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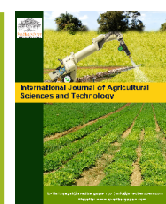
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## Assessment of the Willingness-To-Pay (WTP) for Forest Resources Conservation in Imo State, Nigeria

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### Abstract

Dwindling appropriation to the forestry sub-sector has necessitated alternative finance mechanisms for sustainable forest service in developing and developed societies. Studies on Willingness-To-Pay (WTP) for forest service and nature conservation among households was conducted in a rural (Ekeugba forest community) and semi-urban (Obinze community with no forest reserve therein) regions of Imo State, SE Nigeria. A hundred sets of questionnaire were administered to households in these communities to assess willingness levels, acceptable amounts payable by the above households and likely factors which influence WTP which latter was analyzed using multiple regression at  $p < 0.05$ . In the results, low percentage of WTP (14%) was recorded for the forest community who derived an average of about N4,391:81 per month/household from forest service while 30% WTP was obtained from semi-urban community who correspondingly derived an average of about N1,610:36 from forest service per month/household. Acceptable payment signified by these households was N394/month/household for semi-urban community and N100/month/household for rural forest community which reflects 24% and 2% respectively of the above income derivative from forest utility. The more educated (education:  $p = 0.005$ ) and the more married that household members are (marital status:  $p = 0.042$ ), the more willing they are to pay for forest service/conservation in their area in the result, location (urban:  $p = 0.006$ ) influenced individual's perception and thinking about natural resources. Urbanism with its associated spate of socialization, administrative structure and influence tends to add impetus to influence individual thinking and perception about development.

**Keywords:** Finance mechanisms, Forest community, Perception, Urbanism

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### 1. Introduction

Conservation of forests and natural resources in general has become a topical global issue that must be handled with effective coordination between forestry department and the public. In this light, several environmentalists and conservation experts have reportedly submitted that active participation of forest communities and the public in general play significant

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roles in attaining conservation goals. Undoubtedly, these forests and other natural resources are crucial assets for sustainable development for regional development particularly rural sector development. These resources function to service human needs and man acknowledges them within his social system (Tshewang *et al.*, 2019; and Shindler *et al.*, 2002).

In view of the above development thrust which forest resource is key studies that border on assessing within the wider societal frame, the levels of willingness of rural/urban communities for conservation help in directing policies/programs and articulating actionable modalities towards achieving desired goals. These goals include rural/urban sector livelihood improvement, poverty reduction, environmental control/stability, mitigation of natural hazards, soil conservation, regulation of hydrological cycle, water purification and protection of wildlife habitats among others (Pawar and Rothkar, 2015).

Unlike tangible and easily monetizable forest products, forest services are often not paid for/compensated. Therefore, economic value of services from forest resources cannot remain without financial accompaniment from the public sector. In other words, in face of poor financial standing of the forestry sector especially in developing countries, those who manage forests (private and public) where these services are produced do not often capture the benefits (economic and otherwise) that result from such services to elicit public interest and commensurate participation in resource management (Lette and Henneleen, 2002).

Evidences from researches and observations show that fees attached to forest resources evoke negative psychological or behavioral reaction from forest communities (Usman, 2021; and Rakotonarivo *et al.*, 2021). The expected *cost-benefit* balance in forest service provision to the public will expectedly provide/chart a roadmap towards sustainable forest management. However, the cost of sustained forest service provision to the public reflects an important indicator influencing individual and community decision making and participation module. Therefore, researches aimed at assessing likelihood of willingness of the public to pay for forest products and services have become timely especially in third-world countries where only meager budgetary allocation is unsustainably appropriated to the forestry sub-sector.

Furthermore, in either contributive fairness or distributive fairness, perceptions of cost for forest conservation and management are fundamentally based on attribution of cost and responsibility (Rakotonarivo *et al.*, 2017). Tropical forest management has largely been based on consumption with little or no attention paid to generation of optimal equitable revenue from such a resource that is productive. This study will evoke interest in stepping up programs and expectedly incite implementable modalities to estimate the cost of avoidable forest degradation/deforestation and optimum forest service provision in the southeastern region of Nigeria where per capita land size (population per land availability) is grossly declining.

## 2. Historical, Conceptual and Analytical Framing

The past decades (up to 2000) have shown some levels of concern for the environment as well as depletion of natural resources. Long before the 21<sup>st</sup> century, for instance, in 1900, some American scientists, political leaders and business elites were becoming concerned about the depletion of the nation's forest soil, mineral and water resources.

Prior to the rise of the conservation movement, farmers grew crops for longer periods until the soil could no longer nourish them, used water resources freely without much thought to conservation and eagerly looked to the discovery and exploitation of mineral resources. Conservation emerged as a form of applied science whereby conservation leaders came from fields such as forestry, agronomy, geology, and hydrology.

Currently, in most conservation researches in Africa, social issues and contexts which underpin almost the opportunities and constraints for implementation are accorded much less priority, if addressed at all (Knight *et al.*, 2006). Social assessment studies bordering on public sector forest participation is key to conservation and forestry development. Across African forests including Nigeria, this is regrettably low and outputs could prospectively offer positive potentials for country-side development (Ochola *et al.*, 2010).

Understanding the salient dimensions in arousing peoples' willingness-to-pay for services erstwhile considered as nature's free gifts could well form a scholarly and culturally ripple-filling paradigm especially for poor, dominantly-agrarian third-world societies. The main hypothesis in this survey is that Willingness-To-Pay (WTP) for forest conservation and sustainability depends on the preference of forest communities and beneficiaries for those resource values (Bamwesigye *et al.*, 2020). In addition, we examined socioeconomic characteristics of beneficiaries of forest products/services such as gender, age, occupational disposition, educational level, marital status, household leadership and income which have been included in some works to influence WTP for forest conservation and restoration (Soaga and Adekunle, 2015; and Endaler and Wondimagegnhu, 2019).

### 3. Study Area

There are over 664 communities in Imo State (Harneit-Sievers, 1998). Over time and occasioned by progressive development, a number of these communities have attained the status of semi-urban and/or urban locations. Instance include Owerri municipal, Orlu, Okigwe and adjoining regions.

Ekeugba forest reserve is a public-owned reserve located in Ohaji-Egbema LGA of Imo State. Ohaji/Egbema is an oil-rich rural area which lies in the Southwestern part of Imo State of Nigeria with a landmass of about 890 km<sup>2</sup> and shares boundaries with Owerri in the East, Oguta in the North and Ogba/Egbema/Ndomi in River State in the Southwest. It is located within latitude 5° 15'N and longitude 6° 58'E. The Ekeugba forest reserve serves as tourist attraction center for the region. This study area is a physiographic region characterized by undulating lowland plain, which bears relationship with its geology.

The climate and vegetation are characterized by two distinct seasons: the dry and rainy seasons. The rainy season occurs between April and October while the dry season occurs between November and March. The high temperatures, humidity and precipitation of the area favor plant growth as well as enhance vegetation establishment.

### 4. Data Collection and Analysis

Data were collected using sets of structured questionnaire. In the controlling questions, respondents reposed their WTP or otherwise for forest conservation and restoration in the area. The maximum amounts they would be willing to pay, should they continue to access the forest products/services in the area. Again, the factors that likely affect their (un)willingness-to-pay for these products and services were captured using the instrument of questionnaire. Questionnaire was administered by hand to target households living within five (5) communities of the Ekeugba forest reserve in Ohaji/Egbema Local Government Area, Imo State Nigeria. The survey also considered a community located 10-20 m away from Ekeugba forest area (Obinze) located in a semi-urban area at the outskirts of Owerri. This was used to compare WTP levels for respondents residing away from forest endowed communities.

Willingness-to-pay was analyzed using multiple regression model at  $p < 0.05$  level of significance. The below perceived factors were used to determine their respective effects on respondent's willingness to pay for forest conservation and restoration. The results were presented in tabular form.

The equation of the multiple regression (dichotomous) is stated thus:

$$Y = b_0 + b_1x_1 + b_2x_2 + \dots + b_nx_n \dots \quad \dots(1)$$

where

Y = Willingness-to-Pay (dependent variable)

$b_0$  = Regression constant

$x_1$  = Rural community (Ekeugba =1; otherwise =0)

$x_2$  = Semi-urban community (Obinze=1, otherwise=0)

$x_3$  = Gender (Male=1, Female=0)

$x_4$  = Marital Status (Married=1, Otherwise 0)

$x_5$  = Household Leadership (Male-headed =1, Otherwise 0)

$x_6$  = Educational Attainment (Yes=1, Otherwise =0)

$x_7$  = Age (Continuous variable: Adults: 45 years+ =1, Otherwise 0)

$b_1, b_2 \dots b_n$  = Regression slopes

### 5. Results and Discussion

The observed percentage proportions as recorded for both genders (males 57%, females 43% for Ekwugba community; males 52%, females 48% for Obinze community) are contained in Table 1. Observably, the above respective pairs of values were somewhat close indicating a likely parallel in forest utilization along gender lines across the study area. It is important to note that across gender lines and beyond, forest communities often show a history of livelihood directly supported by forests within their neighborhood as reposed by Ekwugha and Onyema (2014). It is perceived from the above previous study that these residents derive their fuelwood, animal protein sources, vegetables and fruits from the forests and similar vegetation located within their community and neighborhoods.

Respondents in Ekeugba community had the highest estimated average amount derived from utilizing forest reserves in the area (₦4,391:81) while Obinze community correspondingly had average of about ₦1,610:36 derived for the use of forest resources (Table 1). By comparison, the income base of residents of Ekeugba community is over two-times that obtained by residents in Obinze community. Again, given the established poverty line of about \$1 (about N480) per day, assuming some of the respondents currently live below this mark, from this result, forestry is able to force down poverty line by about 30% in Ekeugba region (N146/day) and about 11% in Obinze region (N53/day) *ceteris paribus*.

Variables	Category	Percentage (%)	
		Ekeugba Community (N=50)	Obinze Community (N=50)
Gender	Male	57	52
	Female	43	48
Age (years)	< 20 years	18	12
	20 – 30 years	33	40
	31 – 45 years	28	16
	>45 years	21	32
Marital Status	Single	41	49
	Married	53	44
	Divorced	1	7
	Widowed	5	-
Level of Education	None	10	-
	Primary	19	11
	Secondary	34	37
	Tertiary	37	52
Household Leadership	Man headed	61	73
	Woman headed	39	27
Willingness-to-pay	Yes	14	30
Maximum amount (N) tolerable to Respondents (Average)		100.2	394.18
Estimate of income (N) derived from forest use (/month)		4,391.81	1,610:36
<i>Source: Field Survey (2021)</i>			

The result shown in Table 1 above equally presents the respondents' WTP levels for forest conservation. An estimated 44% willingness level was recorded (14% from rural community and 30% from semi-urban community). From the above, proximity to forest resources does not seem to have positively encouraged household WTP for forestry conservation and development. In Table 2, about 73.7% of the respondents agreed that attitude towards environment is the major factor that influence their WTP for forest restoration. Again, about 72.4% of the respondents opined that it is fair enough to pay for conservation of nature. In Table 2 also, about 60.5% of the respondents posited that their culture does not abhor payment for forest services hence reflecting cultural acceptability in environmental protection/conservation programmes/projects.

Table 3 shows the results of cross-tabulation of respondents' reposed unwillingness-to-pay level under certain influencing factors whereby the respondents reposed the following reasons: forest around them not well managed as to

<b>Respondents' Willingness-to-pay for forest resources</b>	<b>Yes</b>	<b>No</b>	<b>%</b>
Culture/belief abhors to pay for forest service	39.5%	60.5%	100
I live close to forest area	48.7%	51.3%	100
It is fair for efficient forest management	72.4%	27.6%	100
Have optimum income level	47.4%	52.6%	100
Positive attitude towards environment	73.7%	26.3%	100

*Source: Field Survey (2021)*

<b>Factors that influence reposed unwillingness-to-pay for forest resources</b>	<b>% (100)</b>
Respondents who live far away from forest	59.2%
Level of income	44.7%
Forests around respondents are not well managed	67.1%
No previous payments attached	59.2%

*Source: Field Survey (2021)*

encourage payment (67.1%), respondents live far away from the forest (59.2%); and there has been no previous payments attached for the conservation of forest (59.2%).

Respondents in Obinze community (>10 km away from established forest reserve) in Imo State tended to be more willing to pay (30.0%) for forest resource for conservation (Table 1). However, respondents living <5 km from point of established forest reserve in Imo State comparatively lower level of willingness to pay (14.0%). This indicates less willingness to pay for forest conservation despite the fact that they live close to the established point of forest reserve and derive more dividends/benefits (as evidenced from income derivable contained in Table 1). This might not be distant from the perceived fact that majority of the forest community members strongly views forest resources as a free gift of nature which ought to be freely utilized with less or no fee attached to it (Ravenscroft *et al.*, 2013). This seems to be in consonance with Adeyoju's (1974) view who worked on forest resources and communities in Nigeria and documented that people see forest as a natural resource whose products and services ought to be freely utilized without any fee or demand from the consumers. About 73.7% of the respondents agreed that their positive attitude towards the environment is a factor that influence their WTP level for forests management/protection (Table 2).

The average amount respondents reposed that they would be willing to pay for forest conservation and service in their area is contained in Table 1. Respondents in Obinze community (a semi-urban area located away from reserve area) showed willingness to pay an average of about ₦394 per month per household representing about 8.9% of the estimated income they derived as contained in Table 1. Conversely, the residents/community located in Ekeugba forest reserve were willing to pay an average of not more than N100 monthly per household representing 3.74% of what they derived from the forest as contained in Table 1.

Given the 2016 population figure for Imo State (5,408,300) and the average household size of 3.7 as contained in NBS (2017), by extrapolation, an estimated 1,461,702 households exist in Imo State. From the results of this survey, it can be inferred by projection that in the event that this acceptable fee becomes applicable with a conservative blanket ceiling of N100 per household, about N1,464,625 is realizable per month across communities (rural and urban).

**Table 4: Results of Multiple Regression on Factors that Tend to Influence Respondent Willingness-to-Pay for Forest Conservation**

Variable	B <sub>0</sub>	Exp(B)	SE	p-Value	Remarks
Constant	1.317	3.731	1.879	0.484	Not significant
Rural Community (Ekeugba)	-0.35	0.705	1.531	0.819	Not significant
Semi-Urban community (Obinze)	1.807	2.876	1671.3	0.006*	Significant
Age (years)	-0.747	0.474	1.365	0.584	Not significant
Education	-3.882	0.021	1.371	0.005*	Significant
Gender	0.786	2.194	0.601	0.191	Not significant
Marital status	0.931	2.537	0.457	0.042*	Significant
Household leadership	-0.994	.370	0.631	0.115	Not significant

**Note:** SE = Standard Error, \* Significant at  $p < 0.05$ .

**Table 5: Cross-Tabulation of the Frequencies of Respondents' Variables that Showed Significance to Willingness-to-Pay in the Study Area**

Location	Education			Marital Status		
	Tertiary	Secondary	Primary	None	Married	Not Married
Ekeugba	4	4	-	2	6	4
Obinze	13	5	2	3	17	6

*Source: Field Survey (2021)*

From the results in Table 4, education ( $p=0.005$ ) and marital status ( $p=0.042$ ) significantly influenced willingness-to-pay for forest conservation in the study area. The respondents who were educated showed evidence (from the result) of appreciation of conservation of forest resources perhaps because of their level of knowledge. The higher their educational attainment level (tertiary level: Ekeugba=4; Obinze=13), the higher the likelihood of their willingness-to-pay for forest conservation and by extension sustainability of forest service in their community (Table 5). Given that marriage presented a statistically significant factor in influencing WTP, the result of cross-tabulation (Table 5) showed that this was more pronounced among residents in semi-urban location than in rural location. By and large, urbanism in this sense tends to influence individual perception about responsibility, development and public resource management. Socialization, active public influence and community administrative structure which stimulate urban life could well have added drive to influencing WTP.

## 6. Conclusion

Given the fact that WTP level was low (14% for rural residents and 30% for semi-urban residents), positive attitude towards environment is a major factor considerable in inciting respondents' WTP. In the study area, majority of the people still see forest as a natural resource that ought to be freely utilized without any form of payment for conservation.

From the results of this research survey, it seems very untimely for general acceptance and possible enforcement of any policy that will warrant collection of fees for the use and/or possible conservation of forest resources from communities in Nigeria. However, if any, fees with ceiling of not more than N100 per month for households in rural regions where established forest estate is and N394 for semi-urban especially in other neighboring States and regions before adoption could be trial-tested. This should be with select residents with similar background livelihood before forest policy involving cost on forest use can be considered for promulgation.

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