

Urban Tree Planting: Implication on Sustainable Forest Management in Idi-Shin, Oyo State

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Abstract— The role of urban tree planting cannot be overemphasized as it design features in an urban area. However, the act of sustaining the continuous urban tree planting within and around the urban residents has become a challenge. Therefore, this study aim at investigating urban tree planting and it implication on sustainable forest management in Idin-shin area. Idi-shin was purposively selected for this study. A total of 2,963 people resides in the area and this was computed by projecting the population from the 1991 census result obtained from the National Population Commission of Oyo state. Furthermore, 2.5% sampling intensity was used to select 74 respondents for the study. Primary data were collected with the aid of structured questionnaire. Data was analyzed using descriptive statistics and the logistic regression analysis. Results showed that majority of the respondents were between 32-50 years with 32.4%, female (56.8%), married (50.0%), had tertiary education (54.1%) and most of them were civil servants (32.5%). It was also revealed that most (90.5%) of the respondents have idea on urban tree planting; this they (28.4%) got from watching television although these information comes on occasional basis (64.9%). Majority (56.8%) of the respondents have planted trees before and 81.9% of them confirmed that tree planting is not difficult, as such 72.7% agreed to engage in tree planting in their residence. Mango tree was the most common tree species planted in the residence of Idi-shin. Tree planted prevent wind (TPPW) and urban tree serve as shade (UTSS) was the most significant benefits of urban tree planting with odds-ratio of 3.18 and 2.13 respectively. Therefore, proper urban planning and community involvement in urban tree planting are important for sustainable forest management to be realized.

Keywords— Urban tree planting, Sustainable forest management, Residents, Attitude, Perception.

I. INTRODUCTION

According to McPherson (2006), urban forestry is the care and management of single tree and tree populations in the urban settings for the purpose of improving the urban environment. Urban forestry plays an important role in the ecology of human habitats in many ways. These includes: filtering of air and water, provision of shelter to animals and recreational areas for people. They are critical in cooling the urban heat effect (Kellent and Wilson, 1993). Furthermore, the benefits of urban tree planting includes beautification, reduction of storm water runoff, reduction of air pollution, reduction of energy cost through increased shade over buildings, improve wildlife habitat and mitigation of urban environmental impact (Wilson, 2011). In addition, the presence of tree reduces stress and contribute to the healthy lifestyle of urban dwellers (Maller *et al.*, 2008). The shade of tree and other urban green spaces make place for people to meet, socialize and play.

Urban tree planting, been one of the key factor in urban forestry that enhance urban ecological balance cannot be over emphasized (Hastre *et al.*, 2006). It is however, worthy of note that some residents in the urban area due to ignorance find it very easy to remove green areas and tree stands in and around the residents for various purposes which include constructions of roads, building of estates, offices, schools etc. without replacement. This consequently leads to environmental problems such as erosion, greenhouse effect, global warming, pollution, drought, loss of biodiversity etc. Therefore, this study aim at investigating urban tree planting and its implication on sustainable forest management with a view to encouraging participation in urban tree planting in the study area.

II. METHODOLOGY

Study area

Idi-shin is an area in Southwestern Nigeria. Idi-shin lies on latitude $7^{\circ} 40'87''N$ and longitude $3^{\circ} 8'56'' E$, at an

altitude of 336m and with the rainfall pattern ranging from 1,300mm – 1,500mm. The average temperature is about 37.2^o and average range is about 75 – 100 % (McPherson, 2006).

Sampling procedure

Idi-shin was purposively selected for this study. A document indicating the population of the area for 1991 was obtained from the National Population Commission (N.P.C.) of Oyo state and from this document a projection of 2018 population size for the area was computed using the formula:

$$P_n = P_o e^{rt} \dots\dots\dots (1)$$

Where: P_n = Final population, P_o = Initial population, e = exponential. r = growth rate (3.2%), t = time internal (x – 1996) years, t = 21 years

Therefore, the total population for 2018 was 2,963 people. Furthermore, 2.5% sampling intensity as adopted by Diaw *et al* (2002) was then used to select respondents for this study. This indicated that where the population is less than 500, 10% sampling intensity was adopted, population above 500 but less than 1000, 5% sampling intensity was adopted while population above 1000, 2.5% sampling intensity was used. A total of 74 respondents were randomly selected for this study.

Method of data collection

Both primary and secondary data was used for this study. Primary data was collected with the aid of structured

questionnaire while the secondary data was obtained from the N.P.C. census document. The questionnaire was designed to obtain information on the level of awareness of residents on urban tree planting, participation of residents on urban tree species, common tree species and the benefits of urban tree planting to residents of the area.

Data analysis

Data was analyzed using descriptive statistics and the logistic regression analysis. The logistic regression is expressed below;

$$Y = \exp (b_0 + b_1x_1 + b_2x_2 + \dots\dots\dots b_7x_7) / 1 + \exp (b_0 + b_1x_1 + \dots\dots\dots b_7x_7) \dots\dots\dots (2)$$

Where:

Y= Benefit of urban tree planting (BUTP) (dependent variable)

Independent variables are:

- x1=Urban tree prevent erosion(U.T.P.E)
- x2= Urban tree beautify the environment (U.T.B.E)
- x3= Urban tree serves as income (U.T.S.I)
- x4= Urban tree serves as shade (U.T.S.S)
- x5= Urban tree serves in purify the air (U.T.S.P.A)
- x6= Urban tree provide medicinal value (U.T.S.M.V)
- x7=Urban trees prevents wind from destroying things in the environment (U.T.P.W)

III. RESULTS AND DISCUSSION

Demographic information of respondents in the study area

Table 1: Demographic characteristics of respondents

Demographic characteristics	Frequency	Percentage
Age		
10- 20	12	16.2
21-30	21	28.4
31-50	24	32.4
51-65	12	16.2
65 and above	5	6.8
Total	74	100
Gender		
Male	32	46.2
Female	42	56.8
Total	74	100
Marital status		
Single	27	36.5
Married	37	50.0
Widowed	5	6.8
Divorced	5	6.8
Total	74	100
Educational status		
No formal education	5	6.8

Primary	5	6.8
Secondary	10	13.5
Tertiary	40	54.1
Others	14	18.9
Total	74	100
Occupation		
Civil servant	34	32.5
Artisan	29	24.4
Farmers	11	17.8
Others	26	25.3
Total	74	100

Source: Field survey, 2019

Table 1 showed the demographic information of the respondents in the study area. The age distribution revealed that majority (32.4%) of the respondents were between the ages of 31- 50 years while the least percentage (6.8%) of the respondents were between the ages of 65 and above. This is an indication that younger folks prefers to reside in the urban environment than the rural areas and this can be attributed to the fact that the urban area are better equipped with infrastructural facilities which contribute to good standard of living. The result on gender revealed that 56.8% of the respondents were female while 43.2% of the respondents were male, this might be due to the fact that the males are always busy sourcing for alternative means of sustaining their homes and as a result are not always at home while the females (though might be working) are mostly home makers and as such carry out most of the plantings activities in the residence they reside in.

The findings also showed that 50.0% of the respondents were married while 6.8% of the respondents were divorced and widowed respectively. This is also an indication that most planting in the urban area are carried out by the married for one purpose or the other in their places of residence. It was also observed that 54.1% of the respondents had tertiary education while 6.8% of the respondent had no formal education and primary education respectively. This is a clear indication that majority of respondents living in the study area are elites. Furthermore, the study also showed that 32.5% of the respondents were civil servants while 17.8% of the respondents were farmers. This implied that most respondents are engaged in white collar jobs and other businesses to sustain themselves and as a result may pay less attention to the planting of trees.

Level of awareness of residents on urban tree planting in the study area.

Table 2: The level of awareness of residents on urban tree planting in the study area

Level of awareness	Frequency	Percentage
Do you have idea on tree planting?		
Yes	67	90.5
No	7	9.5
Total	74	100
If yes, how did you get this information?		
Mass media	18	24.3
Forest extension	10	13.3
Internet	4	14.9
Discussion	10	13.3
Television	21	28.4
Chat	11	6.8
Total	74	100
How often do you get the information?		
Frequently	26	35.1
Occasionally	48	64.9
Total	74	100

Do you have any idea on importance on tree planting?		
Yes	65	87.8
No	9	12.2
Total	74	100
Is tree planting necessary in your environment?		
Yes	67	90.5
No	6	9.5
Total	74	100
Do you have interest in tree planting?		
Yes	60	79.1
No	14	20.9
Total	74	100

Source: Field survey, 2019.

Table 2 showed the level of awareness of respondents to tree planting. It was revealed that 90.5% of the respondents were aware of tree planting while 9.5% of the respondents were not aware of tree planting. This implied that most of the respondents in the study area in one way or another have access to information on tree planting. The table also showed that 28.4% of the respondents got the information from watching the television, this was closely followed by those respondents that got information from the mass media with 24.3% while a few 6.8% of the respondents got the information through chatting with friends. This might be due to the fact that television and mass media are the commonest means of getting information among majority of individuals.

However, the findings indicated that 64.9% of the respondents get the information occasionally. The percentage of respondents who had idea on importance of tree planting were about 87.8%. More so, 90.5% of the respondents affirmed that tree planting is necessary in the study area while 9.5% of the respondents responded in the negative. This is a clear indication that information on tree plantings are not always announced and broadcasted on regular basis as compared to other programmes. As a result, this had made people less concerned on daily basis when the issue of tree planting is mentioned.

With reference to the purpose of planting trees, 53.0% of the respondents stated that trees were planted for the purpose of wind break while a few respondents (3.0%) planted trees for recreational purposes (Figure 1). This implied that many respondents planted trees to protect their homes from the action of wind. This affirmed the

findings of Maller *et al.*, (2008) that many people planted trees because it serves as wind break.

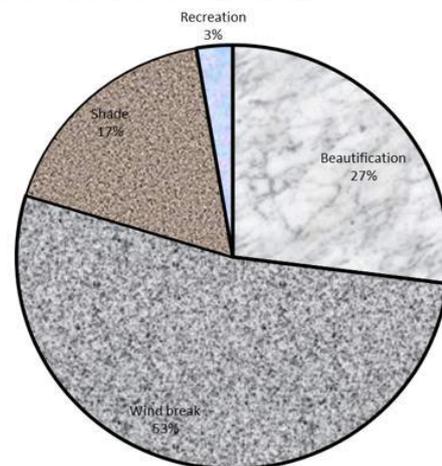


Fig.1: Response on purpose of planting trees in the study area

Moreover, the result also indicated that 79.7% of the respondents have interest in tree planting while 20.3% of the respondents do not have interest in tree planting in the study area (Table 2). Therefore, the reasons given for lack of interest in tree planting in the study area were lack of fund (35.7%), stress (21.4%), lack of space (21.4%), time consuming exercise (14.3%) and slow growth of trees (7.1%) (Figure 2). This corroborated the findings of Pickett *et al.*, (2008) who stated that due to some hazards involved with presence of trees in the urban area, residents may develop negative attitude towards the planting of trees in their environments.

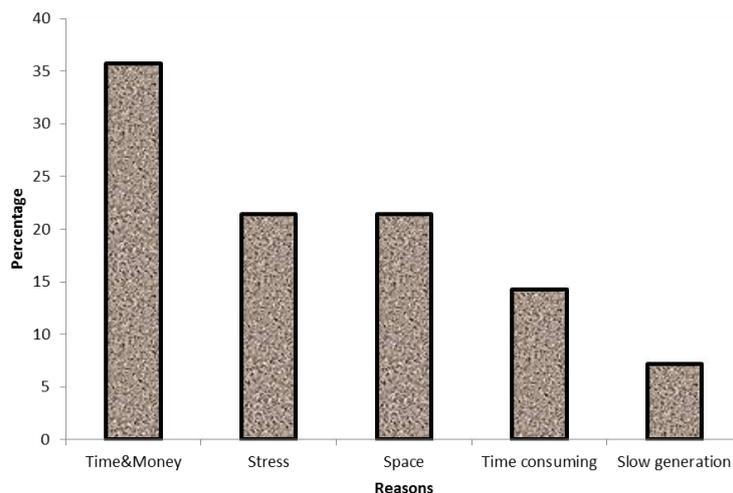


Fig.2: Response on reasons for lack of interest in planting of trees in the study area.

Participation of residents on urban tree planting in the study area

Table 3: Participation of residents in urban tree planting in the study area

Participation of residents	Frequency	Percentage
Is there tree(s) in your residence?		
Yes	62	83.8
No	12	16.2
Total	74	100
If yes, who planted them?		
Yourself	10	16.1
Parents	8	12.9
Naturally existing	44	71.0
Total	62	100
Have you planted tree before?		
Yes	42	56.8
No	32	43.2
Total	74	100
How did you get the species planted?		
Raised by you	5	11.9
Bought	7	16.7
Donated to you	12	28.6
Others(specify)	18	42.9
Total	42	100
Is planting tree difficult?		
Yes	14	18.9
No	60	81.9
Total	74	100
Is there space in your residence?		
Yes	55	74.3
No	19	25.7
Total	74	100
If yes, would you like to engage in tree planting?		
Yes	40	72.7
No	15	27.3
Total	55	100

Source: Field survey, 2019

Table 3 showed that 83.8% of the respondents have tree(s) in their residence while 16.2% of the respondents have no tree(s) in their residence. Furthermore, the table also revealed that 70.9% of the respondents have naturally existing trees in their compounds. This implies that respondents are not really committed in the planting of trees except for those trees that grew naturally and are allowed to remain due to the benefit the respondents derive from them (Pickett *et al.*, 2008). However, the result showed that 56.8% of the respondents have not

planted tree(s) before while 43.2% of the respondents have planted tree(s) before. This they (81.9%) acclaimed that the exercise was not difficult while a few (18.9%) of the respondents stated that tree planting was a difficult task. Though, 74.3% of the respondents stated that there was enough space for planting tree in their residence and would like to engage in tree planting while 27.3% of the respondents stated that they don't have space in their compounds and may not be able to engage in the exercise.

Common tree species planted in the study area

Table 4: Common tree species identified in the study area

S/N	Scientific names of species identified	Common names	Local name (Yoruba)	Number of occurrence	General uses
1	<i>Morinda lucida</i>	Morinda	Oruwo	8	Medicinal purposes
2	<i>Peltophorum pterocarpum</i>	Copper pond	Igi copper	1	Medicinal purposes, shade
3	<i>Mangifera indica</i>	Mango	Mangoro	19	Fruit, medicinal, shade, income
4	<i>Gliricidia sepium</i>	Gliricidia	Agunmaniye	15	Income, medicinal, fruit
5	<i>Tectona grandis</i>	Teak	Teak	9	Shade, pole, income
6	<i>Gmelina arborea</i>	Bench wood	Gmelina	9	Shade, windbreak
7	<i>Anogeissus leiocarpa</i>	Africa birch	Africa birch	6	Shade, wind break
8	<i>Anacardium occidentale</i>	Cashew	Cashew	13	Fruits, shade, medicinal purpose
9	<i>Shorea roxburghii</i>	Temak	Shorea	7	Fruit production, income, shade
10	<i>Eucalyptus torelliana</i>	Cadaga tree	Cadaga	3	Timber production, shade, income
11	<i>Casuarina equisetifolia</i>	Christmas tree	Ahoyaya /Igi irin	2	Ornamental plant, income
12	<i>Terminalia catappa</i>	Almond tree	Igi fruit	6	Relaxation, wind break
13	<i>Cedrella odorata</i>	Spanish cedar	Kado	3	Beautification
14	<i>Hildegardia barteri</i>	Mast	Okurugbedu	3	Erosion control
15	<i>Terminalia ivorensis</i>	Terminalia	Black afara	3	Shade, income
16	<i>Zanha golungensis</i>	Muchenya(shona)	Igi-idan	6	Recreation, windbreak
17	<i>Polyalthia longifolia</i>	Masquerade tree	Asoko	7	Beautification, income
18	<i>Theobroma cacao</i>	Cocoa	Koko	3	Medicinal use
19	<i>Cordia allitectora</i>	Salm wood	Ecuador laurel	2	Shade, relaxation
20	<i>Elaeis guineensis</i>	Palm tree	Igi ope	4	Beautification, income
21	<i>Khaya senegalensis</i>	Africa mahogany	Djalla	5	Income, shade
22	<i>Citrus paradise</i>	Grape	Grape	7	Fruit, medicinal
23	<i>Xylia xylocarpa</i>	Iron wood	Igi irin	4	Shade, timber production
24	<i>Triplochiton scleroxylon</i>	Obeche	Arere	8	Shade, income
25	<i>Cola nitida</i>	Kolanut	Obi	5	Income, medicinal value
26	<i>Delonix regia</i>	Flame of the forest	Panseke	4	Beautification, shade
27	<i>Moringa oleifera</i>	Drum stick	Moringa	3	Medicinal purposes

28	<i>Holarrhena floribunda</i>	False rubber tree	Igi rubber	2	Shade, medicinal
29	<i>Nauclea diderrichii</i>	Brimestone	Okuta dan	5	Shade, income
30	<i>Cassia fistula</i>	Golden rain	Amaltas	4	Shade, income, medicinal purposes

Source: Field Survey 2017

Table 4 showed the common trees species identified in the study area. *Mangifera indica* (mango) was the commonest tree species in the residence of most respondents. This may be due to the fact that mango is one of the commonest fruit trees known to many people and this is coupled with the fact that it provides fruits, shade, serve for medicinal purposes and generate income from their sales. This therefore, supported the findings of Vincent (2013) that tree planted within the environment can be a source of sustenance for the people who care for them. Other tree species identified in the area includes: *Gliricidia sepium*, *Anacardium occidentale*, *Morinda lucida*, *Tectona grandis*, *Gmelina arborea*, *Nauclea diderrichii*, *Delonix regia* etc. These trees served various purposes; such as for provision of shade, windbreaks, medicinal purposes, income generation, timber production, beautification etc. (McPherson *et al.*, 2002).

Benefits of urban tree planting to residence in Idi-shin Logistic regression analysis for the benefit of trees for urban tree planting to residents of Idi-shin area

The binary regression model obtained for the benefit of trees for urban tree planting to residents in Idi-shin area. $U.T.B = -0.98 + 0.04UTPE - 1.64UTBE - 1.69UTSI + 0.76UTSS - 1.75UTSPA + 0.23UTSMV$

+1.16TPPW.....
.....(3)

N =74, Final loss =15.30, Chi-square (df, 7) = 6.00, P = 0.5402

Odd ratio (unit change): Constant (0.37); UTPE (1.04); UTBE (0.19); UTSI (0.18); UTSS (2.13); UTSPA (0.17); UTSMV (1.26); TPPW (3.18).

Where:

BUTP= Benefit of urban tree planting, UTPE= Urban tree prevent erosion, UTBE= Urban tree beautify the environment, UTSI= Urban tree serves as income, UTSS= Urban tree serves as shade, UTSPA= Urban tree serves in purifying the air, TPPW= Tree planted prevent wind from destroying things.

The model presented above for the benefit of urban tree planting to residents in Idi-shin gave overall significant fit to the data judging from χ^2 value that was significant at $p < 0.05$. However, Tree planted prevent wind (TPPW) was the most significant benefit of urban tree planting in the study area with odds-ratio of 3.18. This was followed by Urban tree serves as shade (UTSS) with odd-ratio of 2.13 (Table 5). Implying that the factors with odds-ratio approximately 2 and above have the likelihood of constituting the benefit of urban tree planting in Idi-shin area (Deeks, 1996)

Table 5: Logistic binary nature for the benefit of trees for urban tree planting to residents of Idi-shin area

Dependent Variable: Benefit of Urban Tree Planting (BUTP)(Yes = 1, No = 0)		
Independent variable	Co-efficient	Odd ratio
U.T.P.E	0.04	1.04
U.T.B.E	-1.16	0.19
U.T.S.I	-1.69	0.18
U.T.S.S	0.76	2.13*
U.T.S.P.A	-1.75	0.17
U.T.S.M.V	0.23	1.26
T.P.P.W	1.16	3.18*
Model χ^2 (df, 7) = 6.00, P = 0.5402		

*= significant at $p < 0.05$

IV. CONCLUSION

Urban forest plays a vital role in making the environment conducive for better living as it provide numerous environmental, economic and social benefits. Therefore, efforts should be made to create more awareness on tree

planting in the urban areas. Activities such as World Environment Day and other Campaigns programmes on the awareness of tree planting should be given serious priority to enlighten the residents on the need to imbibe the habit of tree planting in the study area. Likewise,

Research Institute and other related field should make it a point of duty that residents around the environment are enlightened on tree species and their importance to ensure protection, conservation and sustainability of these species.

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