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Economic Evaluation of Urban Forest Tree Service Functions in Benue State Secretariat Makurdi, Benue State

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Abstract: This study is carried out on economic evaluation of urban forest tree service functions in Benue State Secretariat Makurdi, Benue State. The Willingness to Pay (WTP) format of contingent Valuation Method (CVM) was adopted to elicit information on monetary values for the services provided by urban trees. Data was collected through a structured questionnaire administered to 57 respondents. The respondents were randomly selected from three cadres of workers in the Benue state civil service. They were Higher, lower and middle cadres. Descriptive and statistical tools such as mean, mode, tables, frequency and percentages were used to analyse the data. Also, multiple regression analysis was used to determine socio-economic factors determining willingness to pay (WTP). A total of 56.1% of the respondents indicated willingness to pay money ranging from ₦50 to ₦500 monthly. ₦100 had a wider range with percentages of 57%, 14.3% and 28.6% for higher, middle and lower cadre respectively and thus represent the modal value. The overall mean of willingness to pay was found to be ₦624.33. The study revealed that 100% of the respondents were aware of environmental services trees provide except for pollution abatement (14.6%). The linear regression equation revealed that the age of respondents significantly influenced Willingness to Pay (WTP) in the study area at 5% level of significance. It is therefore concluded that the sampled respondents valued the environmental services of forest trees and are willing to contribute to the continuous existence of trees in the study area. Therefore, there is the need to create more awareness and educate the people to understand that forest trees are depletable renewable resources that require sound management and conservation for their sustainable utilization.

Keywords: Economic Evaluation, Urban Forest, Tree Service Functions, Willingness to Pay

1. Introduction

Forests world-wide are known to be critically important in terms of biological diversity they contain and the ecological functions they serve [1]. According to Konijnendijk *et al*., [2], urban forestry is defined as 'the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic, and aesthetic benefits trees provide society.

In urban areas, trees provide a number of benefits to the public such as recreational, environmental and economic benefits. Environmental services are all those benefits that a population obtains from ecosystems [3]. According to Millennium Ecosystem assessment [4], the benefits and services derived from the forest are collectively referred to as ecosystem service functions. Trees by nature serves as natural purifiers of the environment, and provide benefits which include climate stabilization, carbon storage, protection of hydrological functions and biodiversity conservation. They also contribute to regulating temperature and moisture, which improves air quality, all of which are factors related to quality of life [5]. Urban forests provide a range of environmental, ecological and socio-economic as well as psychological benefits that contribute to the quality of urban life (Dumenu, 2013) [6]. The urban green spaces provide services such as water purification, air pollution control, recreation and leisure, and maintenance of biodiversity [7-11]. Urban forests provide

a wide range of services in urban areas and are therefore fundamentally important to human well-being [12]. Each type of forest cover provides amenities in both public and private properties and this has important implication for the costs and benefits of urban trees.

Studies by [13-16] have reported many problems associated with rapid urbanization such as congestion, excess commuting, urban heat island effect, and air and water pollution. According Mckinney, [17], Mckinney [18, 19] Urban expansion leads to fragmentation of natural habitats and has negative impacts on native species, causing changes in their abundance, distribution, community composition, and ecosystem function. These problems are associated with the conversion from natural land uses in urban areas to infrastructural areas, thereby affecting ecological systems and most especially environmental services trees provide [20]. The development of infrastructure such as building, road, electricity lines, water lines affect the benefit urban forest provide to regulate the urban environment such as micro climate modification. These services are not measured to reflect economic values they provide inspite of the myriad of ecological and environmental benefits.

Economics valuation is the process of ascribing monetary values to social and environmental goods and services of the forest, it is also termed the act of monetization [21]. It is an importance tool for environmental mangers and decision makers to justify public spending on conservation activities. Conservation can only be possible if the urban forestry trees as well as forests can be shown in monetary value of the environmental service by the environmental economists [22]. A well-known among the stated preferences methods is the contingent valuation method (CVM) which is the means of quantifying public's preferences and willing to pay (WTP) or willing to accept (WTA) compensation of the environmental goods and services [23]. Forest cover in urban environments can occur in form of public parks, protected forests, unprotected forest and trees growing in yard along streets [24] and each type of forest cover provides amenities on both public and private properties [25]. This has important implication for costs and benefits of urban trees (residential, commercial and industrial [26].

The depletion of trees in urban centres by various problems such as encroachment, illegal cutting, low legal enforcement and lack of awareness has diminished the contributions to health and ecological balance of urban centres because trees can only provide benefits if they are healthy and alive for a long time. However, in order to correct economic decision that often treat environmental functions as free, it is important to determine or measure their value because economic decisions regarding resource allocation are made based on societal values. Therefore, studies on economic valuation are valuable in that they will help in the provision of needed data and information on the monetary values of urban forest tree service function and their contribution toward environmental protection in the study area. This study seeks to provide monetary value of environmental services provided by trees. Specifically, this study identifies the tree species around the Benue State Secretariate, assess the perception of respondents on environmental service functions and their willing to pay and the determinants of willingness to pay among socio-economic characteristics of respondents in the study area.

2. Methodology

2.1. Study of Area

The study was conducted at the State Secretariate Makurdi, Benue Nigeria. Makurdi is the capital city of Benue State located in the middle belt along the Benue River bank on latitude 7°44N and longitude 8°54°E and is located within the floodplain of the lower River Benue valley. It is situated between 73-167m above a sea level (Hula and Udoh, 2015) [19].

Makurdi Local Government was created in 1976, but was founded about 1927 when the railroad from Port Harcourt (279 mile (449k) south west) was extended to Jos and Kaduna.

The town is naturally divided into two land masses by River Benue into two North and south Bank, the south bank is further divided into Wurukum, High level, Wadata. Anakpa quarters and old GRA (Government Reserve Area). Dry season commences from November to march while rainy season starts from April and end in October and ranges between even 150-180cm. Temperature fluctuate between 23°C during the rainy season to as much as 38°C during the dry season (Udo, 1981) [20]. The vegetation consists of guinea savanna forest of operation woodland with tall trees as well, usually with short bole and broad leave. The vegetation of the area is riparian made up of predominantly grasses, woodland.

2.2. Population and Sampling Procedures

The target population comprises 3 cadres of staff of Benue State Secretariat Makurdi. Purposive sampling and simple random sampling were used to determine two study sample drawn from the cadres of workers in Benue State Secretariat, Makurdi, Benue State. The sample size was determined by using Taro-Yamane formula expressed below was used to get the sample size of fifty-seven (57) workers across the various ministries from the total population.

The formula is expressed as;

$$\mathrm{N} = \frac{N}{1+N(e)^2}$$

Where:
n=requires sample
N=population of the study,
e=level of significance.

3. Data Collection

The data for the study was collected through primary and secondary data source. The primary data was collected with

the aid of a semi-structured questionnaire and personal observation while secondary data was through literature search. The data was collected between at the secretariat in Makurdi. The questionnaire used for collection of data was divided into two sections: the first set of questions on bio-data of respondents, while the second set of questions was data on the economic valuation of urban forest tree service functions in Benue State Secretariat Makurdi across different ministries.

3.1. Data Analysis

Data obtained were analyzed using statistical tools and Contingent valuation method (CVM). Descriptive statistical tools such as frequencies, percentage and mean, tables were used to analyze the variables of interest. Multiple linear regression was used to determine socio-economic variables that significantly influenced WTP.

3.2. Model Specification

The model specifications are as follows:

$$WTP=f\,[X_1 + X_2 + X_3 + \ldots\ldots + X_n + c].$$

Where:
WTP=willingness to pay
X_1=Age of the respondents [in years]
X_2=Educational level [years spent in school]
X_3=Awareness of ecosystem services
X_4=Income
X_5=Marital status
E=error term
Implicit form of function
Linear: $WTP=b_0 + b_1X_1 + b_2X_2 + \ldots\ldots\ldots + b_nX_n + e$
Where:
B_o=Constant
$b_1b_2\ldots\ldots b_o$=Regression coefficient for WTP
e=Residual or error term

Thus, out of the number of workers across the different cadre following sample size were down Table 1 below.

Table 1. *Number of Workers Across the Different Cadre Following Sample Size.*

S/N	Cadre	Sample Size
1	High cadre	38
2	Middle Cadre	7
3	Lower Cadre	12
	Total	57

4. Results and Discussion

4.1. Species Identified in the Study Area

Table 2 shows the trees species found in the study area. Nine (9) species of trees were identified. *Azdirachta indica* had the highest number (80), followed by *Mangifera indica* (25) while *Khaya senegalensis* have the lowest number in the study area.

Table 2. *Numbers of tree species identified in the study area.*

S/N	SCIENTIFIC NAME	FAMILY NAME	TOTAL
1	*Azadiradata indica*	*Meliaceae*	80
2	*Khaya senegelensis*	*Meliaceae*	10
3	*Danellia oliveri*	*Caesapiniodeae*	18
4	*Tectona grandis*	*Verbenaceae*	15
5	*Mangifera indica*	*Anacardiaceae*	25
6	*Gmelina arborea*	*Verbenacea*	10
7	*Delonix regia*	*Flamboyant*	10
8	*Eucalyptus camaldulensis*	*Myrtaceae*	17
9	*Afzelia africana*	*Fabaceae*	15

Source: Field survey, (2019)

4.2. Assessment of Perception of Awareness and Willingness to Pay for Environmental Services Functions of Trees in the Study Area

4.2.1. Perception of Awareness and Willingness to Pay

The result on the perception of awareness and willingness to pay for environmental service functions of trees in the study area is presented in Table 3. The result indicates that all respondents are aware of environmental services tree provide. On the willingness to pay 51.6% indicated willingness to pay for environmental services trees provide, while 43% declined.

Table 3. *Assessment of perception of awareness of environmental services functions of trees Benue State Secretariate, Makurdi.*

Categories	Responses	Frequency	Percentage
Awareness of tree service function	Yes	57	100
	No	0	0
	Total	57	100
Willingness to pay	Yes	32	56.1
	No	25	43.9
	Total	57	100

Source: Field survey, (2019)

4.2.2. Perception of Tree Service Function in the Study Area

The result on the perception of awareness of environmental service functions of trees in the study area is presented in Table 3. The result revealed that all (100%) of the respondents are aware of the service function of trees for provision of shades and recreation. This is followed by erosion control (93%), aesthetics (73.7%) while only (14.6%) indicated to be aware of the function of trees for pollution abatement.

Table 4. *Perception of Tree Services Function in the Study Area.*

Forest trees services	Frequency	Percentage
Provision of shades	57	100
Recreation	57	100
Ornament / aesthetic	42	73.7
Pollution/abatement	8	14.6
Erosion	53	93.0

Sources: Field survey, (2019)

4.2.3. Willingness to Pay (WTP) for Trees Services Functions in the Study Area.

The result on the amount of the different cadre of respondents' willingness to pay for service functions in the study area is presented in Table 5. Among the cadres, the higher cadre had highest proportion (66.7%) ₦50 followed by

(57.1%) ₦100, while middle cadre 20% of the proportion indicated the willingness to pay ₦ 250, ₦350, and ₦500, based on the lower cadre all (100%) of respondents indicates willingness to pay ₦250, 80% for ₦300, 75% for ₦400 while the least indicated the willingness to pay ₦100.

Table 5. *Willingness to Pay (WTP) for Tree Service Functions by Respondents in the Study Area.*

Categories		N50	N100	N150	N200	N250	N300	N350	N400	N500
Higher cadre	No. 1	4	1	6	-	-	1	1	1
	% 16.7	57.1	16.7	85.7	-	-	20.0	25.0	20.0
Middle cadre	No. 2	1	1	1	1	-	1	-	1
	%13.3	14.3	16.7	14.3	20.0	-	20.0	-	20.0
Lower cadre	No. 3	2	4	-	3	4	3	3	3
	%20.0	28.6	66.7	-	100.0	80.0	60.0	75.0	60.0

Source: Field survey, (2019)

4.2.4. Willingness to Pay Among Different Socio-economic Variables

The result on willingness to pay among different socio-economic variables is presented in Table 5. Among the socio-economic variables, females higher proportion (₦302.673) than males. The age distribution of respondents of 31-40 had higher mean value of ₦335.71. In terms of marital status, the singles had higher mean value of ₦393.33. In terms of income distribution those of whose income falls between ₦ 46,000 to ₦ 96,000 had higher mean value of ₦372.22. Based on educational level, those who had tertiary education had higher mean values of ₦356.25. Based on employment cadre, the respondents on higher cadre had a higher mean value of ₦266, followed by the middle cadre ₦212, while the least mean value of ₦145 was of the lower cadre.

Table 6. *Willingness to Pay (WTP) among different Socio-economic in the Study Area.*

Categories	Variable	Total frequency	Total WTP (₦)	Mean WTP (₦)	Mode
Gender	Male	38	6,100	160.53	Male
	Female	19	1,750	302.63	
Age	31-50	87.7	9,500	190.00	31-40
	41-60	12.3	2,350	335.71	
Marital status	Single	15	5,900	393.33	Married
	Married	42	5,950	141.67	
Income	₦10,000-₦48,000	48	8,500	177.68	₦10,00-₦48,000
	₦48,000-₦96,000	9	3,350	372.22	
Education	Tertiary	38	2,850	356.25	Tertiary
	Secondary	12	9,000	183.67	
Employment	Higher cadre	38	3,500	145.83	
	Middle cadre	7	1,700	212.50	Higher cadre
	Lower cadre	12	6,650	266.00	

(Source: Field survey, 2019)

Table 7. *Estimated monetary values of forest tree service function in the study area.*

Categories	No of Sample Respondents	Total WTP	Mean WTP
Higher Cadre	38	3,500	145.83
Middle Cadre	7	1,700	212.50
Lower Cadre	12	6,650	266.00
Total	57	11,850	624.33

4.2.5. Socio-economic Determinants of Willingness to Pay (WTP) for Trees Services Functions

From all the variables examined, only age indicates a significance difference as a determinant for willingness to pay for environmental service functions that trees provide in the study area (Table 8). The result indicated (0.017) at 5% significant level. Though education and income were not significant but positive indicating that as they increase, the Willingness to Pay also increases.

Table 8. *Determinants of Willingness to Pay (WTP) for Tree Service Functions.*

	Variables	Regression coefficient	std. Error	Beta values	t-cal	Sig
1	Constant	0.903	0.226		3.990	0.000
2	Age	0.477	0.193	0.316	2.467	0.017
3	Gender	-0.091	0.964	-0.088[b]	-670	0.506
4	Marital status	-0.043	0.745	-0.047[b]	-0.315	0.754
5	Education	0.108	0.142	0.271[b]	0.798	0.428
6	Income	0.049	0.253	0.092[b]	0.358	0.721

The level of significance 0.05%

4.3. Discussion

Nine (9) species were identified the study area, they include *Azadiradata indica*, *Khaya senegelensis*, *Danellia oliveri*, *Tectona grandis*, *Mangifera indica*, *Gmelina arborea*, *Delonix regia*, *Eucalyptus camaldulensis*, *Afzelia africana*. Among the species identified *Gmelina arborea*, *Tectona grandis*,

Eucalyptus camaldulensis were exotic species. While the rest were indigenous species. The presence of exotic species could be that they were cultivated in the regional region and Nigeria due to their value for timber.

These exotic species are also reported by Onefeli and Adesoye [27]. According to their study, the widely known and cultivated exotic species are *Tectona grandis* and *Gmelina arboreal*, the species dominate various forest plantation in Nigeria.

The indigenous species are species that are native to the region or ecosystem. Their presence in the region is as a result of natural processes, with no human intervention [28]. This finding is corroborated by earlier findings of [29] who reported that these species are found in the region of the country.

All the respondents (100%) were aware and appreciated tree service function and this might be due to the educational level of the respondents. Hence, they indicated their willingness to contribute in cash for environmental service function of trees. The others that declined to contribute might be having erroneous view that trees and their services are gifts of nature, hence no payment is required. This finding is in line with that of Adekunle, *et al*. [30].

Most of the respondents were aware and appreciated tree service functions except pollution abatement in the study area. This could be due to the fact that a large percentage of the respondents always park their cars directly on the tree canopies. People find succor or relax under trees especially during hot afternoons. These findings are consistent with other studies such as Ancha et al., [31] and Popoola and Ajewale [32].

The reason for wider acceptability of ₦200 for higher cadre ₦250, ₦350 and ₦500 for middle cadre and ₦250 for lower cadre could be based on their earnings.

The clear disparity between Willingness to Pay (WTP) by male (₦160.53) and Willingness to Pay (WTP) by females (₦302.63) could be because the job is gender sensitive and this could have influenced the mean Willingness to Pay (WTP). Although, benefits derived from forests are not gender biased, it could be observed that both males and females accessed tree service functions in the study area. Adekunle *et al*., (2008) [28] however, recorded a larger mean Willingness to Pay (WTP) value among male respondents in FUNAAB urban community.

As expected, the higher the Willingness to Pay (WTP) value (₦393.33) was elicited from the single respondents. The mean Willingness to Pay (WTP) skewed towards those respondents with high income bracket 48,000 – 96,000. This is in line with Adekunle and Agbaji [33] where their mean Willingness to Pay (WTP) skewed towards respondents with high income bracket.

This could due to the single adults are more mean able to recreational activities than the married. The indication of the age bracket 41-60 having the highest mean value could be a blessing because as people grow older, they will be more willing to pay for the tree service function.

Educational status could play significant role in people's Willingness to Pay (WTP) for tree source function as found in this study, Tertiary had the mean monthly Willingness to Pay (WTP) of ₦356.25, this is a clear indication that formal education could enhance people willingness to contribute for the sustainability of tree service function.

The mean Willingness to Pay (WTP) was highest for the higher cadre, this could be due to their higher earning power which could influence their ability to spare some money for tree service function in the study area.

The percentage distribution of WTP values (₦) for tree service functions in the study show that ₦100 had wider acceptability with the highest percentage recorded for the higher Cadre and lower cadre (66.76) respectively.

Determinant of the socio-economic factors contributing to the monetary value of forest trees service function showed that respondents age and awareness of tree services function had significant influence at ($P \leq 0.5$) on the amount the respondents are willing to pay for environmental services. As people increase in age, they may be willing to pay for environmental service. Although income and education were not significant, they indicated that the higher the income or as the income increases the more is the respondent's willingness to pay (WTP).

5. Conclusion and Recommendation

5.1. Conclusion

This study revealed that respondents Willingness to Pay (WTP) for free service functions and that they are aware of these services trees provide and benefit from them. The also revealed that age is a determinant factor in the Willingness to Pay (WTP) for tree service functions in the study area.

5.2. Recommendation

1. Awareness by government and NGO's on tree planting should be encourage and deforestation discouraged.
2. Environmental conservation and management should monetize environmental values through appropriate policy and economic instruments.
3. The State government should harness the environmental service function of trees and promote the sector involvement in the development of green areas in urban centers for recreation, revenue and employment generation.

References

[1] Adekunle, VAJ. Adewole, O. O. and Akindele, S. O. (2015). Tree Species Diversity and Structure of Strict Nature Reserve. Tropical Ecology, 54, 275-289. Hhttps://www.tropecol.com.

[2] Konijnendijk, C. C., Ricard, R. M., Kenney, A. and Randrup, T. B., 2006. Defining urban forestry – a comparative perspective of North America and Europe. Urban Forestry and Urban Greening, 4: 93-103.

[3] Dixon, K. Pagiola, I. (2008). Oregon Douglas-fir forest reconstruction study. Ph.D. Thesis. Corvallis: Oregon State University. p. 124.

[4] MEA Millennium-Ecosystem-Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Washington, DC., Island Press, 155 p.

[5] Dosi, C. (2001). Barbier EB, Koch EW, Silliman BR. 2008. Coastal ecosystem-based management with nonlinear ecological functions and values. Science 319: 321e323.

[6] Demenu, W. K. 2013. What are we missing? Economic valuation of an urban forest in Ghana. Ecosystem services. 5: e137-e142.

[7] Comelis K. and Herma, G. Cam E, Nichols JD, Sauer JR, (2004). Relative species richness and community completeness: Birds and urbanization in the Mid- Atlantic States. Ecological Applications 10: 1196e1210.

[8] Harris RV, Clarck JR, and Matheny NP (1999) Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines, 3rd edn. Upper Saddle River, NJ: Prentice Hall.

[9] McPherson EG, Simpson JR, Peper P, and Xiao Q (1999) Benefit cost analysis of Modesto's Municipal Urban Forest. Journal of Arboriculture 25: 235-248.

[10] Renema J. Cao M, Zhang J. (1999). Tree species diversity of tropical forest vegetation in Xishuangbanna, SW China, Biodiversity & Conservation volume 6, pages 995-1006.

[11] Sherer, P. M. 2006. The benefits of urban parks. Why America needs more city parks and open space. The Trust for Public Land, San Francisco.

[12] Helms, J. A. (1998). The dictionary of forestry. CAB INTERNATIONAL.

[13] Zhang, S., Wu, C., Liu, H., Na, X. (2011). Impact of urbanization on natural ecosystem service values: A comparative study Environ, Monit Assess. 179: 575–585.

[14] Pickett, S. T. and M. L. Cadenasso. 2009. Altered resources, disturbance, and heterogeneity: a framework for comparing urban and non-urban soils. *Urba11 Ecosystems* 12 (1): 23-44.

[15] Wang McKinney, M. L. 2008. Effects of urbanization on species richness: A review of plants and animals. *U1ba11Ecosystems* 11 (2): 161-176., Z., Zhang, B., Zhang, S., Li, X., Liu, D., Song, K., et al. (2006). Change of land use and of ecosystem service values in Sanjiang Plain, Northeast China. *Environmental Monitoring and Assessment, 112*, 69–91. Wang, S. (2013). Forest economics in an increasingly urbanized society: The next frontier. Forest Policy and Economics, 35, 45-49.

[16] Newman, P., & Kenworthy, J. R. (1999). Sustainability and cities: Overcoming automobile dependence. Washington DC: Island Press.

[17] McKinney, M. L. 2006. Urbanization as a major cause of biotic homogenization. *Biological conservation*. 127 (3): 247-260.

[18] McKinney, M. L. 2008. Effects of urbanization on species richness: A review of plants and animals. *Urban ecosystems. 11 (1): 161-176.*

[19] Yarie, J., Viereck, L. A, Van Cleve, K., and Adams, P. 1998. Flooding and Ecosystem Dynamics along River Tanana River Applying the state-factor approach to studies of ecosystem structure and function on the Tanana River Floodplain. *BioScience* 48 (9): 691-695.

[20] McDonald, R. I., Marcotullio, I., Giineralp, B. 2013. Urbanization and trends in biodiversity and ecosystem services. In Urbanization, biodiversity, and ecosystem services: Challenges *and opportunities.* Edited by: T. Seto, CK., Solecki, W. D., Griffith C. A. London and New York: Rutledge, Tailor and Francis Group. pp. 139-151.

[21] Ajewole, S, Paul A, Khan ML, Singha LB. 2001. Species diversity and community structure of a temperate mixed Rhododendron forest along an altitudinal gradient in West Siang District of Arunachal Pradesh, India. Nature and Science 9: 125e140.

[22] White A. and Lovett N. Magurran AE. 1999. Measuring biological diversity. New Jersey: Blackwell Science Ltd.

[23] Adekunle, M. F, Ajibola, A. A and Odeyemi A. S (2012). Economic valuation of forest trees environmental service functions in Abeokuta metropolis, *Nigeria. Journal of Agricultural Forestry and social science* (JOAFSS). Vol. 10. No 1. Pp. 237-250.

[24] Mansfield, C., Pattanayak, S. K., McDow, W., McDonald, R., & Halpin, P. (2005). Shades of green: measuring the value of urban forests. In the housing market. Journal of forest economics, 11 (3), 177-199.

[25] Hotte, N., Barron, S., Cheng, Z. C., Nesbitt, L., Judith, C. (2015). Social and Economic values of Canada's Urban Forests: A National Synthesis. Canadian Forest Service and University of British Columbia Vancouver 1-97p.

[26] Zhu, P., & Zhang, Y. (2008). Demand for urban Forests in United States cities. *Landscape and urban planning, 84* (34), 293-300.

[27] Onefelli, A. O and Adesoye, P. O (2014) Early Growth Assessment of Selected Exotic and Indigenous Tree Species in Nigeria. Sourtheast Eur for 5 (1): 45-51

[28] Ijeomah, H. M, and Aiyeloja, A. A (2010) Ecotourism: An Instrument for Combating Renewable Natural Resources Degradation: In Igeomah Hm. And Aiyeloja A. A (eds) Practical issues on Forest & Wildlife resource Management Canopy consultant, Choba, Port Harcourt Nigeria 6. 25p.

[29] Sambe, L. N. "2019. Assessment of Chainsaw Milling in Benue State, Nigeria", *Asian Journal of Research in Agriculture and Forestry,* 4 (2): 1-19.

[30] Adekunle MF, Momoh S, Agbaje BM (2008). Valuing Urban Forests: Application of Contingent valuation Methods. Ethiopian J Environ. Stud., 1 (2): 61-67.

[31] Ancha, PU. Ikyaagba, E. T. Nongov, T. T. 2019. Undergraduate Students Willingness to Pay for Social Services of Trees at the Federal University of Agriculture Makurdi, Benue State, Nigeria", International Journal of Environment and Climate Change.

[32] Popoola, L. and Ajewole, O. I. (2002). Willingness to pay (WTP) for rehabilitation of Ibadan urban environment through reforestation projects. *Int. J. Sustain. Dev. Ecol.* 9 pp 256-268.

[33] Adekunle, M. F and Agbaje, B. M (2012). Public Willingness to pay for ecosystem service function of a peri-urban forest near Abeokuta, Ogun State, Nigeria Journal of Development and Agricultural Economics 4 (2): 45-50.

[34] Udo, E. S. (2001). The position of forestry in Awa Ibom State. In: Udo, E. S. (ed.). Proceedings of the 1st workshop of the Forestry Association of Nigeria Akwa Ibom State Branch in collaboration with the Department of Forestry and Wildlife, University of Uyo, State Ministry of Environment and the UNDP, Akwa Ibom State held in Uyo, Akwa Ibom State between 10th and 11th April, 2001. Pp 31-43.

[35] White PCL, Lovett JC (1999). Public preferences and willingness –to-pay for nature conservation in the environmental management, 55: 1-13.

[36] Hula, M. A. and Joseph, Udoh, J. C. 2015. An Assessment of the impact of flood events in Makurdi, Nigeria. Civil and Environmental Research, 7 (10): 1-9.

[37] Adekunle, V. A. J. and Oke, D. O. (eds.). Proceedings of the 1st National Conference of the Forests and Forest Products Society of Nigeria (FFPN) held at the Federal University of Technology, Akure, Ondo State between 16th – 18th April, 2008. Pp 95-98.