

**PUBLIC WILLINGNESS TO COMMIT TIME TO URBAN FORESTRY DEVELOPMENT IN LAGOS METROPOLIS, NIGERIA**

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**ABSTRACT**

*This study assessed willingness of Lagos metropolitans to commit time and the prospective number of hours to be committed to Urban Forestry Development (UFD) in the metropolis. Data were obtained from a questionnaire survey of 900 metropolitans living in three income profiled neighbourhoods using the payment card contingent valuation method. Data were analysed with descriptive statistics and Tobit model at  $p=0.10$ . Results show that 48% of the respondents were willing to commit their time to UFD in the metropolis, out of which 13.9% were willing to commit a modal two hours per week (h/w) to the UFD. Moreover, 53.1%, 50.8%, 71.1%, 47.6%, 65.4% respectively of those who love to live or work in green environment, were aware of benefits of trees in urban environment. They either belonged to social organizations, owned their residences, or previously participated in community projects and were willing to commit time to the UFD. Twelve of the 32 regressors (constant inclusive) had significant influence on the probability to commit time and the number of hours to commit per week to urban forestry development in Lagos metropolis. To harness the great pool of volunteers for urban forestry development in Lagos metropolis, promoters and protagonists of urban greening in the metropolis will have to put in place an appropriate formal public education programme to enlighten the metropolitans on the benefits of trees in urban environment; bring together social organizations, CBOs, NGOs etc. for the use of educating and eliciting support of the public for UFD among others.*

Keywords: willingness to commit time, community participation, urban forestry

**INTRODUCTION**

Time and money are very important prerequisite resources essential for participatory urban forestry development. At times, many individuals prefer to give out money for community development project rather than taking out time of their schedule to physically participate in such community projects. However, Sustainable urban forestry development requires the support of local people by being physically involved in the planting and management of the urban trees and woodlands. Involvement of the locals in urban forestry development encourages the incorporation of people's needs, opinions, and preferences into the planning and

management process right from the choice of trees to actual planting, tending, and harvesting of tree products. Besides, participatory urban forestry development has some socio-psychological benefits to urban residents, and can play a crucial role in improving urban living conditions (Ajewole, 2002). Practical involvement in urban forestry development can provide an effective focus for community development by granting urbanites an ideal low risk opportunity for community groups to build confidence and achieve a shared goal of environmental enhancement. Practical community events in urban forestry development in which people can participate include tree planting, litter clearance, path construction or the removal of bushes which are growing too close to path edges.

Carter (1994) reported some ways by which urban dwellers have been practically involved in urban forestry development to include tree wardens or similar schemes, whereby individuals volunteer to take responsibility for the care of the trees planted in their area. This was reported to operate successfully in Bangalore, while the “godparents of trees” programme, in which children effectively adopt a tree, was also reported to be popular in Guatemala City. Since urbanites can actually take some hours off their schedule to be physically involved in the planning, establishment and management of urban forests, it becomes very important to investigate the factors that are capable of affecting the prospect of urban dwellers committing their time to urban forestry development in order to make optimal use of such information for the development of urban forestry. The objective of this study therefore is to assess the Lagos metropolitans’ willingness to commit time to urban forestry development in the metropolis and the factors that can influence both the willingness to commit time and the prospective number of hours to be committed to the project.

## **METHODOLOGY**

### **Data Collection and Analysis**

The data for this study were obtained from a questionnaire survey of 900 residents of Lagos metropolis, using the payment card contingent valuation method. The questionnaire which was designed in line with Hoehn (1992) and Hanemann (1994) elicited the respondents’ willingness to commit time to urban forestry development in the metropolis. Adapting Aluko's (1996) socio-economic stratification of Lagos metropolis according to property values, a multi-stage random sampling procedure was adopted to stratify the metropolis into three socio-economic communities, viz. high, medium and low class communities. Thereafter, each of the three (3) communities was stratified into neighbourhoods. Five (5) neighbourhoods were subsequently randomly sampled from each of the communities. Names of major streets in each of the resulting neighbourhoods were collected from the metropolitan planning authority. Using a table of random numbers, three streets were picked from each of the fifteen neighbourhoods. Twenty respondents were sampled in each of the three selected streets of the fifteen neighbourhoods. This gave a total sample size of 900 respondents. In all

873 questionnaires were used for the analysis, having discarded 27 for inconsistency. Information were regarded as inconsistent when responses were at variance with questions asked, or when multiple and conflicting answers were given to a single question.

### The Analytical Model

Willingness to commit time to urban forestry development is conceptualised to involve a two step simultaneous decision by the respondents. This entails:

- i. whether or not to be physically involved in the project; and
- ii the number of hours the decision maker is willing to commit after the initial decision has been made.

The Tobit model (a hybrid of probit and multiple regression models) is appropriate in capturing such a decision process (Tobin; 1958).

### Model Specification

The one limit Tobit model for this study is specified as follows:

$$\gamma = \gamma^* = \begin{cases} \alpha_i\beta + \varepsilon_i & \text{if } \alpha_i\beta + \varepsilon_i > 0 \\ = 0 & \text{if } \alpha_i\beta + \varepsilon_i \leq 0 \end{cases} \text{equation (1)}$$

Where;

- i = 1, 2... n observations.
- $\alpha_i$  = the vector of explanatory variables.
- $\gamma$  = limited dependent variable
- $\gamma^*$  = continuous dependent variable which is observed only when it is positive.
- $\beta$  = vector of unknown coefficients
- $\varepsilon_i$  = error term ;  $\sim NI(0, \sigma^2)$

McDonald and Moffit (1980) argued that the Tobit coefficients do not correctly measure the regression coefficients for observations above the limit. Therefore the Tobit coefficients have to be decomposed in order to isolate the probability of participating physically and the number of hours per week the prospective participant will like to commit to urban forestry development in Lagos metropolis. The procedure for the decomposition following McDonald and Moffit (1980) is as follows;

The expected value of  $\gamma$  in the model is;

$$E\gamma = \alpha_i\beta F(z) + \sigma f(z), \text{equation (2)}$$

Where  $z = \alpha_i\beta/\sigma$ ,

$f(z)$  = the unit normal density,

$F(z)$  is the cumulative normal distribution function.

$\sigma$  = standard error of the estimate of the dependent variable  $\gamma$ .

$\alpha$  and  $\beta$  are as previously defined in equation (1).

Furthermore, the expected value of  $\gamma$  for those willing to participate physically in urban forestry development in the metropolis (i.e. prospective number of hours per week) is given as

$$E\gamma^* = \alpha_i\beta + \sigma f(z)/F(z). \text{equation (3)}$$

Consequently, the basic relationship between the expected value of all observations;  $E\gamma$ , the expected value conditional on willingness to commit time to urban forestry development in the metropolis;  $E\gamma^*$  (i.e. the expected number of hours per week), and the probability of participating physically;  $F(z)$  is

$$E\gamma = F(z) E\gamma^* \quad \text{equation (4)}$$

If we consider the effect of a change in the  $i^{\text{th}}$  explanatory variable 'α' on  $\gamma$ :

$$\delta E\gamma / \delta \alpha_i = F(z)(\delta E\gamma^* / \delta \alpha_i) + E\gamma^* (\delta F(z) / \delta \alpha_i) \quad \text{equation (5)}$$

Equation (5) shows the total change in  $\gamma$  being disaggregated into two parts: (1) the change in  $\gamma$  of those that are willing to participate physically (expected number of hours to be committed weighted by the probability of participating physically), and (2) the change in the probability of participating physically weighted by the expected number of hours per week to be committed.

Also the change in the probability of participating physically in urban forestry development in Lagos metropolis as independent variable  $\alpha_i$  changes is;

$$\delta F(z) / \delta \alpha_i = f(z) \beta_i / \sigma \quad \text{equation (6)}$$

And the change in number of hours per week to be committed with respect to a change in an explanatory variable among the participant is

$$\delta E\gamma^* / \delta \alpha_i = \beta_i \{1 - zf(z) / F(z) - f(z)^2 / F(z)^2\} \quad \text{equation (7)}$$

$\beta$  and  $\sigma$  were obtained from the maximum likelihood estimates (MLE) and used to compute each of the terms in equations (5) (6), and (7).

### **The Empirical Model**

In order to assess the factors affecting the public willingness to commit time to urban forestry development in Lagos metropolis, an empirical one limit Tobit model comprising 31 urban forestry development related variables was specified. The dependent variable  $\gamma$  is the number of hours an individual was willing to commit to urban forestry development (UFD) in the metropolis. The explanatory variables are explained below.

LOVGRENT is a dummy variable that indexes respondent's love for green environment. It takes the value of 1 if the respondent loves to live or work in green environment and 0 if the respondent does not appreciate living or working in a green environment. AWENBENT is also a dummy variable that indexes respondent's awareness of benefits of trees in living and working environments. It takes the value of 1 if the respondent is aware, and 0 if the respondent is not aware. PREPACOP is a dummy variable that indexes respondent's previous participation in any community development project. It takes the value of 1 if the respondent has previously participated in a community project and 0 otherwise. MEMSORG is a dummy variable that indexes respondent's membership of social organisation. It assumes the value of 1 if the respondent is a member of social organisation and 0 if the respondent is not a member of any social organisation. NATUPARK is a dummy variable that indexes respondent's previous use of nature park. It assumes the value of 1 if the respondent has made previous use of

nature park and 0 if the respondent has not previously visited nature park. BOTGARD is a dummy variable that indexes respondent's previous use of botanical garden. It assumes the value of 1 if the respondent has made previous use of botanical garden and 0 if the respondent has not previously visited botanical garden. ZOOGARD is a dummy variable that indexes respondent's previous use of zoological garden. It assumes the value of 1 if the respondent has made previous use of zoological garden and 0 if the respondent has not previously visited zoological garden. STRTREES is a dummy variable that indexes respondent's previous use of street trees. It assumes the value of 1 if the respondent has made previous use of street trees and 0 if the respondent has not previously made use of street trees. SOLITUDE is a dummy variable that indexes respondent's previous use of an urban forest as solitude for personal meditation. It assumes the value of 1 if the respondent has made previous use of an urban forest as solitude for personal meditation and 0 otherwise. PICNIC is also a dummy variable that indexes respondent's previous use of an urban forest for picnicking. It assumes the value of 1 if the respondent has made previous use of an urban forest for picnicking and 0 if otherwise. MEDPLANT is a dummy variable that indexes the previous use of an urban forest as a source for collection of medicinal plants. It takes on the value of 1 if the respondent has previously collected medicinal plants from an urban forest and 0 if otherwise.

OWNSRED is a dummy variable that indexes respondent's ownership of residence. It takes the value of 1 if the respondent owns his residence and 0 if the respondents live in rented apartment. The variable DURESD is the number of years a respondent has spent in the metropolis as a resident. The foregoing variables are hypothesized to have positive influence on willingness to commit time to urban forestry development in the metropolis. Occupational variables in the empirical model comprise employed, pensioner, student and jobseek. The variable EMPLOYED is a dummy variable that indexes employment. It takes on the value of 1 if the respondent is employed and 0 if the respondent is not employed. PENSIONER is a dummy variable that indexes being a pensioner. It takes on the value of 1 if the respondent is a pensioner and 0 if the respondent is not a pensioner. STUDENT is a dummy variable that indexes being a student. It takes on the value of 1 if the respondent is a student and 0 if he is not a student. JOBSEK is a dummy variable that indexes unemployment. It takes the value of 1 if the respondent is unemployed and is neither a pensioner nor a student. It takes the value of 0 when the respondent is employed or a pensioner or a student. Being a pensioner, student or job seeker is expected to have positive influence on willingness to commit time to urban forestry development, while the influence of being employed can either be positive or negative.

In order to isolate the possible effects of each level of educational attainment on willingness to commit time to UFD, the empirical model has four educational variables, namely TEREDU, SECEDU, PRIMEDU and NOFEDU. TEREDU is a dummy variable that indexes having tertiary education. It takes the

value of 1 if the respondent has tertiary education and 0 if the respondent does not have tertiary education. SECEDU is a dummy variable that indexes having secondary education. It takes on the value of 1 if the maximum education attainment of the respondents is secondary education and 0 if the maximum education of the respondent is not secondary education. PRIMEDU is a dummy variable that indexes having primary education. It takes on the value of 1 if the maximum education attainment of the respondent is primary education and 0 if the maximum education of the respondent is not primary education. NOFEDU is a dummy variable that indexes illiteracy. It takes on the value of 1 if the respondent is illiterate and 0 if the respondent is educated. With reference to educational variables, it is hypothesized that the higher the education of a respondent the more the respondent will be willing to commit time to UFD, since it is expected that the more educated an individual is, the more the environmental consciousness of the individual and the more the individual should be willing to participate in environmental improvement project. Furthermore, in order to isolate the effect of different age groups on willingness to commit time to UFD, the empirical model has five age groups comprising 18-24 years, 25-34 years, 35-44 years, 45-54 years, and 55 years and above. It is hypothesized that the age groups at the extremes (18-24 years and 55 years and above) will have positive influence on willingness to commit time to UFD, since these age groups consist mainly of students and pensioners who are relatively not in their active working age. On the other hand, the influence of the age range 25-54 years might be negative on willingness to commit time to UFD, since this is the period when people are actively involved in career development and may not have the time to spare for participatory UFD. The variable INCOME measures the influence of respondent's income on willingness to commit time to UFD, while GENDER is a dummy variable that indexes the sex of the respondents. It takes the value of 1 when the respondent is a male and 0 when the respondent is female.

The empirical model also has three location variables namely hican, meclan and loclan. HICLAN is a dummy variable that indexes living in high class neighbourhood. It takes the value of 1 if the respondent is living in high class neighbourhood and 0 if the respondent is not living in high class neighbourhood. MECLAN is a dummy variable that indexes living in medium class neighbourhoods. It takes the value of 1 if the respondent is living in medium class neighbourhood and 0 if the respondent is not living in medium class neighbourhood. LOCLAN is a dummy variable that indexes living in low class neighbourhood. It takes the value of 1 if the respondent is living in low class neighbourhood and 0 if the respondent is not living in low class neighbourhood. The expected signs of the location variables in the model are empirical since they can either be positive or negative.

**RESULTS**

**Descriptive Analysis of Willingness to Commit Time to Urban Forestry Development**

Results in Figure 1 show that 52% of the respondents were not willing to be physically involved in UFD in Lagos metropolis which indicates that only 48% of the respondents were willing to commit their time to UFD in the metropolis. 13.9% of those who were willing to commit time to UFD in the metropolis were willing to commit two hours per week (h/w), 7.3%, 5.7%, 4.5% and 4.1% were willing to commit 1 h/w, 3 h/w, 4 h/w and 5 h/w respectively to UFD in the metropolis. Further results in Table 1 show that on the average, those who were willing to be physically involved in UFD in the metropolis were slightly younger (30 years) than those who were not willing to be physically involved in UFD in the metropolis (31years), but earn higher income (₦37690.29) and have longer years of residency (18.13 years) in the metropolis.

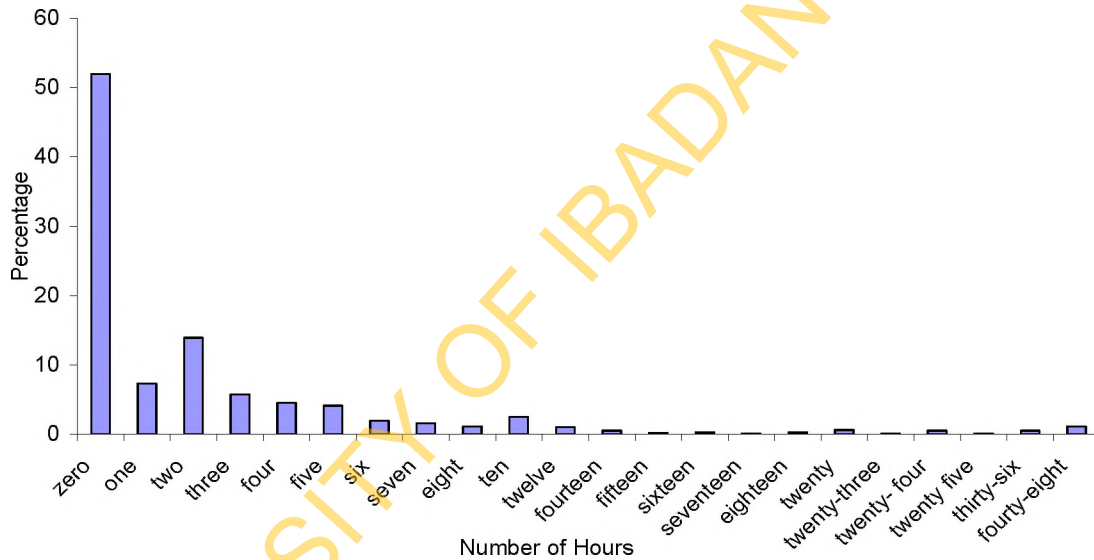


Figure 1: Percentage Distribution of Prospective Number of Hours Per Week Respondents are Willing to Commit to Urban Forestry Development in Lagos Metropolis.

Source: Author's analysis

**Table 1: Descriptive Statistics for Quantitative Variables in the Empirical Tobit Model**

Variables	<u>Prospective Participant</u> (n=420)		<u>Non-prospective Participant</u> (n=453)	
	Mean Standard Deviation		Mean	Standard Deviation
Age (years)	30.20	11.62	30.80	11.39
Income (₦)	37690.29	37292.42	31676.71	26241.82
Length of Residency	18.13	13.32	10.18	13.25

Source: Author's analysis

Results in Table 2 reveal that 84.2% of the respondents expressed their desire to live or work in a green environment, 53.1% of this group of respondents were willing to devote time to UFD while 92.9% of the prospective committers of time to UFD in the metropolis would love to live or work in green environment. Most of the respondents (91.2%) claimed to be aware of the benefits of trees in working and living environment, 50.8% of that group expressed their willingness to be physically involved in UFD, while 96.2% of prospective committers of time to UFD were aware of benefits of trees in the urban environment. The results in Table 2 further reveal that only 5.2% of the respondents belonged to one social organization or the other, although 71.1% of this group of respondents were willing to commit their time to UFD in the metropolis that only accounts for 7.6% of those willing to commit time to the UFD programme. Results in the Table also show that although respondents who own their residences in the metropolis accounts for 55.3%, only 47.6% of them were willing to give their time to UFD in the metropolis and this constitutes 54.8% of prospective committers of time to UFD in the metropolis. Respondents who had previously participated in a community development project constitute only 15.6% although 65.4% of this group were willing to commit their time to UFD and this accounts for 21.2% of the prospective committers of time to UFD.

Results in Table 3 reveal that 54.5% and 45.5% of the respondents were males and females respectively. However, only 54% and 41.1% of the respective males and females expressed their willingness to commit time to UFD in Lagos metropolis. Furthermore, more males (61.2%) relative to females (38.8%) were willing to commit time resource to UFD in the metropolis. Further results from the Table show that respondents between the age of 18 and 24 years constitute 24.4%



of the respondents and 50.7% of this age group were willing to commit time to the UFD which accounts for just 25.7% of the prospective committers of time to the UFD.

**Table 2: Descriptive Statistics for Contingent Variables**

Variable s	Prospective Participant		Non Prospective Participant		Total by Category		% of Respondents' WTC in relation to Variables
	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	
<b>Love to live or work in Green Environment</b>							
Yes	390	92.9	345	72.2	735	84.2	53.1
No	30	7.1	108	23.8	138	15.8	
Total	420	100	453	100	873	100	
<b>Awareness of Benefits of Trees in Working and living Environment</b>							
Yes	404	96.2	392	86.5	796	91.2	50.8
No	16	3.8	61	13.5	77	8.8	
Total	420	100	453	100	873	100	
<b>Membership of Social Organization</b>							
Yes	32	7.6	13	2.9	45	5.2	71.1
No	388	92.4	440	97.1	828	94.8	
Total	420	100	453	100	873	100	
<b>Ownership of Residence</b>							
Yes	230	54.8	253	55.8	483	55.3	47.6
No	190	45.2	200	44.2	390	44.7	
Total	420	100	453	100	873	100	
<b>Previous Participation in a Community Development Project</b>							
Yes	89	21.2	47	10.4	136	15.6	65.4
No	331	78.8	406	89.6	737	84.4	
Total	420	100	453	100	873	100	

Source: Author's Analysis

The age group 25 -34 constitute 39.5% of the respondents and 49.6% of this age group were willing to commit time to UFD which accounts for 40.7% of the prospective committers of time to the UFD. Also, respondents between ages 35 and 44 years constitute 20.3% and 41.2% of this group were willing to commit time to the UFD which accounts for 17.4% of the prospective committers of time to the UFD. Likewise, respondents between ages 45 and 54 constitute 8.5% and 45.9% of this age group were willing to commit time to the UFD although this accounts for just 8.1% of the prospective committers of time to the UFD.

Although respondents above 54 years of age constitute only 2.9%, yet 49.6% of this group were willing to commit time to the UFD which accounts for 3.3% of the prospective committers of time to the UFD. The results in Table 3 also show that 77% of the respondents had tertiary education and 50.1% of these tertiary education holders were willing to commit time to the UFD which accounts for 80.2% of the prospective committers of time to UFD.

Similarly, 13.1% had secondary education and 52.6% of these holders of secondary school education were willing to commit time to UFD which constitutes 54% of the prospective committers of time to UFD. Furthermore, only 3.9% of the respondents had primary education, 11.8% of this group of respondents were willing to commit time to UFD which constitutes negligible 1% of the prospective committers of time to the UFD. Respondents who had no formal education constitute 6.5% and 40.4% of this group were willing to commit time to the UFD and this accounts for 5.5% of the prospective committers of time to the UFD.

Table 4 presents the results for the descriptive statistics for utility variables which express the relationship of respondents' previous use of selected urban forest type and willingness to commit time to UFD. From the Table it can be observed that only 18.1% of the respondents had made use of nature parks in the metropolis. However, 55.7% of these respondents were willing to devote their time to UFD in the metropolis and this also accounts for 21% of those willing to commit time to UFD in the metropolis. In addition, only 22.5% of the respondents had made previous use of botanical garden. Nevertheless, 50% of this group of respondents were willing to commit time to UFD in the metropolis and this also accounts for 23.3% of those willing to commit time to UFD in the metropolis. Respondents who had made previous use of zoological garden constitute only 23.5% while 42.4% of the respondents in this group were willing to commit time to UFD in the metropolis. This accounts for just 20.7% of those who were willing to devote some time to UFD in the metropolis. Also 30.2% of the surveyed metropolitan residents claimed to have made previous use of street trees. Fifty six percent of this group of respondents were willing to commit time to the UFD and this constitutes 35.2% of those willing to commit time to UFD in the metropolis. Furthermore, 12.8% of the surveyed urbanites had used one form of urban forest or the other for solitudinous activities. However, 47.3% of this group expressed willingness to commit time to UFD in the metropolis and this constitutes 12.6% of those willing to commit time to UFD in the metropolis.

**Table 3: Descriptive Statistics for Demographic Variables**

Variables	Prospective Participant		Non Prospective Participant		Total by Category		% of Respondents' WTC
	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	
<b>Gender</b>							
Male	257	61.2	219	48.3	476	54.5	54
Female	163	38.8	234	51.7	397	45.5	41.1
Total	420	100	453	100	873	100	
<b>Age Class 18-24</b>							
Yes	108	25.7	105	23.2	213	24.4	50.7
No	312	74.3	348	76.8	660	75.6	
Total	420	100	453	100	873	100	
<b>Age Class 25-34</b>							
Yes	171	40.7	174	38.4	345	39.5	49.6
No	249	59.3	279	61.6	528	60.5	
Total	420	100	453	100	873	100	
<b>Age Class 35-44</b>							
Yes	73	17.4	104	23	177	20.3	41.2
No	347	82.6	349	77	696	79.7	
Total	420	100	453	100	873	100	
<b>Age Class 45-54</b>							
Yes	34	8.1	40	8.8	74	8.5	45.9
No	386	91.9	413	91.6	799	91.5	
Total	420	100	453	100	873	100	
<b>Age Class 55 and above</b>							
Yes	14	3.3	11	2.4	25	2.9	56
No	406	96.7	442	97.6	848	97.1	
Total	420	100	453	100	873	100	
<b>Have Tertiary Education</b>							
Yes	337	80.2	335	74	672	77.0	50.1
No	83	19.8	118	26	201	23.0	
Total	420	100	453	100	873	100	
<b>Have Secondary Education</b>							
Yes	60	14.3	54	11.9	114	13.1	52.6
No	360	85.7	399	88.1	759	86.9	
Total	420	100	453	100	873	100	
<b>Have Primary Education</b>							
Yes	04	1	30	6.6	34	3.9	11.8
No	416	99	423	93.4	839	96.1	
Total	420	100	453	100	873	100	
<b>No Formal Education</b>							
Yes	23	5.5	34	7.5	57	6.5	40.4
No	397	94.5	419	92.5	816	93.5	
Total	420	100	453	100	873	100	

Source: Author's Analysis

Also 12.8% of the surveyed urbanites had previously collected medicinal plants from an urban forest. However, 51.8% of these urbanites were willing to commit time to UFD in the metropolis which accounts for 13.8% of those willing to commit time to UFD in the metropolis. From Table 4 it can be observed that only 13.4% of the sampled Lagos metropolitan residents had made previous use of an urban forest in the metropolis for picnicking. Fifty two percent of these residents were willing to commit time to UFD in the metropolis and this accounts for just 14.5% of those willing to commit time to UFD in the metropolis.

**Table 4: Descriptive Statistics for Utility Variables**

Variables	Prospective Participant		Non Prospective Participant		Total by Category		% of Respondents' WTC in relation to Variables
	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	
<b>Previous use of Nature Park</b>							
Yes	88	21	70	15.5	158	18.1	55.7
No	332	79	383	84.5	715	81.9	
Total	420	100	453	100	873	100	
<b>Previous use of Botanical Garden</b>							
Yes	98	23.3	98	21.6	196	22.5	50
No	322	76.7	355	78.4	677	77.5	
Total	420	100	453	100	873	100	
<b>Previous use of Zoological Garden</b>							
Yes	87	20.7	118	26	205	23.5	42.4
No	333	79.3	335	74	668	76.5	
Total	420	100	453	100	873	100	
<b>Previous use of Street Trees</b>							
Yes	148	35.2	116	25.6	264	30.2	56.1
No	272	64.8	337	74.4	609	69.8	
Total	420	100	453	100	873	100	
<b>Solitude as a benefit earlier obtained from an Urban Forest</b>							
Yes	53	12.6	59	13	112	12.8	47.3
No	367	87.4	394	87	761	87.2	
Total	420	100	453	100	873	100	
<b>Collection of Medicinal Plant as a benefit earlier obtained from an Urban Forest</b>							
Yes	58	13.8	54	11.9	112	12.8	51.8
No	362	86.2	399	88.1	761	87.2	
Total	420	100	453	100	873	100	
<b>Picnicking as a benefit obtained from an Urban Forest</b>							
Yes	61	14.5	56	12.4	117	13.4	52.1
No	359	85.5	397	87.6	756	86.6	
Total	420	100	453	100	873	100	

Source: Author's Analysis

Another major group of variables considered in the study are the occupational variables which include being employed, pensioner, student and job seeker. Therefore, results in Table 5 reveal that 64.8% of the respondents were employed, out of which 43.5% were willing to commit time to UFD in the metropolis. These employed respondents who were willing to commit time to UFD in the metropolis constitute 58.6% of the prospective committers of time to UFD. Furthermore, only 5.7% of the respondents were pensioners and most of these sampled pensioners (60%) were willing to commit time to the UFD, even though this constitutes only 7.1% of the prospective committers of time to the UFD.

**Table 5: Descriptive Statistics for Occupational Variables**

Variable s	Prospective Participant		Non Prospective Participant		Total by Category		% of Respondents' WTC in relation to Variable s
	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	
<b>Employed</b>							
Yes	246	58.6	320	70.6	566	64.8	43.5
No	174	41.4	133	29.4	307	35.2	
Total	420	100	453	100	873	100	
<b>Pensioner</b>							
Yes	30	7.1	20	4.4	50	5.7	60
No	390	92.9	433	95.6	823	94.3	
Total	420	100	453	100	873	100	
<b>Student</b>							
Yes	113	26.9	97	21.4	210	24.1	53.8
No	307	73.1	356	78.6	663	75.9	
Total	420	100	453	100	873	100	
<b>Job Seeker</b>							
Yes	47	11.2	48	10.6	95	10.9	49.5
No	373	88.8	405	89.4	778	89.1	
Total	420	100	453	100	873	100	

Source: Author's Analysis

Moreover, 24.1% of the respondents were students and 53.8% of these students were willing to commit time to UFD and this constitutes 26.9% of the prospective committers of time to the UFD. The last of the occupational variables is being a job seeker which constitutes 24.1%. Fifty percent of these job seekers were willing

to commit time to the UFD and this constitutes just 11.2% of the prospective committers of time to UFD.

**Table 6: Descriptive Statistics for Locational Variables**

Variable s	Prospective Participant		Non Prospective Participant		Total by Category		% of Respondents' WTC in relation to Variable s
	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	Number of Respondents	% of Respondents	
<b>Living in High Class Neighbourhood</b>							
Yes	93	22.1	201	44.4	294	33.7	31.6
No	327	77.9	252	55.6	579	66.3	
Total	420	100	453	100	873	100	
<b>Living in Medium Class Neighbourhood</b>							
Yes	154	36.4	119	26.3	273	31.3	56.4
No	266	63.3	334	73.7	600	68.7	
Total	420	100	453	100	873	100	
<b>Living in Low Class Neighbourhood</b>							
Yes	169	40.2	130	28.7	299	34.2	56.5
No	251	59.8	323	71.3	574	65.7	
Total	420	100	453	100	873	100	

Source: Author's Analysis

The last group of variables considered in the study is the locational variables vis a vis the relationship between respondents' willingness to commit time to UFD and respondents' residency environment in terms of property values and concentration of an income group such low, medium and high income earners in a neighbourhood. In this regard, results in Table 6 reveal that 33.7% of the respondents were living in high income neighbourhood and 31.6% of these respondents were willing to commit time to UFD and this accounts for 22.1% of the prospective committers of time to UFD. Similarly, respondents living in medium income neighbourhood constitutes 31.3% and 56.4% of this group were willing to commit time to UFD and this constitutes 36.4% of the prospective committers of time to UFD. Lastly from the results in Table 6, it can be observed that 34.2% of the respondents were living in low income neighbourhood, and 56.5% of this group were willing to commit time to UFD and this constitutes 40.2% of the prospective committers of time to UFD in the metropolis.

### **Tobit Analysis of Willingness to Commit Time to Urban Forestry Development**

The MLE coefficients of the Tobit model (at  $p < 0.1$ ) used to investigate factors affecting the probability of committing time, in other words be physically involved in one aspect of urban forestry development or the other in Lagos metropolis and the prospective number of hours to be committed per week are shown in Table 7.

Twenty seven apart from the constant were incorporated into the Tobit model out of the 31 regressors presented in the empirical model. The remaining four variables were used as control variables. Therefore, the variable JOBSEK was used as control variable for occupational variables; NOFEDU was used as control variable for educational variables, LOCLAN was used as control variable for locational variables and lastly age group 55 and above was used as control variable for age groups. This is in line with Gujarati (1985) and Ajewole (2011).

From Table 7, it can be observed that 12 of the 32 regressors (constant inclusive) had significant influence on WCT (the probability to commit time and the number of hours to commit per week to urban forestry development in Lagos metropolis). Since Tobit coefficients do not directly give the marginal effects of the associated independent variables on the dependent variable but rather their signs show the direction of change (Nkoya et al 1997), the regression coefficients have to be decomposed according to McDonald and Moffit (1980) to probability of committing time to UFD in Lagos metropolis and the prospective number of hours per week to commit. Consequently, the intercept value of -0.14 which is the autonomous total change in WCT as can be observed from Table 7 is significant and has negative sign. This is decomposed to 0.03, the autonomous probability of committing time or in other words being physically involved in UFD in Lagos metropolis, and 1.63 the autonomous prospective number of hours per week to be committed to UFD in the metropolis. The variable “love green environment” significantly and positively influence WCT. The coefficient of the intercept dummy of the respondents who love to live or work in green environment and are willing to commit time to UFD in the metropolis is 0.57.

This means that relative to those who are not keen on living or working in green environment; the prospective number of hours per week to commit to UFD in the metropolis is expected to increase by 0.57 for those who love living or working in green environment than that of those who are not keen on working or living in green environment. Similarly, the coefficient of the intercept dummy for those who love living or working in green environment but are not willing to commit time to UFD is 0.01. This also implies that relative to those who are not keen on living or working in green environment; the level of autonomous probability (0.03) of committing time to UFD in Lagos metropolis will increase by 0.01 for those who love living or working in green environment. Summarily put the probability of a person who love living or working in green environment to commit time to UFD in Lagos metropolis is 0.04 (4%), while that of a person who is not keen on living or

working in green environment is 0.03 (3%). Also the individual who love living or working in a green environment is expected to commit 0.57 hour per week (h/w) to UFD in Lagos metropolis above that of the person who is not keen on living or working in green environment.

Following the same procedure for the interpretation of decomposed coefficients for all the other significant dummy variables in the model, the following results will be achieved. Awareness of environmental benefits of trees (AWENBENT) has significant and positive influence on WCT. The probability of a person who is aware of environmental benefits of trees to commit time to UFD in Lagos metropolis is 0.04 (4%) as compared to 0.03 (3%) for those who are not aware of environmental benefits of trees. Such an individual is expected to commit 0.37 h/w to UFD in the metropolis above that of the person who is not aware of environmental benefits of trees. Similarly, having previously participated in a community development project (PREPACOP) has significant and positive influence on WCT. The probability of an individual who had participated in a community development project to commit time to UFD in Lagos metropolis is 0.04 (4%) as compared to 0.03 (3%) for those who had not participated previously in any community development project. Furthermore, such an individual is expected to commit 0.26 h/w to UFD in the metropolis above that of the person who had not previously participated in community development project.

Previous use of street trees (STRTREES) also has significant and positive influence on WCT. The probability of an individual who had made use of street trees to commit time to UFD in Lagos metropolis is 0.034 (3.4%) compared to 0.03 (3%) for those who claimed not to had made use of street trees previously. Such individual is also expected to commit 0.19 h/w to UFD in the metropolis above that of the person who had not previously made use of street trees in the metropolis. Furthermore, being a pensioner (PENSIONER) also has significant and positive influence on WCT, thus the probability of a pensioner to commit time to UFD in Lagos metropolis is 0.04 (4%) compared to 0.03 (3%) for job seekers. In addition, such a pensioner is expected to commit 0.33 h/w to UFD in the metropolis above that of job seeker. Likewise, being a student also has a significant and positive influence on WCT, hence the probability of a student to commit time to UFD is 0.04 (4%) compared to 0.03 (3%) for job seekers. Moreover, such a student is expected to commit 0.28 h/w to UFD in the metropolis above that of job seekers.

In the case of the educational variables, having secondary education has a significant and positive influence on the WCT. Therefore, the probability of a respondent who had a maximum of secondary education to commit time to UFD in the metropolis is 0.04 (4%) compared to 0.03 (3%) for those who did not have any formal education. Such individual who had a maximum of secondary education is expected to commit 0.42 h/w UFD in the metropolis above those who did not have formal education. Similarly, having primary education has a significant but negative influence on WCT. Hence, the probability of a respondent who had a maximum of primary education to commit time to UFD in the metropolis is 0.01 (1%) compared



to 0.03 (3%) for those who did not have any formal education. Such individual who had a maximum of primary education is expected to commit 0.86 h/w to UFD in the metropolis less those who did not have formal education.

Table 7: Tobit Model Estimates for Evaluation of Public Willingness to Finance Urban Forestry Development

Variable	Coefficient s	Standard Error	Mean	P[ Z >z ]	Total change in willingness to commit time $\delta E\gamma / \delta \alpha_i$	Change in the probability of committing time $\delta F(z) / \delta \alpha_i$	Change in the contributory number of hours/week $\delta E\gamma^* / \delta \alpha_i$
Constant	-17.49***	2.29	-	0.0000	-0.14	-0.03	-1.63
LOVGRENT	6.10***	1.59	-0.3021	0.0001	0.05	0.01	0.57
AWENBENT	3.96*	2.09	-0.2323	0.0579	0.03	0.01	0.37
PREPACOP	2.83**	1.22	-0.9874	0.0208	0.02	0.01	0.26
MEMSORG	2.13	1.95	-1.0915	0.2752	0.02	0.004	0.20
NATUPARK	0.80	1.24	-0.9622	0.5182	0.01	0.002	0.07
BOTGARD	0.69	1.13	-0.9188	0.5439	0.01	0.001	0.06
ZOOGARD	-0.005	0.84	-3.1968	0.5791	-0.00004	-0.00001	-0.0005
SOLITUDE	-0.34	1.43	-1.0149	0.8115	-0.003	-0.001	-0.03
PICNIC	-0.27	1.37	-1.0092	0.8422	-0.002	-0.001	-0.03
MEDPLANT	-0.49	1.40	-1.0149	0.7278	-0.004	-0.001	-0.05
STRTREES	2.07**	0.99	-0.8410	0.0367	0.02	0.004	0.19
OWNSRED	1.03	0.97	-0.5904	0.2857	0.008	0.002	0.10
EMPLOYED	0.002	1.18	-0.4954	0.9987	0.00002	0.000004	0.0002
PENSIONER	3.57*	1.87	-1.0858	0.0563	0.03	0.01	0.33
STUDENT	3.04**	1.31	-0.9027	0.0202	0.03	0.01	0.28
TEREDU	0.33	1.72	-0.3741	0.8468	0.003	0.0006	0.03
SECEDU	4.49**	1.91	-1.0126	0.0186	0.04	0.01	0.42
PRIMEDU	-9.21***	3.27	-1.1041	0.0048	-0.08	-0.02	-0.86
DURESD	0.15***	0.04	13.2816	0.0000	0.001	0.0003	0.01
GENDER	-0.000004	0.008	-2.8844	0.9996	-3.3E-8	-7.8E-9	-3.7E-6
INCOME	-0.00001	0.00002	22572.2 2	0.4009	-1.1E-6	-2.5E-8	-1.2E-5
HICLAN	-1.60**	0.62	-8.8077	0.0101	-0.01	-0.003	-0.15
MECLAN	1.60**	0.62	-8.8318	0.0102	0.01	0.003	0.15
AGE 1	0.58	1.56	-0.9993	0.7077	0.005	0.001	0.06
AGE 2	0.92	1.26	-1.8913	0.4646	0.01	0.002	0.09
AGE 3	-0.72	1.37	-2.0835	0.6001	-0.01	-0.001	-0.07
AGE 4	-0.58	1.89	-1.0583	0.7568	-0.005	-0.001	-0.05
<i>Sigma</i>	11.50	0.42		0.0000			

Source: Author's Analysis

Besides the educational variables, the length of time the respondents have spent in Lagos metropolis (DURESD) also has significant and positive influence on WCT. Thus, the probability of committing time to UFD will increase by 0.0003 (0.03%) with a unit increase in the year of residence in the metropolis. Furthermore, every unit increase in the number of years of residence in the metropolis will lead to an increase of 0.01 h/w committed to UFD in the metropolis.

Living in high income neighbourhood has significant but negative influence on WCT. Hence, the probability of a respondent living in a high income neighbourhood committing time to WCT is 0.027 (2.7%) compared to 0.03 (3%) for those who are living in low income neighbourhood. Furthermore, such individual who lives in high income neighbourhood is expected to commit 0.15 h/w to UFD in the metropolis less those who live in low income neighbourhood. Finally living in medium income neighbourhood has significant and positive influence on WCT. Therefore, the probability of a respondent who live in medium income neighbourhood to commit time to UFD in the metropolis is 0.033 (3.3%) compared to 0.03 (3%) for those who live in low income neighbourhood.

## **DISCUSSION**

The results of this study showed that only 48% of the respondents were willing to be physically involved in urban forestry development in Lagos metropolis. These results compare well with the findings of Ajewole (2011) where 84% of the respondents were willing to commit money to UFD in the metropolis. This indicates that many people would be willing to give money rather than time to UFD in the metropolis. Be that as it may, the modal two hours per week (h/w) respondents were willing to commit to the UFD, indicates in a way the great importance many of the metropolitans attach to green environment to the extent of willing to give two hours a week of their time to promote and ensure sustainable greening of the metropolis. This is quite instructive and encouraging particularly if cognisance is taken of the 35.5% of the respondents who were willing to put between 1 and 5 h/w to UFD in the metropolis. This interest and commitment to sustainable greening of the metropolis can be further understood and appreciated since 84.2% and 91.2% of the respondents respectively desired to live or work in a green environment and were aware of benefits of trees in urban environment.

The fact that only 50.8% of those who claimed to be aware of benefits of trees in the metropolis were willing to be physically involved in the UFD suggests that the effect of the awareness is not strong enough on the respondents' willingness to commit time to UFD. This may be because there is no formal awareness programme on ground to effectively educate and enlighten the public on the benefits of trees in the metropolis. Furthermore, since 71.1% of those who belonged to social organizations and 65.4% of those who had previously participated in a community development project were willing to commit time to UFD, it suggest that belonging to social organizations and previous participation

in community development project might have great bearing on the metropolitan residents' willingness to be physically involved in UFD in the metropolis.

Moreover, the findings that only 38.8% of the female respondents compared to 61.2% of male respondents who were willing to commit time to UFD in the metropolis may be a reflection of the usual perception that forestry related activities are generally meant for men, most especially the physically exerting ones. It is interesting that out of all the five age groups, 56% of the age group of 55 years and above (who are mostly senior citizens retirees) were willing to be physically involved in urban greening of Lagos metropolis. This is quite consistent with the a-priori expectation since most members of this group are less busy and have a relatively more time to do some extracurricular activities such as being involved in UFD in the metropolis. Being physically involved in UFD by this age group may actually be socially beneficial by providing opportunities for social interaction and support having been actively disengaged from work environment; and as well therapeutic by providing opportunity for moderate outdoor exercise. The next noteworthy results are those of the age group 18-24 years of age in which 50.7% were willing to commit time to UFD in the metropolis. This relatively high interest in being physically involved in UFD within this group may be attributed to the fact that the age class group comprises young people who are either in or just coming out of tertiary institutions of learning with a lot of energy and zeal. This group of young people may be looking for outlets for the dissipation of their bountiful energy. Being physically involved in UFD by these young people can also be socially beneficial by providing opportunities for them to expend their energy constructively and profitably on urban greening instead of expending such energy on social vices. These young people can also pick one or two skills or interest in some activities in the UFD and turn these round for economic empowerment. Results for utility variables clearly show the importance of the urban forest from the utilization point of view. Thus street trees and nature parks appear top most in order of utilization importance with 56% of those who claimed to have enjoyed the services of street trees and 55.7% of those who claimed to have previously used nature park willing to be physically involved in UFD.

The results can be explained by the fact that street trees constitute the most visible part of the urban forest and the one that probably has the greatest and most intimate impact offering diverse services to urbanites. Likewise for the park which play invaluable role in outside recreation for urbanites. This role is indeed very important in congested urban areas where open green spaces for recreation are not common. The trend of the results for occupational variables is in consonance with the results for the age group earlier discussed. Therefore, 60% of the pensioners (most of who will be above 54 years of age) and 53.8% of the students were willing to commit time to UFD in the metropolis unlike the 43.5% of the employed willing to commit time to UFD. This trend is expected since the daily hustling and bustling of average employed Lagos metropolitan residents would

have weakened them with fatigue to the extent that their minds would be preoccupied with the thought of using their free time to rest rather than taking up a voluntary public service of being physically involved in UFD which may not attract any economic returns. Similarly, the results for locational variables where 56.5%, 56.4% and 31.6% of those living in low income, medium and high income neighbourhoods respectively were willing to commit time to UFD in the metropolis are in line with a priori expectation since people living in highbrow areas are people with high socioeconomic and income profiles and are very busy and as such may not have the time to spare to be physically involved in UFD in the metropolis.

The results of the Tobit analysis corroborate those of the foregoing descriptive statistics. Since LOVEGRENT AWENBENT are positive and significant and most of the respondents (84.2%) would love to live or work in a green environment, it suggests that Lagos metropolitan residents will most likely be well disposed to solicitation for participatory urban forestry development in the metropolis. This must be of course be anchored on good enlightenment programme on the benefits of trees and forests within and around urban areas.

## **CONCLUSION**

The findings of this study have revealed that many of the residents of Lagos metropolis love to live and work in a green environment and are willing to be physically involved in UFD by committing some hours per week to such programme. To harness this great pool of volunteers, promoters and protagonists of urban greening in Lagos metropolis will have to put in place an appropriate formal public education programme to enlighten the metropolitan residents on the benefits of trees in their living and working environment. Furthermore, social organizations, community based organizations, nongovernmental organizations etc. can be brought together under a platform and used to educate and elicit the support of the public in sustainable greening of the metropolis. In addition, special attention has to be given to gender roles by making explicit the different aspects of possible physical involvement and particular areas where females can effectively participate. Moreover, existing structure of community involvement in development projects has to be studied, improved if needs be and used to elicit support for participatory urban forestry development in the metropolis.

## **REFERENCES**

- Ajewole Opeyemi (2002): Prospect for Participatory Urban Forestry Development in Ibadan Metropolis. *Journal of Tropical Forest Resources: Vol. 18 (1): 86- 100*
- Ajewole Opeyemi Isaac (2011): Determinants of Public Willingness to Fund Urban Tree Planting In Lagos Metropolis, Nigeria. In R.A. Adeyemo (ed.) *Urban Agriculture, Cities and Climate Change*. Cuvillier Verlag Göttingen,

Internaler wissenschaftlicher Fachverlag, Nonnenstieg 8, 37075 Göttingen.  
[www.cuvillier.de](http://www.cuvillier.de).

- Aluko, O.E (1996): Location and Neighbourhood Effects on Urban Housing Values. Case Study of Metropolitan Lagos. pp. 47-63. Unpublished Ph.D Thesis. *University of Ibadan, Ibadan, Nigeria*.
- Carter, E.J. (1994): the Potential of Urban Forestry in Developing Countries: A Concept Paper. *FAO Forestry Department Rome 90pp*.
- Gujarati, D.N (1985): “*Basic Econometrics*” McGraw-Hill Book Company Inc, 2<sup>nd</sup> Edition pp 431-504
- Hanemann, W.M. (1994): “Valuing the Environment through Contingent Valuation”. *The Journal of Economic Perspectives*, 8(4), 19-43
- Hoehn, J.P. (1992): “Contingent Valuation in Fisheries Management; the Design of Satisfactory Contingent Valuation Format”. In Markandaya, A and Richardson, J. (eds.). *The Earthscan Reader in Environmental Economics*. pp 101-111 (London Earthscan Publications Ltd.)
- McDonald, J.F. and R. A. Moffit (1980): “The Uses of Tobit Analysis”. *The Review of Economics and Statistic*. Vol. LXII, 2, pp 318-321
- Nkoya, E., Schroeder, T., and Norman, D. (1997): Factors Affecting Adoption of Improved Maize Seed and Fertilizer in Northern Tanzania. *Journal of Agricultural Economics*, 48 (1) 1-12
- Tobin, J. (1958): “Estimation of Relationships for Limited Dependent Variables” *Econometrica*; 26, 24-36

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