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IMPACTS OF RURAL COMMUNITY ON THE FOREST ESTATE IN UGBOLU, OSHIMILI NORTH LOCAL GOVERNMENT AREA, DELTA STATE, NIGERIA

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ABSTRACT

This study examined the impact of Community based forest management (CBFM) in Ugbolu forest reserve (UFR), Delta State. A random selection of 110 respondents was carried out. Information on activities encouraging deforestation, list of resources extracted, jobs and income provided from involvement in CBFM, structure and strategy used by community in managing UFR were collected using structured questionnaire and interview section. Descriptive statistics was used to analysed the data (frequency table and likert scale). Majority of respondents were male (51.8%), married (61.6%), between the age of 31-40 (34.5%), had household size of 7-9 (39.1%). The activities that contributed to deforestation in the reserve were logging (70.9%), livestock breeding (15.5%), and farming (10.9%). The forest resources harvested included Tectona grandis, Gmelina aborea, Rattus fuscipes, Thryonomy swinderianus. Involvement in CBFM provided jobs (categorized as Forest user groups (FUG) namely; timber merchants, fellers, loaders, hunters, farmers, forest guards to community members. The income earned varied between ₦11,000 ($28.9) to ₦200,000 ($526.3) monthly. Majority (58.2%) of respondent stated that heads of different FUG constituted the committee which works with an annual plan (53.4%), arrived at by voting (70.0%). The annual plans meet the demands of various FUG (81.8%) with little interference from government (86.4%). The committees major forest management strategies included partnership of forest guards with rural people (40.0%), creation of a community forest administration group (26.4%) and laws stopping illegal entry into the forest estate (23.4%). Intensification of government involvement and adequate funding for effective CBFM were recommended by the study.

Contribution/Originality: This study is one of very few studies that have investigated the participation of rural dwellers in the management of the forest. The interests of various user were met, the forest estate adequately managed, and crisis, a basic characteristic of natural resources management was reduced.

1. INTRODUCTION

A forest estate is a composite asset constituted by the forest land and standing timber. It includes any forest-related environmental assets included in the forest concerned [1]. Nigeria is well endowed with lots of forest estates and the resources which are gotten from such estates are numerous. These resources are vital means of income to majority of pastoral/local people in Nigerian forest zones. Forest estates also supply the basic materials for craft workers and processing activities. The forest also provides services which include ecological services,

economic services, socio-cultural services, scenic and landscape services and values [2] and serve as shelter for wild animals.

An enclave community also known as support zone community is a community with distance not more than 5km away from the national park or forest estate. Globally, about 1.6 billion rural people's livelihood depends fully or partially on products derived from forest estate. These people live within or adjacent the forest and have relied on these wild and God-given resources to meet their basic needs for survival for many generations. This dependence has created both positive and negative impacts on the estate. The positive impacts include the significant contributions of the forest products to the income of the rural household and the alleviation of poverty. While the negative impacts on nature include forest resources depletion, soil erosion, water pollution, and change in climate [3]. In Nigeria, a developing country, 51.4% of her population comprises rural households living close to forest estate and depending on it for their livelihoods. These people practice shifting cultivation in nearby forest areas and directly extract forest products [4]. These rural communities overexploit and always throwing caution to the wind when dealing with resources from the forest especially their intensive engagement in deforestation, indiscriminate poaching activities and convert forest grassland to farms [5]. The rapid rate of forest resources collection, harvesting, and processing harms the forest estate and nature in general [6].

To curb the level of depletion of the estate, a system of forest organization was developed that involved rural dwellers in resource management since they are well acquainted with the rural forest estate, termed community-based forest management (CBFM) [5]. The flora, fauna resources of forest when properly utilized harnessed for socio-economic advancement in rural areas. The deforestation in Nigeria has lead to suffering in the rural communities consequent upon the lack of involvement and participation by the rural communities in forest organization especially as the people living in the rural communities hinged on the forest for food and income [7] and with this rate exploitation of resources, the possibility of the forest to sustain the livelihood of the people is threatened [8]. The CBFM strategy progressed in stages over time to realize sustained management of forest and social equality. The CBFM includes initiatives, sciences, policies, institutions, and processes, government-led initiatives and covers social, economic, and conservation dimensions in series of activities including decentralization and developed forest management, smallholder forestry schemes, community-company partnerships, small scale forest-based enterprises and indigenous management of sacred sites of cultural importance [3]. The CBFM emerged as a search for an alternative approach to administration of forest in parallel to growing international interest in participatory development and linkages between land rights movement and environmental movement [6].

The success of local community management is more feasible in less developed countries, where the societies are small and everyone is related, and based on trust and cooperation among community members, leading to the monitoring and penalty of reckless users [4, 9, 10]. Great quantities of empirical studies have found evidence of success of CBFM in forest conservation [11-16].

The CBFM has been practiced in Nigeria for several years in Ngel Nyaki forest reserve and Cross River National park in Taraba and Cross-River States respectively [17]. The CBFM structure in Ngel Nyaki was put in place to enhance the operation and smooth forest management as stipulated in the management plans. The organization of the estate was divided into three groups namely; Forest advisory committee (FAC), Forest management committee (FMC), and Forest user groups (FUG). The function of FAC was to liaise between the community and government. The FAC deliberates on challenges from the community as regards the management of their forest and proffer solutions. The forest management committee was responsible for the overall maintenance of the forest estate and the forest user groups are individuals who use the forest estate and resources in the estate [17]. This structure ensures that forest management involves the support zone community as they are actively involved in decision making knowing that conserving the estate ensures their perpetual use of it for economic benefits [17]. This elevated their level of commitment to conserving the forest.

However, none of these studies captured the Ugbolu forest reserve (UFR) in Delta State. This study aimed to achieve the following objectives; identify activities causing deforestation in UFR; identify the forest resources harvested from the reserve; determine the availability and accessibility of community members to these resources; identify the various job opportunities provided positively by the forest through CBFM; examine the structure of the present CBFM committees and their challenges in the UFR and identify the forest management strategies used by the community and the influences used by the forest managers on the estate.

2. MATERIALS AND METHODS

2.1 Description of Study Area

The study was carried out in Ugbolu community in Oshimilli North Local Government (LG) Area of Delta State of Nigeria. Ugbolu community is bounded by Asaba of Oshimilli South Local government area of Delta State in the North and Illah of Oshimilli North Local Government Area of Delta State in the South [18]. The region is located between latitudes N 6°18'30" of the equator and longitude E 6°41'19" of the Greenwich Meridian [18]. It occupies a large area of about 210km². The community is endowed with green pasture, arable land, and solid minerals, it has abundant rainforest vegetation and it is characterized by evergreen deciduous forest vegetation [19]. The major occupation of the people is Agriculture. The main agricultural activities are cassava, yam, potatoes, vegetables, hunting, and fish farming. The population of Ugbolu community according to the 2006 census in Nigeria was 40,300. Ugbolu has a tropical climate. The average annual temperature and rainfall is 27°C and 1763mm respectively.

2.2. Data Collection and Analysis

Simple random sampling technique was used for this study. Ten quarters and ten percent of heads of the rural house-hold were selected randomly from the community. One hundred and ten (110) respondents were selected for the study. Data on socio-economic characteristics of the respondent, list of resources extracted from the forest, availability and accessibility of forest resources, jobs created from participation in CBFM, structure and problems of CBFM and strategies for implementation of CBFM was collected using questionnaire and interview sessions.

Descriptive statistics of frequency table and likert scale were the Analytical tool used. A five (5) point likert scale was used to rank the deforestation activities and the level of accessibility to selected forest resources. The scale of extremely high (EH) (5), very high (VH) (4), high (H) (3), medium (M) (2) and low (L) (1) and abundantly available (AA) (5), available (AV) (4), rarely available (RA) (3), scarcely available (SA) (2) and not available (NA) (1) were used to rank the various deforestation activities levels of accessibility to the selected forest resources harvested in the reserve. The mean value of 3 points was used to select the activities that had significant influenced on deforestation and most exploited and endangered resources. A four (4) point likert scale of highly needed (HN) (4), needed (N) (3), somewhat needed (SN) (2) and not needed (NN) (1) was used to rank the strategies used by the community for administering the forest estate. A mean value of 2 was used to choose the most effective strategy for community forest management in the study area.

3. RESULTS

3.1. Socioeconomic Characteristic of the Respondents

The respondent socio-economic characteristics showed that 51.8%, 61.8%, 34.5%, 39.1% and 43.6% were male, married, with age group of 31-40 years, household size of 7-9 and attained secondary school level of education respectively Table 1. The bulk respondents were farmers (43.6%), farming in the forest (55.5%), and native of the community (62.7%) with an annual income of above two hundred and one thousand naira (₦201,000) (56.4%).

Table-1. Socioeconomic characteristic of the respondents.

Variables	Frequency	Percentage	Variables	Frequency	Percentage
Gender			Primary education	16	14.5
Male	57	51.8	Secondary education	48	43.6
Female	53	42.8	Tertiary education	15	13.6
Total	110	100.0	Total	110	100.0
Marital status			Type of work		
Single	38	34.5	Farming	48	43.6
Married	68	61.8	Trading	36	32.7
Divorced	4	3.6	Civil servant	26	23.6
Total	110	100.0	Total	110	100.0
Age			Place of farming		
20-30	30	27.3	Forest	61	55.5
31-40	38	34.5	Private land	26	23.6
41-50	19	17.3	Swamp area	23	20.9
51-60	10	9.1	Total	110	100.0
Above 61	13	11.8	Native of community		
Total	110	100.0	Yes	69	62.7
Household size			No	41	37.3
1-3	13	11.8	Total	110	100.0
4-6	34	30.9	Annual income		
7-9	43	39.1	1000-50000	2	1.8
10-12	16	14.5	51000-100000	15	13.6
13-15	4	3.6	101000-150000	14	12.7
Total	110	100.0	151000-200000	17	15.5
Educational level	22	20.0	Above 201000	62	56.4
No formal education	9	8.2	Total	110	100.0

Source: Data analysis (2020).

3.2. Activities causing deforestation in Ugbolu Forest Reserve

The activities causing deforestation in UFR showed that logging (4.70), livestock breeding (3.44), housing (3.42), land tenure system (3.40), farming (3.35), fuelwood collection (3.28), infrastructural development (3.28) significantly influenced deforestation Table 2. The percentage response from respondents on the activities causing deforestation in UFR showed that logging (70.9%) was the major cause of deforestation in UFR Table 3. Additional sources of deforestation were livestock breeding (15.5%), farming (10.9%), land tenure system (10.0%), infrastructure development (9.1%), and housing (7.3%).

Table-2. Activities causing deforestation in UFR

S/N	Activities	Mean	Median	Mode	Standard deviation
1	Farming	3.35	3.00	3.00	0.71
2	Logging	4.70	5.00	5.00	0.48
3	Fuel wood	3.28	3.00	3.00	0.68
4	Housing	3.42	3.00	3.00	0.75
5	Livestock breeding	3.44	3.00	3.00	0.93
6	Mining	2.50	2.00	2.00	0.86
7	Oil extraction	1.95	2.00	2.00	0.83
8	Infrastructure development	3.28	3.00	4.00	1.04
9	Land tenure system	3.40	3.00	3.00	0.85

Keys: 5=extremely high, 4=Very high, 3=High, 2=Medium, and 1=Low.
Source: Data analysis (2020).

3.3. Forest Resources Harvested from UFR

The identified forest resources harvested in UFR presented in Table 4a and b consist of 18 tree, 12 animals and 3 mineral resources. The major species mentioned were Teak (*Tectona grandis*), Gmelania (*Gmelania aborea*), Bamboo (*Oxytenanthera abyssinica*), Ogbono (*Irvingia gabonesis*), Dogoyaro (*Azadiritia indica*), Squirrel (*Xerus rutilus*), Rabbit (*Oryetolagues cunicules*), Bush rat *(Rattus fuscipes)*, Grasscutter (*Thryonomy swinderianus*), and Snail (*Achatina fulica).*

Table-3. Percentage response of respondents on the activities causing deforestation.

S/N	Variables	Extremely high	Very high	High	Medium	Low
1	Farming	12(10.9)	18(16.4)	77(70.0)	3(2.7)	
2	Logging	78(70.9)	31(28.2)	1(0.9)		
3	Fuelwood	1(0.9)	42(38.2)	54(49.1)	13(11.8)	
4	Housing	8(7.3)	39(35.5)	54(49.1)	9(8.2)	
5	Livestock breeding	17(15.5)	31(28.2)	45(40.9)	17(15.5)	
6	Mining		15(13.6)	37(33.6)	46(41.8)	12(10.9)
7	Oil extraction	1(0.9)	1(0.9)	26(23.6)	46(41.8)	36(32.7)
8	Infrastructure development	10(9.1)	42(38.2)	34(30.9)	17(15.5)	7(6.4)
9	Land tenure system	11(10.0)	37(33.6)	47(42.7)	15(13.6)	

N.B: Figure in parenthesis are percentages of response.
Source: Data analysis (2020).

Table–4a. Forest resources harvested from UFR.

S/N	Local names	Botanical names	Parts	Uses
1	Teak	*Tectona grandis*	Log/Bark/Branches	Production of medicines, Sold to timber merchants and construction purposes
2	Gmelania	*Gmelania arborea*	Log/Bark/Branches	Sold to timber merchants and construction purposes
3	Rubber tree	*Hevea brasilenisis*	Log/nut	Production of plastic, rubber and rubber boots
4	Ogbono	*Ivingia gabonesis*	Seed	Used for cooking and marketable
5	Honey bee	*Api mellifera*	Comb	Production of honey
6	Grasshopper	*Phyllochoreia ramakrishnai*	Flesh	Serves as meat and marketable
7	Squirrel	*Xerus rutilus*	Flesh	Serves as meat and marketable
8	Monkey	*Simifermes cattarhini*	Flesh	Serves as bush meat and traded for income
9	Bush pig	*Potamorcheorus larvuis*	Flesh	Traded in the market and eating
10	Grasscutter	*Thyonomy swinderianus*	Flesh	Eating as bush meat and sold in the market
11	Snail	*Achatina fulica*	Flesh	Serves as meat and sold in the market
12	Bamboo	*Oxytenanthera abyssinica*	Log	For construction work
13	Rabbit	*Oryetolagus cuniculus*	Flesh	Serves as bush meat
14	Antelope	*Antilocapo Americana*	Flesh/hides	Serves as bush meat and sold in the market
15	Plantain	*Musa paradisiaca*	Fruit	Serves as food
16	Dogoyaro	*Azadirctia indica*	Log/Bark/Branches	Serves as medicine
17	Bush rat	*Rattus fuscipes*	Flesh	Traded for income and eating
18	Locust	*Schistocerca gregaines*	Flesh	As food or sold in the market
19	Cashew	*Anacardium occidentale*	Fruits/Nuts	Used for feeding livestock, serves as food and sold in the market
20	Orange	*Citrus sinensis*	Fruits/seeds/bark/branches	Eating, marketable and used for medicine

Source: Data analysis (2020).

From the pull of the resources identified in UFR, ten (10) – five (5) plant based and animal based were purposively selected because of their high level of occurrence in the response. The scale response on their availability and accessibility in UFR showed that Bamboo (*Oxytenanthera abyssinica*) (3.87), Squirrel (*Xerus rutilus*) (3.41), Grasscutter (*Thryonomy swinderianus*) and teak *(Tectona grandis)* (3.32), Gmelina *(Gmelania aborea)* (3.29), Ogbono (*Irvingia gabonesis*) (3.30) and Dogoyaro (*Azadiritia indica*) (3.21) were available and accessible with a mean score higher than 3 point while Rabbit (2.59) (*Oryetolagues cunicules*) and Bush rat (2.45) *(Rattus fuscipes)* were rarely and scarcely available respectively Table 5.

Table-4b Forest resources harvested from UFR.

21	Mango	*Mangifera indica*	Fruits/seed	For eating and sold in the market
22	Acacia	*Acacia nilotica*	Bark/Liquid	Temin and dye
23	Kolanut	*Cola acuminate*	Pod/Seed	Serves as medicine
24	Pawpaw	*Carica papaya*	Fruits/leaves	For eating and for making medicine
25	White sand	----------	Sand	For construction work
26	Clay	-----------	Sand	For construction work
27	African catfish	*Clarias gariepinus*	Flesh	For consumption and sold in the market
28	Iroko	*Milicia excels*	Log/Bark/Branches	Used for fuel wood and traded to timber merchant
29	Cotton tree	*Ceiba pentandra*	Wool	Marketable
30	Banana	*Musa sapienlmu*	Fruits	For consumption and marketable
31	Palm tree	*Eleasis guinesis*	Shells	Palm kernel cake, production of palm oil and marketable
32	African pear	*Dacryodes edulis*	Fruits	For consumption
33	Stones	-------------	Stones	Used for construction
34	Almond	*Prunus dulcis*	Fruits/Seed/Bark	Used for medicine and eating

Source: Data analysis (2020).

Table-5. Levels of availability and accessibility of selected forest resources.

S/N	Products	Mean	Median	Mode	Standard deviation
1	Bush rat	2.45	3.00	3.00	1.16
2	Rabbit	2.59	3.00	3.00	1.07
3	Grasscutter	3.32	3.00	3.00	1.15
4	Squirrel	3.41	3.00	3.00	1.92
5	Snail	2.83	3.00	3.00	1.29
6	Teak	3.32	3.00	3.00	1.01
7	Gmelina	3.29	3.00	3.00	1.10
8	Bamboo	3.87	4.00	4.00	1.26
9	Dogoyaro	3.21	3.00	3.00	1.40
10	Ogbono	3.30	3.00	3.00	1.00

Keys: 5= Abundantly AA, 4=AA, 3=Rarely AA, 2=Scarcely AA, 1=Not AA.
Source: Data analysis (2020).

Table-6. Percentage responses of availability and accessibility of selected forest resources.

S/N	Products	Abundantly AA	AA	Rarely AA	Scarcely AA	Not AA
1	Bush rat	5(4.5)	14(12.7)	38(34.5)	22(20.0)	31(28.2)
2	Rabbit	2(1.8)	18(16.4)	48(43.6)	17(15.5)	25(22.7)
3	Grasscutter	15(13.6)	37(33.6)	41(37.3)	3(2.7)	14(12.7)
4	Squirrel	16(14.5)	27(24.5)	56(50.9)	8(7.3)	3(2.7)
5	Snail	9(8.2)	29(26.4)	33(30.0)	12(10.9)	27(24.5)
6	Teak	18(16.4)	23(20.9)	48(43.6)	19(17.3)	2(1.8)
7	Gmelina	18(16.4)	27(24.5)	40(36.4)	19(17.3)	6(5.5)
8	Bamboo	37(33.6)	51(46.4)	7(6.4)	1(0.9)	14(12.7)
9	Dogoyaro	26(23.6)	20(18.2)	37(33.6)	5(4.5)	22(20.0)
10	Ogbono	12(12)	35(31.8)	42(38.2)	16(14.5)	5(4.5)

N.B: Figure in parenthesis are percentages of response
Source: Data analysis (2020).

The result from the percentage responses of respondents in Table 6 revealed that Bamboo (*Oxytenanthera abyssinica*), Dogoyaro (*Azadiritia indica*), Teak (*Tectona grandis*) and Gmelina (*Gmelina aborea*) were abundantly available and accessible with 33.6%, 23.6%, and 16.4 % respectively. Bamboo (*Oxytenanthera abyssinica*), Grassscutter(*Thryonomy swinderianus*), Ogbono (*Irvingia gabonesis*) and Snail (*Achatina fulica*) were available and accessible with 46.4%, 33.6%, 31.8%, and 26.4% respectively. The result further revealed that Squirrel (*Xerus rutilus*), Rabbit (*Oryetolagues cunicules*), Teak (*Tectona grandis*) and Ogbono (*Irvingia gabonesis*) were rarely available and accessible with 50.9%, 43.6%, and 38.2% respectively. Bush rat (*Rattus fuscipes*), Teak (*Tectona grandis*), Gmelaina (*Gmelaina arborea*) and Rabbit (*Oryetolagues cunicules*) were scarcely available and accessible with 20.0%,

17.3%, and 15.5%. Bush rat (*Rattus fuscipes*), Snail (*Achatina fulica*), Rabbit (*Oryetolagues cunicules)* and Dogoyaro (*Azadirchata indica)* were not available and accessible with 28.2%, 24.5%, 22.7%, and 20.0 % respectively.

3.4. Jobs Created and Income Generated From Involvement in CBFM

Involvement in CBFM in UFR was basically by forest user groups. The groups as presented in Figure 1 - 11 earned weekly, monthly and annually (WMA) from the utilization of forest resources. Most (51.8%, 50.0%, 45.5%) timber merchants earned above ₦41,000 ($107.9), ₦200,001 ($526.3), ₦3,000,001 ($7,894.7) WMA (Fig.1). Thirty six percent (36.4%), 29.1% and 36.4% of fellers generated sum of ₦11,000 ($29.0) –20,000 ($52.6), ₦61,000 ($160.5) -100,000 ($263.2) and ₦601,000 ($1,581.6)- ₦1,000,000 ($2,631.6), WMA respectively Figure 2. Bulk (40.0%, 55.5%, 43.6%) of the loaders earned ₦1000 ($2.6) –10,000 ($26.3), ₦21,000 ($55.3) –60,000 ($157.9) and ₦301,000 ($792.1) - 600,000 ($1,578.9) on WMA basis respectively Figure 3. About 30.9%, 23.6% and 24.5% of hunters earned ₦11,000 ($29.0) –20,000 ($52.6), ₦61,000 ($160.5) - 100,000 ($263.2) and ₦601,000 ($1,581.6) –1,000,000 ($2,631.6), WMA separately Figure 4.

N.B: Exchange rate of ₦380 to $1 https://www.cbn.gov.ng/rates/ExchRateByCurrency.asp
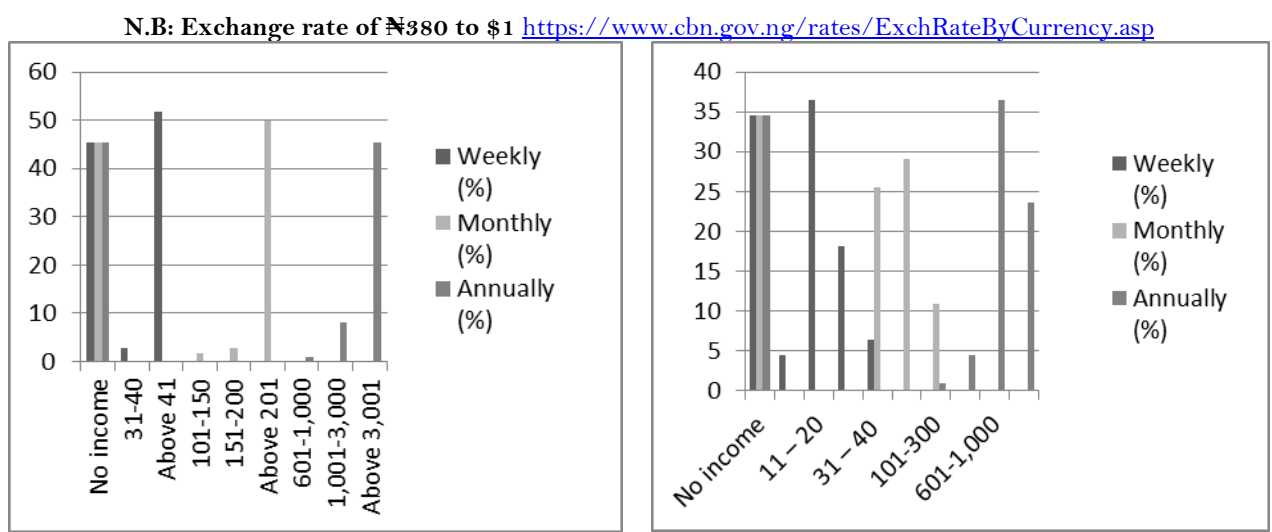
Figure-1. Income earned by timber merchants.

Figure-2. Income of fellers.

The farmers (22.7%, 39.1%, 30.0%) generated ₦21,000 ($55.3)-30,000 ($79.0), ₦151,000 ($397.4) - 200,000 ($526.3), and ₦1,000,001 ($2,631.6) - 3,000,000 ($7,894.7) on a WMA basis Figure 5. The sawmillers (24.5%, 38.2%, 51.8%) Figure 6 and forest guards (29.1%, 46.4%, 39.1%) Figure 7 earned about ₦31,000 ($81.6) - 40,000 ($105.3), ₦151,000 ($397.4) –200,000 ($526.3), ₦1,000,001 ($2,631.6) - 3,000,000 ($7,894.7) and ₦11,000 ($28.9) - 20,000 ($52.6), ₦31,000 ($81.6) - 40,000 ($105.3), ₦301,000 ($792.1) - 600,000 ($1,578.9) WMA respectively. Palm wine tappers (4.5%, 6.4%, 4.5%) Figure 8 and truck drivers (30.0%, 52.7%, 31.8%) Figure 9 earned bout ₦11,000 ($28.9) - 20,000 ($52.6), ₦21,000 ($55.3) - 60,000 ($157.9), ₦101,000 ($265.8) - 600,000 ($1,578.9), and ₦11,000 ($28.9) - 20,000 ($52.6), ₦61,000 ($160.5) –100,000 ($263.2), ₦601,000 ($1,581.6) - 1,000,000 ($2,631.6) WMA separately. Forest extensionist (2.7%, 1.8%, 2.7%) Figure 10 and miners (4.5%, 5.5%, 3.7%) Figure 11 generated ₦1,000 ($2.6) –10,000 ($26.3), ₦11,000 ($28.9) –60,000 ($157.9), ₦61,000 ($160.5) - 600,000 ($1,578.9), and ₦1,000 ($2.6) - 10,000 ($26.3), ₦11,000 ($28.9) - 60,000 ($157.9), ₦301,000 ($792.1) - 600,000 ($1,578.9) WMA respectively.
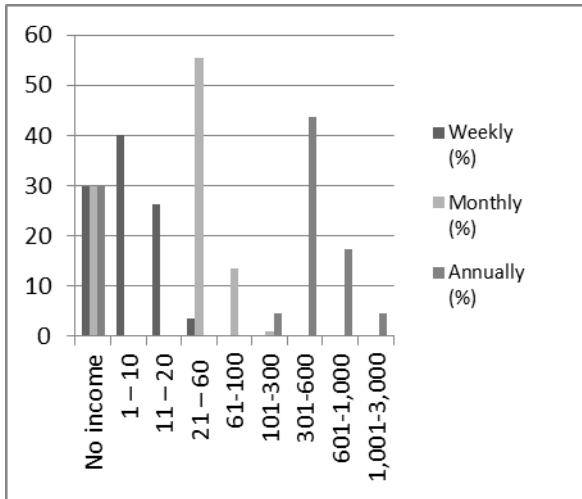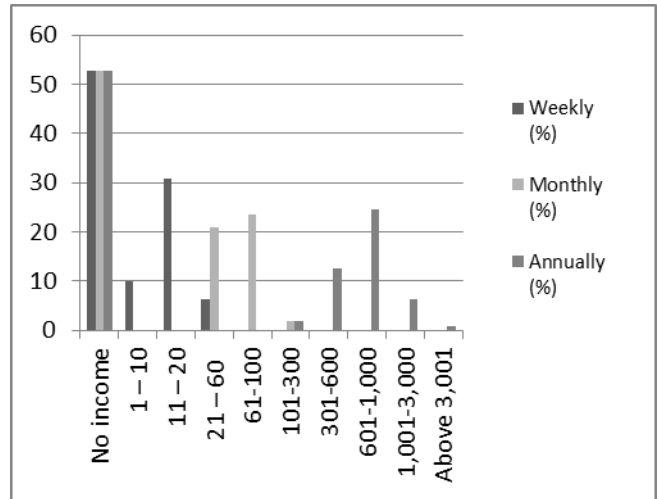
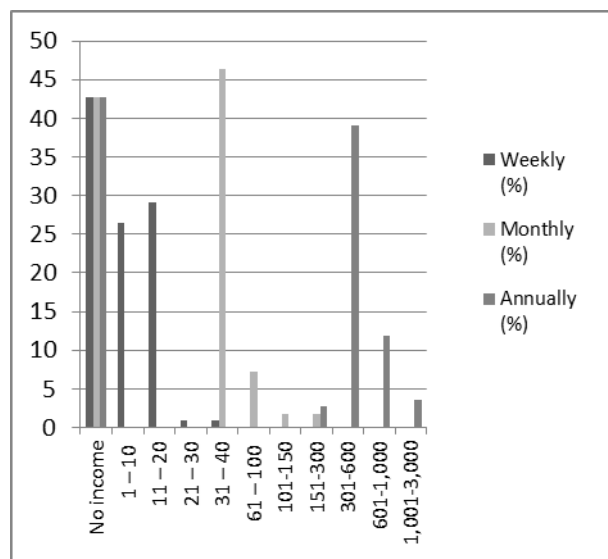**Figure-3.** Income of lumber loaders.

Figure-4. Income of tree fellers.
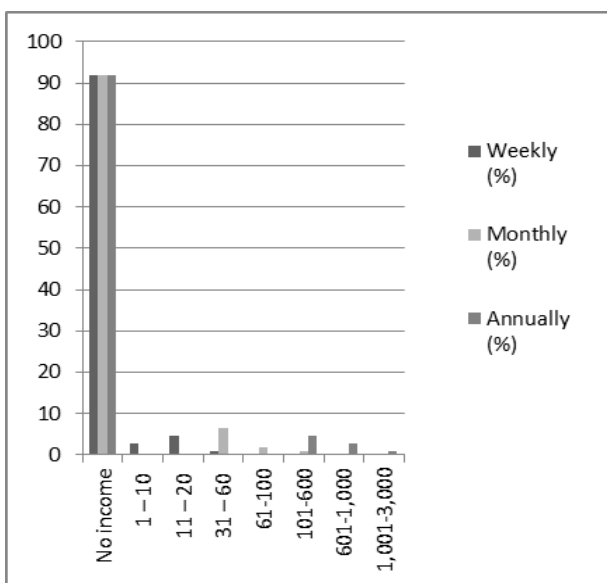

Figure-5. Income of farmers.
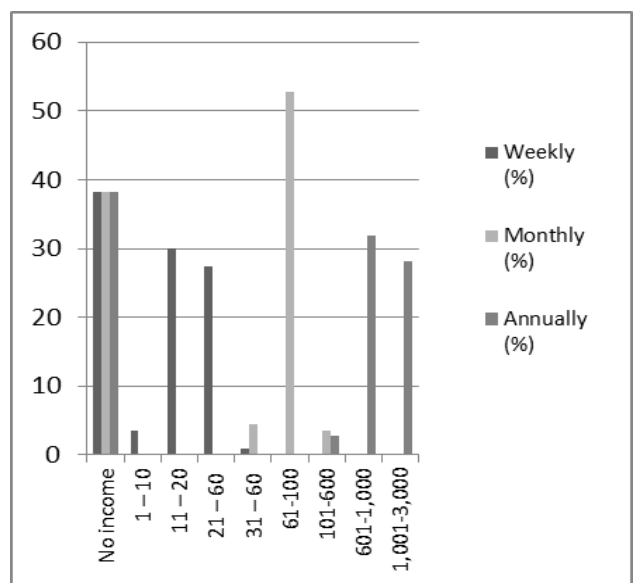

Figure-6. Income of sawmillers.

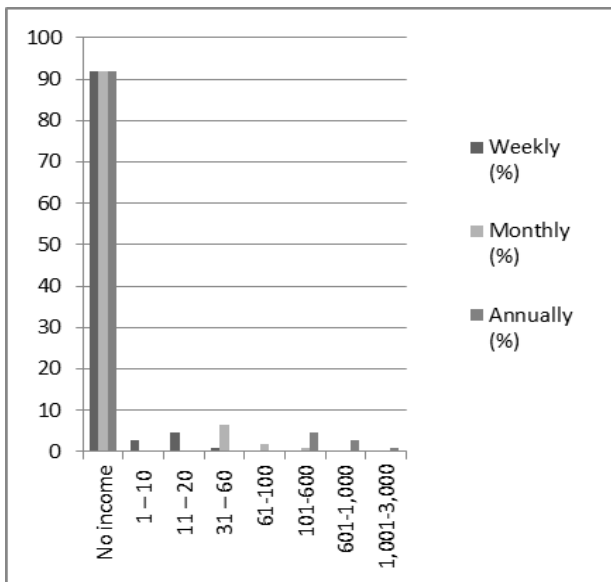

Figure-7. Income of forest guard.

Figure-8. Income of palm-wine tappers.
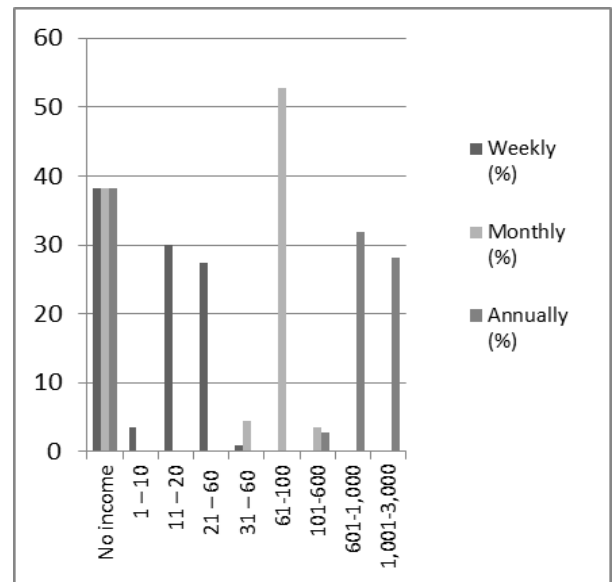

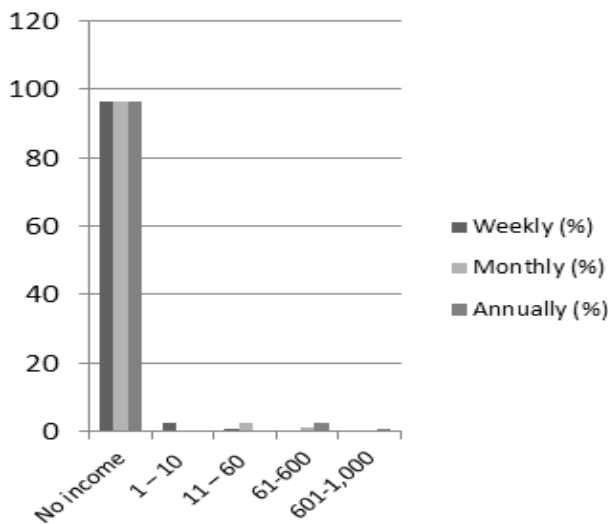**Figure-9.** Income of truck drivers.

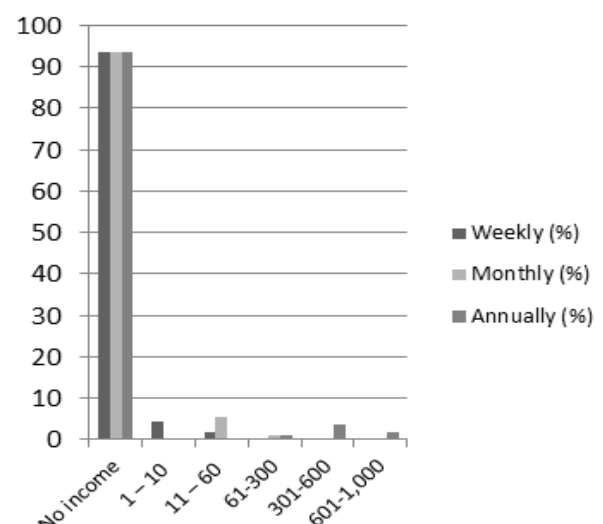**Figure-10.** Income of miners.

Figure-11. Income of miners.

3.5 Structure and Challenges of CBFMC in UFR

The structure of CBFM Committee in UFR presented in Figure 12a showed that 73.6% of the committee members were not nominated by the community leaders, most (80.0%) were selected from the various villages in the LG, and the bulk (58.2%) which was the head of the different forest user groups constitutes members of the committee. Most of respondents stated that community leader do not head the committee (63.6%) Figure 12a Tuesday and Wednesday (22.7%) were majorly the days of committee meetings Figure 12b.

Most respondents (53.4%) stated that they had annual plan of Management activities which were arrived at by voting (70.0%) with the needs of various FUG captured by bulk of the plans (81.8%). There exist government based advisory committees whom according to the respondents (86.4%) hardly oversee the activities of the CBFM committee and had little or no roles in the community (87.3%) Figure 12c.
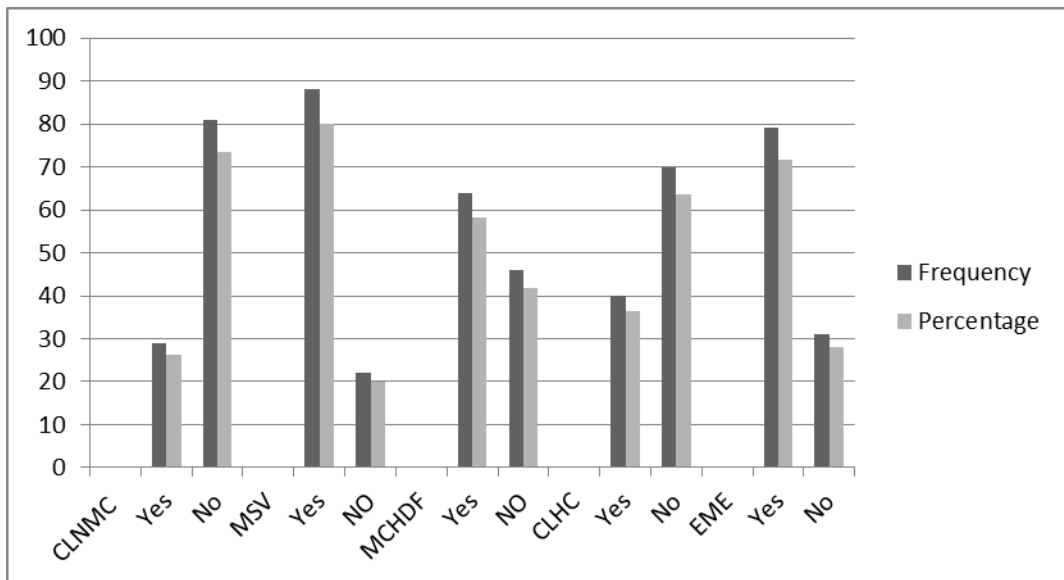
Figure-12a. Structure of CBFM in UFR.

N.B: Community leader nominates member of the committee (CLNMC); Members selected from villages (MSV); Members consist of heads of different FUG (MCHDF); Community leaders head the committee (CLHC); Executive members exist (EME).
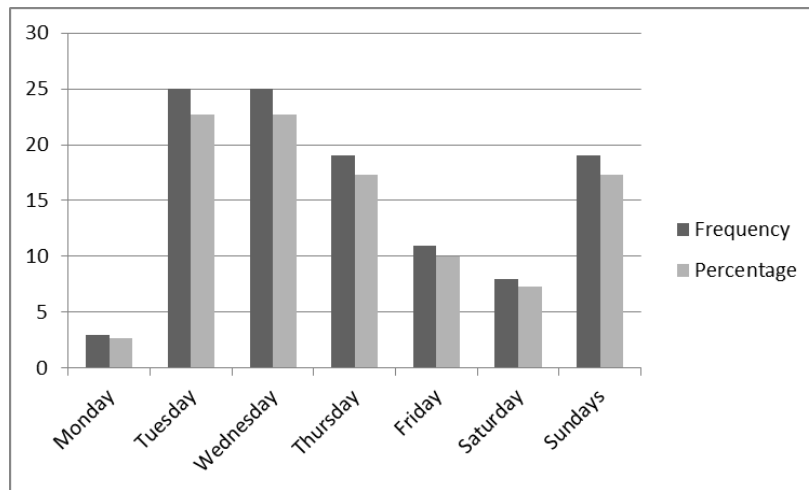

Figure-12b. Days of meetings.

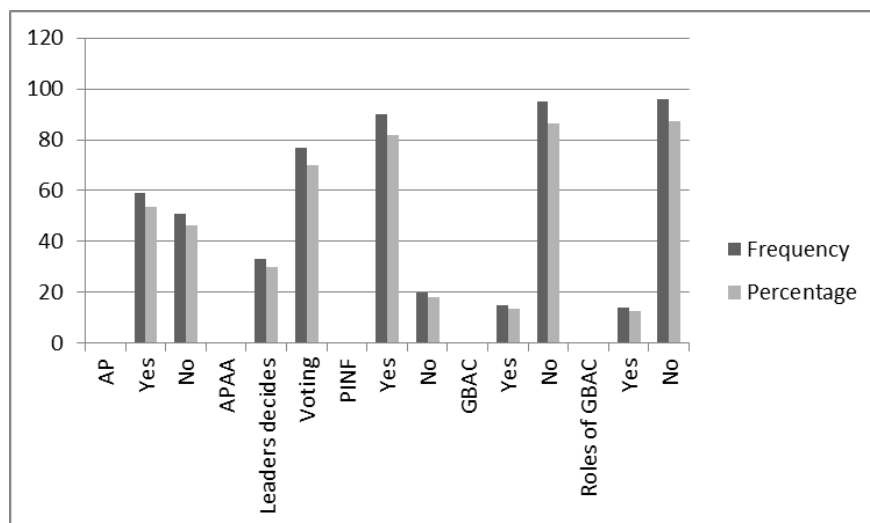**Source:** Field data, 2020.

Figure-12c. Structure of CBFM in UFR.

N.B: annual plan (AP); Annual plan arrived at (APAA); Plan includes needs of FUG (PINF); Government based advisory committee (GBAC); Roles of GBAC.

Source: Field data, 2020.

The structure also showed that the committee consists of executive members; these executive members include; Heads of each quarter, a representative of forest guards, Heads of the all the household in the quarter, Farmland owners, a representative of the FUG. They further revealed that the structure of CBFM in UFR consist of various users group. These groups were Fellers association, Loaders association, Truck drivers association, Forest guards, Timber merchants association, Saw millers association and Forest extensionist.

The various activities of the CBFM and the user groups were:

1. Assisting of forest guards.
2. Land tenure system.
3. Laws reducing illegal logging.
4. Education of rural people.
5. Reforestation of forest estate.
6. Conservation of animals in forest estate.
7. Alternate income sources.
8. Sharing of forest estate by the various quarters.

3.6. Strategies Needed for Effective CBFM

The result in Table 7 showed that collaboration of forest guards and the rural people (40.0%) was the major strategy that existed in CBFM of UFR. Other strategies included creation of a rural forest organization group (26.4%), laws stopping illegal entry into the forest estate (23.4%), alternative sources of income (5.5%) reduction of the agricultural activities on forest estate (1.8%), collaboration of the forest guards and the local people (1.8%) and provision of basic amenities (0.9%).

Table-7. Strategies that exist in the LG.

S/N	Variables	Frequency	Percentage
1	Alternative sources of income	6	5.5
2	Collaboration of the forest guards and the local people	44	40.0
3	A collaboration of the government and local people	2	1.8
4	Creation of a community forest organization group	29	26.4
5	Reduction of the agricultural activities on forest estate	2	1.8
6	Provision of basic amenities	1	0.9
7	Laws stopping illegal entry into forest estate	26	23.4
	Total	**110**	**100.0**

Source: Data analysis (2020).

The result of respondent preference on the various strategies for effective administration of CBFM Tables 8 showed laws stopping illegal entry of forest estate (3.90), provision of basic amenities (3.76), collaboration of the government and the rural people (3.53), education of the rural people concerning the forest estate (3.51), reduction of the agricultural activities in the forest estate, collaboration of forest guards and rural people (3.49) and alternate income sources (3.27) were the preferred strategies in CBFM in UFR with a mean score of above 3 point.

The percentage response of strategies needed for effective CBFM result Table 9 showed that laws stopping illegal entry into forest, provision of basic amenities, partnership of government and rural people, and reduction of the agricultural activities on the estate were highly needed with 90.0%, 76.4%, 59.1% and 53.6% respectively. Alternative income sources, creation of community forest administration group, education of the rural people concerning the forest estate and partnership of forest guards and rural people were needed with 56.4%, 51.8% and 43.6% respectively. Creation of a community forest management group, a collaboration of the government and the rural people, collaboration of the forest guards and the rural people and reduction of the agricultural activities on the forest estate were somewhat needed with 21.8%, 4.5% and 3.6% respectively and creation of a community forest management group, alternative sources of income and a collaboration of the government and the rural people were not needed with 2.7% and 0.9% respectively.

Table-8. Respondents level of perception of strategies needed for effective CBFM.

S/N	Strategies	Mean	Median	Mode	Standard deviation
1	Alternative income sources	3.37	3.00	3.00	0.57
2	Partnership of the forest guards and rural people	3.49	4.00	4.00	0.57
3	Education of rural people concerning the forest estate	3.51	4.00	4.00	0.55
4	A partnership of government and rural people	3.53	4.00	4.00	0.63
5	Creation of a community forest management group	2.96	3.00	3.00	0.75
6	Reduction of the agricultural activities on forest estate	3.50	4.00	4.00	0.57
7	Provision of basic amenities	3.76	4.00	4.00	0.43
8	Laws stopping illegal entry into the forest	3.90	4.00	4.00	0.30

Keys: 1=Not needed, 2=somewhat needed, 3=Needed, 4=highly needed
Source: Data analysis (2020).

Table-9. Percentage of respondent perception on strategies needed for CBFM.

S/N	Strategies	Not needed	Somewhat needed	Needed	Highly needed
1	Alternate income sources	1(0.9)	2(1.8)	62(56.4)	45(40.9)
2	Partnership of forest guards and rural people		4(3.6)	48(43.6)	58(52.7)
3	Education of rural people concerning forest		3(2.7)	48(43.6)	59(53.6)
4	A partnership of government and rural people	1(0.9)	5(4.5)	39(35.5)	65(59.1)
5	Creation of a community forest management group	3(2.7)	24(21.8)	57(51.8)	26(23.6)
6	Reduction of the agricultural activities on the forest		4(3.6)	47(42.7)	59(53.6)
7	Provision of basic amenities			26(23.6)	84(76.4)
8	Laws stopping illegal entry into the forest			11(10.0)	99(90.0)

N.B: Figure in parenthesis are percentages of response
Source: Data analysis (2020).

The result for the various activities carried out in each of the strategies Table 10 ranged from reduction of land tenure system, sharing and division of the estate between the different quarters, education of the rural people on essentials to manage the forest, employment of more people to guard the forest, issuing of hammers and permits to timber merchants, saw millers, loaders, fellers and truck drivers.

The challenges faced by the CBFM committee in UFR included:

1. The rural people plant crops and rear animals inside the forest estate.

2. Little or no human capital to safeguard the UFR from the government sector.

3. The timber merchants, saw millers, loaders, fellers, and truck drivers do not take permits before entering into the forest.

4. The FMG is unable to regulate the buying and selling of products from the reserve.

5. Inadequate government funding.

6. The different quarters do not agree with the sharing process.

7. The poachers out number forest guards in UFR.

8. The people believe the forest estate is a free gift and should be used as they please.

9. Some members of FMG and forest guards take bribe from the poachers to look the other way.

10. Arson of the forest.

11. Little or no turn up for classes educating the people on the forest estate.

12. Laws which are created by the government and the FMG are not obeyed by rural dwellers.

13.   Encroachment of agricultural activities on forest estate.

Table-10. Activities involved in each of the strategies.

S/N	Strategies	Activities
1	Collaboration of the forest guards with rural people	1. Education of the people on the need to guard the forest estate. 2. Issuing of permits and hammers 3. Going out on patrols to defend the forest 4. Showing the people where to plant their crops and rear their animals
2	Laws stopping illegal entry into the forest estate	1. More collaboration with forest guards 2. House to house visitation to inform the people 3. Creation and enforcing of laws to reduce illegal entry into the forest 4. Employment of more people to safeguard the forest 5. Creation of some basic amenities in the community
3	Alternate income sources	1. Classes on skill acquisition are held 2. Creation of funding of other sources of income apart from forestry based to reduce their reliance on the estate
4	Creation of a community forest management group (FMG)	1. Sharing and division of the forest estate between the different quarters 2. Employment of community forest guards that would work with government employed forest guards 3. Buying and selling of forest products is done through the FMG 4. Education of the people on the need to manage the forest estate 5. Supply of basic amenities in the community
5	Reduction of agricultural activities	1. Reduction of land tenure system 2. Giving the rural dwellers where to plant their crops and rear their animals
6	Collaboration with government	1. Issuing of hammers and permits to timber merchants, saw millers, loaders, fellers and truck drivers 2. Educating the rural dwellers on the negative effect of poaching 3. Education of people on wealth creation from forest products.

Source: Data analysis (2020).

These challenges were resolve by the CBFM committee using the following tools:

1.   Creation and execution of fees and fines to poachers.

2.   Arresting of poachers caught in the reserve.

3.   Intensification in the classes to educate the people on the forest estate.

4.   Setting aside some site in the forest for planting of crops and rear of animals.

5.   House to house visitation by FMG and forest guards on the benefit of forest estate.

6.   Sacking and removal of any forest guard and member of FMG that takes bribe from poachers.

7.   Increase in patrol time and teams.

8.   Selling of forest products by the FMG to afford basic amenities for the people.

9.   Cooperation of FMG, forest guards and quarter leaders.

10.   Destruction of any agricultural product found in the estate.

11.   Increase in job creation by the government and the FMG.

4. DISCUSSION

4.1 Socio-Economic Characteristics of Respondents

The large involvement of males in CBFM in Ugbolu forest reserve reflected the prominence of males in the traditional African community. The males have authority over the house as household head and are actively engaged in decision making in communities. This corroborates the finding of Chukwu and Bada [20]; Manuku [21]. The large involvement of indigene in the CBFM and the income generated from such involvement is an expression of the ownership ties and source of livelihood sustenance of the indigenes to the forest reserve. The

implication is that the community will be committed to protecting the reserve as it is their major inheritance. The large numbers of farmers farming inside the reserves showed the existence of agro-forestry techniques between the community and the forest estate. This is in line with the reports of Borokini, et al. [22]; Akinsoji [17];Bisong, et al. [23]; Chukwu and Bada [20].

4.2. Activities Causing Deforestation in UFR

The various activities causing deforestation were mostly human-induced. These activities are geared towards meeting ends need. The high level of logging, livestock breeding, and farming in UFR corresponds to the report of Akinsoji [17]; Serica and Marlito [6]; Shomkegh, et al. [24]; Takahashi and Todo [25].

4.3. Forest Resources Harvested from UGBOLU Forest Reserve

The identified forest resources obtained from UFR are similar to those reported by Akinsoji [17]; Bisong, et al. [23]; Borokini, et al. [22]; Chukwu and Bada [20]; Onwubuya, et al. [26]. The increased availability and harvesting of Bamboo, Squirrel, Grasscutter, and teak, Gmelina, Ogbono, and Dogoyaro indicate their susceptibility to exploitation and extinction when not controlled. This observation confirms the report of Onwubuya, et al. [26].

4.4. Jobs Created and Income Generated from Involvement in CBFM

The various jobs created by involvement in community Forest management and income generated was continuous as the inflow of cash was all year round. Hence it supports the day-to-day living of rural dwellers. This corroborates the report of Akinsoji [17]; Borokini, et al. [22]; Carig [27]; Onwubuya, et al. [26].

4.5. Structure and Challenges of CBFMC in UFR

The existing structure of CBFM in UFR indicates that stakeholders (the community and the forestry department) are fully represented. This is shown by the representation of the various user groups also known as the various forest-based associations in the CBFM. Importantly, the CBFM is chaired by a representative of the user group and this position is achieved via voting. The involvement of the different association allows for easy information flow and decision making. The presence of executive members also allows for effectiveness in administration as tasks are divided and executed accordingly. This report affirms the findings of Akinsoji [17]; Chukwu and Bada [20]; Onwubuya, et al. [26]. The various challenges faced by the CBFM in UFR is not different from the challenges faced in Ethiopia by Takahashi and Todo [25] Taraba State as reported by Benson and Alex [8]; Borokini, et al. [22] Eastern Nigeria by Bisong, et al. [23]; Onwubuya, et al. [26].

4.6. Strategies Needed for Effective CBFM

For effective administration of CBFM, various strategies were executed in the community to curb the excessive dependence of the rural dwellers on forest resources. The strategies summarize the importance of collaboration of the Government with the rural dwellers. The perceived important strategies for effective forest management by the community collaborates with the findings of Bisong, et al. [23]; Onojeghuo, et al. [28]; Onwubuya, et al. [26]. The activities executed in each strategy in UFR are in line with those reported by Onojeghuo, et al. [28].

5. CONCLUSION

The impact of the rural community-based forest management committee in UFR was linked to and hinges on the involvement of rural dwellers and their understanding of the importance to safeguard the forest estate. The involvement of the indigene was keen as their source of job and livelihood was associated with the reserve. This showed that were there is benefit, the people fights to preserve the source. The UFR was protected on this basis. Activities causing deforestation were curtailed by various laws and policies such as reforestation, agro-forestry

system of farming and sacred areas. The aftermath is a forest reserve fully protected. The creation of awareness and education on the need to protecting the forest estate, Creation of an alternate income source and a well managed agroforestry system are recommended by the study for a continued CBFM success.

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