

Research Report

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Multiple Land Use Benefits of Peri-urban Forest (Arakanga Forest Reserve, Ogun State, Nigeria): Perception of Resource Users and its Implication

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Abstract The study examined multiple land use benefits in a peri-urban forest in Abeokuta, Ogun State, Nigeria and the perception of resource users on the significance of the benefits. Stratified Random Sampling technique was used for the study with 100 respondents selected. The settlement was divided into four strata based on existing pattern in the area. The four strata are Ajegule, Ibode Olude, Ilugun Titun and Mawuko. From each stratum, twenty five respondents were randomly selected with a total of 100 respondents from the study area. Questionnaire and interview were used as the instrument of data collection. The benefits derived from the reserve cut across all age groups, ethnic background, educational levels and marital status of respondents. The forest reserve provides multiple benefits in terms of goods and services and environmental protection. Mantel measurement for combined benefits showed firewood as the most dominant with indispensable value of 34 followed by Teak leaves collection 24 and 16 for geological material extraction. The major objective of the reserve is timber and poles production but simultaneously other multiple benefits such as firewood, snails, teak leaves, medicinal plants, bushmeat and geological materials were derived from the reserve. Consequently, the forest reserve contributes to livelihoods of the surrounding communities. This was measured through perception of the respondents with positive mean values and standard deviation of Likert rating. It is therefore recommended that increased conservation effort must be ensured through appropriate forest policy formulation along with the introduction of alternative domestic energy source to firewood to enable the forest contribute more to the welfare of surrounding communities.

Keywords Dominant use; Combined benefits; Human dimension; Natural resource

Tropical countries in Africa, especially Nigeria, lay emphasis on management and protection of forest through forest reservation. This process of reservation has significant social, economic and environmental impacts. Reservation of forests, especially urban and peri-urban forests, gives rise to benefits in terms of conservation of biodiversity. The bio-diversity of plants and animals provides goods and services. The myriad of goods and services provided by urban and peri-urban forest have been widely reported (Osemeobo et al., 1986; Adekunle, 1998; FAO, 2001, <ftp://ftp.fao.org/docrep/fao/009/y0353e/y0353e00.pdf>), they are timber and non-timber based: examples include sawn wood, fuel wood, medicines, leaves, roots, bark, mushroom, wild animals and geological materials such as sand, gravels, stones and soils. However, the forests were hitherto valued as land

banks rather than a valuable resource of its own right providing essential goods and services for livelihood generation. Consequently, the forest is a key component is a natural resource base of any community or country especially in developing countries. This is particularly so in third world countries located within tropical forest formation including Nigeria where most of the countries have large rural populations depending on natural resource exploitation for their livelihood. According to CIFOR (2005), apart from the forest meeting the economic needs of the rural people for food and shelter, tropical forests are also a major source of both industrial wood products and fuelwood. WCMC (2000) reported that in Nigeria, rainforest is home to over 1 417 known species in fauna and at least 4 715 species of vascular plants. Therefore, forests have the highest species diversity of

any terrestrial ecosystem in the world. Forests therefore provide employment for people and contribute to the GDP of the nation. Forest resources in Nigeria are distributed on state basis with eight major forest types (Beak Consultant, 1998). As one of the states with forest resources, Ogun State has forest reserve that falls under the purview of a peri-urban forest. According to Wiggins and Holt (2000), peri-urban was described as areas beyond the closed settled limits of any urban area but are sufficiently close enough to the urban area to have frequent and substantial interactions with the urban economy. Close enough was taken to mean within 30 minutes of journey of the city by public transport. This expression describes Arakanga forest reserve in Abeokuta, Ogun State, Nigeria. As a peri-urban forest there are growing settlements developing close to the forest in view of the benefits derivable from the forest. This is in addition to the interaction with the urban economy. The values of a peri-urban Forest transcend the valuation of forests as land banks as hitherto was the perception of early settlers. The list of goods and services that urban forestry and peri-urban forestry can provide is impressive. Trees and green spaces help keep cities cool, act as natural filters and noise absorbers; improve microclimates and protect and improve the quality of natural resources, including soil, water, vegetation and wildlife. Trees contribute significantly to the aesthetic appeal of cities, thereby helping to maintain the psychological health of their inhabitants. Beyond ecological and aesthetic benefits, urban forestry has a role in helping resource – poor populations meet basic needs. This therefore underscores the importance of this study with the following objectives:

1. To describe the socio-economic characteristics of peri-urban forest users.
2. To identify the various uses of peri-urban forest in Ogun State.
3. To determine the perception of the respondents on the contribution of peri-urban forest to livelihoods.

1 The study area

The study was carried out in Abeokuta, Ogun State, Nigeria. Abeokuta lies within Latitude 7° and 7°5' N and Longitude 3°3' E and 3°37'.

Arakanga Forest Reserve (AFR) is one of the nine (9) forest reserves in Ogun State that falls under the purview of a peri-urban forest. AFR is about 2.3 km² long and made up of both the High forest and Savanna vegetation. Although the reserve is located in Odeda Local Government Area, it is closer to Akomoje, the headquarters of Abeokuta North Local Government Area and about 5 km from the centre of Abeokuta, the capital city of Ogun State (Awojuola, 2001; Onakomaiya, 1992). The environment is characterized by two distinct seasons. The longer wet season last for eight months (March~October) and shorter dry season last for four months (November~February). The relative humidity is high all year round, generally above 80% during the wet season and fluctuates between 60~80% during the dry season. The most humid months coincide with the rainy season spanning between March and October. Humidity and the long wet season ensure adequate supply of water and continuous presence of moisture in the air. This trend promotes perennial tree growth. The soils in the area are dominated by clayey loam developed on underlying granite. There are also laterite soils. Abeokuta has extensive free forest areas with two gazetted forest reserves of 61.19 km² land area. Major timber crops include Teak and Gmelina with other indigenous species from the free areas.

The major occupation of the people in the study area is farming with agricultural crops such as cassava, maize, cocoyam, plantain, palm produce and vegetables. The area is also rich in fauna resources such as fish of various species, grasscutter, giant rat, grey rat, monitor lizard, weaver birds and others. Stone quarrying is also well developed. Major non-farm employments are provided by transportation and forestry activities such as timber exploitation, firewood, leaves collection and charcoal production.

2 Data collection

Primary data were collected from four (4) settlements to Arakanga Forest Reserve, Abeokuta in Ogun State. Stratified Sampling technique was used for the study. Each village in the study area represents a stratum. From each stratum, respondents were randomly selected. A total of 100 respondents with 25 from each stratum were selected. The villages are Ajegunle,

Ibode-Olude, Ilugun-Titun and Mawuko. The instrument of data collected was through the administration of questionnaire and personal interview. The respondents cut across civil servants, forest users and knowledgeable members of the society. Questionnaire information addressed socio-demographic characteristics of the respondents such as age, gender, marital status, educational background, family size, etc. Technical questions deal with multiple benefits derived from the reserve. The study was carried out between May and August, 2012.

3 Data analysis

Statistical and analytical methods were employed in the analysis of the data collected. The methods include the use of descriptive statistical-tools such as frequency distributions, mean and percentages. Perception of the respondents on resource utilization was measured through Likert rating on the contribution of peri-urban forest to livelihoods.

The Likert scale was a rating of 1~5, where

- 1 Strongly disagree
- 2 Disagree
- 3 Agree
- 4 Slightly agree
- 5 Strongly agree

3.1 Multiple benefits

The rating of various benefits derived from the reserve was also determined. Mantel (1965) table of multiple benefits was used as presented below (Table 1).

4 Results and Discussion

Table 2 shows the socio-demographic characteristics of resource users of Arakanga forest reserve in Ogun State, Nigeria.

The table shows that the respondents were mostly females with 53% and 47% for males. On age distribution, 42% of the respondents were between the ages of 41 to 50 years of age, followed by 38% who falls between the range of 31 to 40 years of age, then 16% of the respondents were between ages 21 to 30 years, while 3% of the respondents were between ages 51 to 60 and 1% were between 61 to 70%.

The table also shows that majority of the respondents

Table 1 Multiple benefits (Mantel, 1965)

Grades	Size class	Benefit
1 Insignificant	VI	A,B,C,D,E,F
2 Significant	V	A,B,C,D,E,F
3 More significant	IV	A,B,C,D,E,F
4 Important	III	A,B,C,D,E,F
5 Very important	II	A,B,C,D,E,F
6 Indispensable	I	A,B,C,D,E,F

Note: A: Firewood; B: Snail; C: Medicinal plants; D: Leaves collection; E: Hunting; F: Geological material (sand, stone, gravel)

Table 2 Demographic characteristic of respondents

Variables	Frequency	Percentage
Gender		
Male	47	47
Female	53	53
Total	100	100
Ages (years)		
21~30	16	16
31~40	38	38
41~50	42	42
51~60	3	3
61~70	1	1
Total	100	100
Marital Status		
Single	12	12
Married	86	86
Divorced	0	0
Widow(er)	2	2
Total	100	100
Household size		
1~2	13	13
3~4	38	38
5~6	44	44
7~8	5	5
Total	100	100
Educational level of respondents		
Primary	25	25
Secondary	16	16
Tertiary	7	7
No formal education	52	52
Total	100	100
Tribe		
Yoruba	90	90
Igbo	9	9
Hausa	1	1
Total	100	100

were married with 86%, while 12% were single and 2% widower.

Table 3 Evaluation of combined benefits derived from the reserve

Benefit \ Grades	A	B	C	D	E	F	Total values ²	
1		27	39	31	33	77	73	15558
2		7	9	4	6	4	4	214
3		3	1	9	5	2	1	121
4		22	25	34	21	1	2	2711
5		7	14	10	9	6	4	478
6		34	12	12	26	10	16	2476
Total		100	100	100	100	100	100	

Note: Benefit: A: Firewood collection; B: Snail gathering; C: Medicinal plant collection; D: Leaves collection; E: Hunting activities; F: Geological material extraction; Grades: 1: Insignificant; 2: Significant; 3: More significant; 4: Important; 5: Very important; 6: Indispensable

The household size of the respondents ranged from 1 to 8. The respondents that constitute the majority were household size of 5 to 6 with 44%, followed by those with 3 to 4 having 38%. Also, 13% have household size of 1 to 2 and 5% have household size of 7 to 8.

Furthermore on education, majority 52% of the respondents had no formal education, 25% had Primary education, while 16% had Secondary education and only 7% of the respondents had Tertiary education.

4.1 Multiple benefits derived from the reserve

Neighbourhood and non neighbourhood respondents derived benefits from the reserve. The benefits were firewood, snail, medicinal plants, leaves collection, hunting and geological material extraction. Table 3 shows the evaluation of combined benefits derived from the reserve. The results showed the analysis of the Benefits: 1- firewood, is the most dominant use, followed by Benefit (D), that is, Teak leaves collection and then medicinal plant collection (C), snail gathering, geological material collection and the least is hunting activities.

4.2 Perception and implication

The perception of respondents was measured through variables that expressed understanding of respondents on benefits derivable from the forest. Table 4 shows the perception of the respondents through likert rating. The mean values and standard deviation of the variables showed the significance of the variables. All the variables showed positive mean values ranging from 1.3 to 2.84. The standard deviation also range from 0.75 to 1.66. The values indicate that respondents derive benefits from the forest reserve. These findings

collaborate previous researchers (Walsh et al., 2005; Abulude, 2004, in press; Akinyemi and Oduntan, 2004) that argued that Forest and Wildlife resources supports the upliftment of living standard of people in Nigeria, especially in the rural area.

Conclusion

The study revealed that Arakanga Forest Reserve is important to the livelihoods of the people living around the reserve. Therefore, Arakanga Forest Reserve provides a multiplicity of goods and services for the respondents. A reasonable percentage, 24% were involved in firewood collection and 21% in Leaves collection. Furthermore, respondents generate income from different forest activities (such as Firewood collection, Snail gathering, Leaves collection, Medicinal plant collection, and Hunting activities). Wages were received by government employees of the reserve under the Department of Forestry. Also, some respondents generate income from Geological material. The evaluation of combined benefits derived from the reserve shows that firewood collection is the most promising with the dominant use in the reserve. On sustainable livelihoods, perception variables showed positive mean values with the standard deviation and consequently indicated significance. However without contradiction, poverty exists in the communities and villages surrounding Arakanga Forest Reserve where the research was carried out and therefore, residents of these villages relied on the forest reserve for various purposes. Consequently, attempts should be made in improving the current state of the reserve for more contribution to the lives of people living in the area.

Table 4 Sustainable livelihood activities

Variable	SA (5)	A (4)	IND (3)	D (2)	SD (1)	MEAN	SD
I collect firewood for regular domestic use	32	1	19	15	33	2.84	1.66
I collect firewood from Arakanga F.R	29	1	18	15	37	2.7	1.65
Firewood is the only source of energy for household cooking	9	9	4	31	47	2.02	1.30
I collect firewood to sell in the community from forest reserve	23	0	1	19	57	2.13	1.63
I collect and package firewood for local market	14	1	1	20	64	1.81	1.39
I gather snail from the reserve for regular use	16	4	11	15	54	2.13	1.50
I gather snail from Arakanga F.R	16	3	12	15	54	2.12	1.49
Snail is the only source of protein for my household	0	5	1	20	74	1.37	0.75
I gather snail to sell in the community from forest reserve	8	0	1	16	75	1.5	1.11
I gather snail to sell at local market	4	0	1	18	77	1.36	0.86
I collect medicinal plants from A.F.R	16	1	22	13	48	2.24	1.46
I collect medicinal plants from the reserve for domestic use	16	1	22	14	47	2.25	1.46
Medicinal plants is the only source of health care for my household	10	3	7	19	61	1.82	1.30
I collect medicinal plant from the reserve to sell in the community	7	0	1	18	74	1.48	1.06
I collect medicinal plants to sell at local market	5	0	1	18	76	1.4	0.93
I collect leaves from A.F.R	25	1	9	14	51	2.35	1.67
I collect leaves for domestic use	25	1	9	14	51	2.35	1.67
Leaves are what I use primarily in my household	6	1	2	22	69	1.53	1.04
I collect leaves from the reserve to sell in the community	22	0	1	15	62	2.05	1.62
I collect leaves from the reserve to sell at the local market	20	0	1	14	65	1.96	1.58
I am a staff of A.F.R	23	1	1	14	61	2.11	1.66
A.F.R is my major source of income for me and my household	23	1	1	14	61	2.11	1.66
Besides with working at A.F.R, I involve in other activities to sustain my family	4	1	1	15	79	1.36	0.89
I involve in hunting activities at A.F.R	7	0	4	12	77	1.48	1.09
Hunting is done only for domestic use	3	2	2	16	77	1.38	0.87
I sell the hunted game from the reserve in the community	7	0	2	14	77	1.46	1.07
I sell the hunted games at the local market	4	0	0	14	82	1.3	0.83
I collect geological materials (such as sand, gravel, or stone) from A.F.R	11	0	2	16	71	1.64	1.28
I collect geological materials for domestic use	9	0	2	15	74	1.55	1.18
I collect geological materials to sell at the community	10	0	2	14	74	1.58	1.22
I collect geological materials to sell from the reserve	10	0	3	13	74	1.59	1.23

Conservation efforts should be based on integrated managements that help to maintain the environment, offer better socio-economic options that would lead to an adequate and acceptable quality of life for the teaming rural and urban poor who depended on forest and forest products, and at the same time, maintain biological diversity. An alternative source of energy

should also be made available to the teaming population who depended on the forest reserve for firewood collection as source of domestic energy.

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