (2012) who reported that, many Forest Reserves and plantations established in the state during the colonial era have overwhelmingly been deforested and degraded as a result of an increase in demand for farmland and expansion of urban centers. Additionally, the pressure from the growing human population has led to the need for more land for settlement and food production. These human activities and population growth put pressure on both the natural forest and the man-made environment, which is why protecting pre-urban forested areas from urbanization is a top priority (Gorte, 2009; Jandl et al., 2007). Compliance with forestry rules was significantly impacted negatively by household size (β= -0.204 p<0.05). A unit increase in household size will result in a -0.204 increase in reliance on forest resources, according to the Beta statistics. This implies that, as the family size increases, there will be more demand on forest resources to meet the family demand for food and energy consumption. This is in agreement with the

findings of Ibrahim *et al.* (2015) who stated that, forest biomass remain the most common source of household energy in Nigeria. Based on the Exp (β) value of 0.816 household was ranked fifth variable that will influence compliance with forestry laws.

Extension Service Delivery in Benue State
There is no active forestry extension service on sustainable forest resources management and exploitation, according to the results of the extension service delivery survey conducted by the respondents in the research region. Extension agents don't go to communities in the research area to show off new technologies for sustainable natural resource management, offer incentives, or raise awareness of the value of environmental management. The government's inadequate funding and the absence of extension programs to teach people how to use forest resources could be the cause of this situation, or it could be the result of forestry staff members' negligence in their duties to manage forest resources for sustainable use. These findings are not in agreement with Omale *et al.*, (2019), who reported that forest extension focuses on the provision of information about best practices, conservation and regeneration techniques to those who live and rely on forest for livelihood. Also, Forestry extension generally seek to informally educate the populace on the importance of preserving the forest resources, advocate controlled exploitation, explain the consequences of over exploitation, teach some conservation techniques, promote forest regeneration, enlighten about the laws guiding forest resource usage and the penalty of violating them (Omale *et al.,* 2019).

People in the area may be denied the chance to be informed, equipped, and actively involved in environmental protection, global warming mitigation, and sustainable forest management if they have little or no access to forest extension services. People in the study region would contribute more to forest protection by adhering to forestry rules if they had access to quality forest extension services and effective extension techniques. This contradicts Agarwal's (2009) assertion that women's involvement in community forest management improved the situation in Nepal and India. In a similar vein, Hemmati and Rohr (2009) sought to develop the climate change negotiation, experience, obstacles, and future directions. They reported that, 'the provision of forest

extension service especially to women farmers has being seen as key in helping to protect the remaining forest resources and regenerate new ones because of their direct role in exploitation and utilization of forest resources.

Models of Extension Service Delivery in Benue State

According to the results of the models used to deliver extension services, there isn't any training that forestry extension agents in Benue state can offer that would significantly impact the public's awareness of and use of forest resources. This can be due to a shortage of extension agents or technical personnel with the necessary skills to conduct efficient training on topics pertaining to the use of forest resources. The increase of farmlands as a result of population growth may also be the cause of this. Thus, these results contradict those of Onumadu *et al.* (2001), who claimed that forestry extension programs are made to accommodate small-scale farmers' needs by providing scientific data on biodiversity, new ideas for forest conservation and protection, and agro-forestry technology conservation of small-size logs and wood processing technology. In a similar vein, Agbogidi and Ofuoku (2009) defined extension education as an optional after-school program for adults that includes pertinent material drawn from physical, biological, and social science research that has been combined into a body of ideas, principles, and practices.

Level of Compliance with Forestry Laws in Benue State

The results regarding the degree of adherence to forestry laws showed no discernible variation across all the laws safeguarding the forest ecosystem. Given that they are not owned by anyone; this has amply demonstrated how easily forest resources may be misused when left unchecked. The depletion of forest resources will also grow as a result of this. This outcome contradicts the findings of CIFOR (2006), which defined forest laws compliance as the extent to which industries or forest owners adhere to the current legal standards governing forest usage. Ogunwale *et al* (2006) and Agbogidi and Ofuoku (2009) reported that, forestry extension will enable the populace to know that forests will be better enjoyed by sharing their benefits, if it's sustainably managed. On the same note Onumadu *et al* (2001) and Adeodun *et al* (2005) reported that, environmental forestry coupled with an

aggressive extension education stands out as the best option for combating environmental degradation.

CONCLUSION

Based on the findings of this research, the study concluded that respondents were young, adults, married, educated, mostly farmers and have been residing in the area over a period of time. The study area had low access to forest extension services hence limiting their compliance to forestry laws. Extension agents do not visit communities within the study area to sensitize the people on the need to sustainable management of the available forests and its resources. There was no training carried out to have any significant effect on the awareness of the forestry laws and compliance by the respondents in the area. There is low compliance with forest laws in Benue State. Extension agents must show the local population that they can sustainably earn a respectable living from the forests in order to preserve and protect them.

RECOMMENDATIONS

From the results of this finding, it is recommended that:

1. The government and Non-governmental organisation should provide adequate access to forest extension services; this could enhance high level of compliance with forestry laws in the study area;

2. Forestry staff should be trained on modern extension technologies/ techniques and regular workshops should be organized to update their knowledge as well as improved funding in Benue State forestry sector.

3. The government should create awareness on forest laws compliance in the study area.

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